



414 Pontius Ave North  
 Seattle, WA 98109  
 Ph: 206-622-6960  
 Fx: 206-622-6870

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

**SOURCE: 1201030-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.54                        | 10.200             | 14.82                   | 91.0          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.61                    | 89.0           | 1.40  | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 1515.0             | 5067000                 | 1010          | 70 - 130        | FGS-054 | QM-02 |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1515.0             | 5034000                  | -1190          | 0.660 | 70 - 130        | 20        | FGS-054 | QM-02 |

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Liz Siska, Project Manager

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 10100000           | 15570000                | 104           | 70 - 130        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 10100000           | 15550000                 | 104            | 0.125 | 70 - 130        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Beryllium  | 2.0000             | 2.039                    | 102            | 75 - 135        | FGS-054 |       |
| Sodium     | 500.00             | 487                      | 97.4           | 80 - 120        | FGS-054 |       |
| Aluminum   | 150.00             | 152.4                    | 102            | 85 - 115        | FGS-054 |       |
| Calcium    | 1500.0             | 1550                     | 103            | 80 - 120        | FGS-054 |       |
| Chromium   | 7.0000             | 6.82                     | 97.4           | 85 - 115        | FGS-054 |       |
| Manganese  | 6.0000             | 6.03                     | 101            | 85 - 115        | FGS-054 |       |
| Iron       | 500.00             | 481.5                    | 96.3           | 80 - 120        | FGS-054 |       |
| Nickel     | 4.0000             | 4.06                     | 102            | 68 - 134        | FGS-054 |       |
| Copper     | 4.0000             | 4.15                     | 104            | 51 - 145        | FGS-054 |       |
| Zinc       | 10.000             | 10.16                    | 102            | 46 - 146        | FGS-054 |       |
| Arsenic    | 15.000             | 15.38                    | 103            | 85 - 115        | FGS-054 |       |
| Selenium   | 30.000             | 31.50                    | 105            | 59 - 149        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.97                     | 98.3           | 85 - 115        | FGS-054 |       |
| Silver     | 1.5000             | 1.569                    | 105            | 74 - 119        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.850                    | 106            | 84 - 113        | FGS-054 |       |
| Antimony   | 0.80000            | 0.866                    | 108            | 79 - 122        | FGS-054 |       |
| Barium     | 10.000             | 10.41                    | 104            | 85 - 115        | FGS-054 |       |
| Thallium   | 0.40000            | 0.433                    | 108            | 64 - 134        | FGS-054 |       |
| Lead       | 1.5000             | 1.611                    | 107            | 72 - 143        | FGS-054 |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Beryllium | 2.0000             | 2.078                     | 104             | 1.91  | 75 - 135        | 20        | FGS-054 |       |
| Sodium    | 500.00             | 496                       | 99.2            | 1.88  | 80 - 120        | 20        | FGS-054 |       |
| Aluminum  | 150.00             | 154.4                     | 103             | 1.28  | 85 - 115        | 20        | FGS-054 |       |
| Calcium   | 1500.0             | 1583                      | 106             | 2.10  | 80 - 120        | 20        | FGS-054 |       |
| Chromium  | 7.0000             | 6.95                      | 99.3            | 1.90  | 85 - 115        | 20        | FGS-054 |       |
| Manganese | 6.0000             | 6.15                      | 103             | 1.97  | 85 - 115        | 20        | FGS-054 |       |
| Iron      | 500.00             | 494.6                     | 98.9            | 2.69  | 80 - 120        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS Recovery % | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Nickel     | 4.0000             | 4.15                     | 104            | 2.20  | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0000             | 4.28                     | 107            | 3.01  | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.000             | 10.52                    | 105            | 3.48  | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.000             | 15.69                    | 105            | 2.00  | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.000             | 32.57                    | 109            | 3.35  | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.93                     | 96.6           | 1.72  | 85 - 115        | 20        | FGS-054 |       |
| Silver     | 1.5000             | 1.557                    | 104            | 0.768 | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.868                    | 108            | 2.04  | 84 - 113        | 20        | FGS-054 |       |
| Antimony   | 0.80000            | 0.872                    | 109            | 0.661 | 79 - 122        | 20        | FGS-054 |       |
| Barium     | 10.000             | 10.54                    | 105            | 1.25  | 85 - 115        | 20        | FGS-054 |       |
| Thallium   | 0.40000            | 0.443                    | 111            | 2.27  | 64 - 134        | 20        | FGS-054 |       |
| Lead       | 1.5000             | 1.641                    | 109            | 1.85  | 72 - 143        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.50                    | 98.8           | 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             | 15.95                     | 102             | 2.89  | 80 - 120        | 24        | EPA 1631E |       |

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

**RECOVERY AND RPD**

**Batch:** F201077

**Sequence:** 2A10015

**Preparation:** Closed Vessel Nitric Oven Digestion

**Lab Number:** F201077-BS/BSD1

**LCS Source:** Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Calcium | 1500.0             | 1517                     | 101            | 80 - 120        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1500.0             | 1571                      | 105             | 3.47  | 80 - 120        | 20        | FGS-054 |       |

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## PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2A09010

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found  | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|--------|------|-------|---------|-----------|----------|
| F201063-BLK1  | Mercury | -0.009 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK2  | Mercury | -0.006 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK3  | Mercury | -0.02  | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK4  | Mercury | 0.03   | 0.50 | ng/L  | F201063 | EPA 1631E | U, QB-04 |
| F201063-BLK5  | Mercury | 0.11   | 0.52 | ng/L  | F201063 | EPA 1631E | U, QB-06 |

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## PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found    | MRL   | Units | Batch   | Method  | Notes |
|---------------|------------|----------|-------|-------|---------|---------|-------|
| F201062-BLK1  | Beryllium  | 0.0002   | 0.060 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Sodium     | 0.09     | 20    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Aluminum   | 0.09     | 4.0   | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Calcium    | 0.5      | 40    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Chromium   | 0.03     | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Manganese  | -0.002   | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Iron       | -0.06    | 10.0  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Nickel     | 0.004    | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Copper     | -0.0003  | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Zinc       | 0.04     | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Arsenic    | -0.07    | 0.15  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Selenium   | 0.003    | 0.60  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Molybdenum | 0.005    | 0.06  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Silver     | 0.0002   | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Cadmium    | -0.00002 | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Antimony   | -0.0003  | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Barium     | -0.04    | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Thallium   | 0.007    | 0.005 | µg/L  | F201062 | FGS-054 | QB-10 |
| F201062-BLK1  | Lead       | 0.003    | 0.040 | µg/L  | F201062 | FGS-054 | U     |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found | MRL | Units | Batch   | Method  | Notes |
|---------------|---------|-------|-----|-------|---------|---------|-------|
| F201077-BLK1  | Calcium | 0.2   | 40  | µg/L  | F201077 | FGS-054 | U     |

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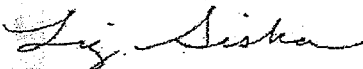
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## Notes and Definitions

- 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-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-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-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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.**

| SAMPLE I.D.              | SAMPLING DATE/TIME<br>*IF COMPOSITE, INDICATE BOTH START & FINISH DATE/TIME | MATRIX (SEE BELOW) | GRAB/*COMPOSITE | VOC                 |   |                  |                       |                              | SVOC          |                       |   |                               | TCDF METALS | INORGANICS | MICRO | OTHER | NOTES |                                       |                               |                           |                             |                              |  |                       |  |                        |                              |                                |                                |                                  |                                  |         |  |                               |                 |
|--------------------------|---|--------------------|-----------------|---------------------|---|------------------|-----------------------|------------------------------|---------------|-----------------------|---|-------------------------------|-------------|------------|-------|-------|-------|---------------------------------------|-------------------------------|---------------------------|-----------------------------|------------------------------|--|-----------------------|--|------------------------|------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|---------|--|-------------------------------|-----------------|
|                          |   |                    |                 | 824.2<br>824.2 BTEX | 524.2 MTBE ONLY<br>8260B VTICS<br>1, 4 DIOXANE EDB DBCP | 8021B BTEX HALOS | 8015B GRO MEGRO MAVPH | 8270D SVTICS<br>ABN A BN PAH | TPH8100 LI L2 | 8015B DRO MEDRO MAEPH | PEST 608 PCB 608<br>PEST 8081A PCB 8082 | OIL & GREASE 1661<br>TPH 1664 |             |            |       |       |       | TCLP 1311 ABN METALS<br>VOC PEST HERB | DISSOLVED METALS (LIST BELOW) | TOTAL METALS (LIST BELOW) | TS<br>Br<br>NO <sub>2</sub> | TSS<br>Cl<br>NO <sub>3</sub> | TDS<br>F<br>SO <sub>4</sub><br>NO <sub>2</sub> | SPEC. CON.<br>T. ALK. | TKN<br>NH <sub>3</sub><br>T. PHOS.<br>O. PHOS. | pH<br>T. RES. CHLORINE | COD<br>PHENOLS<br>TOC<br>DOC | TOTAL CYANIDE<br>TOTAL SULFIDE | REACTIVE CYANIDE<br>FLASHPOINT | REACTIVE SULFIDE<br>IGNITABILITY | TOTAL COLIFORM<br>FECAL COLIFORM | E. COLI | ENTEROCOCCI<br>HETEROTROPHIC PLATE COUNT | TRC, Sulfite<br>Total Phenols | # OF CONTAINERS |
| Treat Tank Eff Composite | 1/11/12, 10:00 TO<br>1/11/12, 10:00 TO                                      | MW C               | C               |                     |   |                  |                       |                              |               |                       |   |                               |             | X          |       |       | X     |                                       |                               |                           |                             |                              |  |                       |  |                        |                              |                                |                                |                                  | 4                                | (4)     |  |                               |                 |
| Treat Tank Eff Grab      | 1/11/12 08:00   | MW G               | G               |                     |   |                  | X                     |                              |               |                       |   |                               |             |            |       |       |       |                                       |                               |                           |                             |                              |  |                       |  |                        |                              |                                |                                |                                  |                                  |         | 16                                       |                               |                 |
| Treat Tank Eff Grab      | 1/11/12 08:00   | MW G               | G               |                     |   |                  |                       |                              |               |                       |   |                               |             |            |       |       |       |                                       |                               |                           |                             |                              |  |                       |  |                        |                              |                                |                                |                                  |                                  |         |  | 3                             | (3)             |

MATRIX: A-AIR; S-SOIL; GW-GROUND WATER; SW-SURFACE WATER; DW-DRINKING WATER; WW-WASTE WATER  
PRESERVATIVE: H-HCl; N-HNO<sub>3</sub>; S-H<sub>2</sub>SO<sub>4</sub>; Na-NaOH; M-MEON

PROJECT MANAGER: Arthur Acalain  
 COMPANY: Northwest Utilities  
 Address: 97 Rivas Rd STATE: NH ZIP: 03304  
 CITY: Boz  
 PHONE: 224-4051 EXT:  
 FAX:   
 E-MAIL: allacalain@nuc.com  
 SITE NAME: Merrimack Station  
 PROJECT #: 3944  
 STATE: NH MA ME VT OTHER:  
 REGULATORY PROGRAM: NPDES: RGP POTW STORMWATER OR  
GMP, OIL FUND, BROWNFIELD OR OTHER:  
 QUOTE #:  PO #: 02259252

DATE NEEDED: 1/12/12

QA/QC REPORTING LEVEL: A OR B OR C

PRESUMPTIVE CERTAINTY

REPORTING OPTIONS: PRELIMS: YES OR NO IF YES: FAX OR PDF ELECTRONIC OPTIONS: No FAX E-MAIL PDF EQUUS

TEMP: 4.7 °C  
ICE?  YES  NO


SAMPLER(S): MS TB  
 RELINQUISHED BY: [Signature] DATE: 1/11/12 TIME: 1330  
 RECEIVED BY: [Signature] DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

METALS: 8 RCRA 13 PP FE, MN, Pb, Cu

OTHER METALS: \_\_\_\_\_

DISSOLVED METALS FIELD FILTERED? YES NO

NOTES: (IE: SPECIAL DETECTION LIMITS, BILLING INFO, IF DIFFERENT)  
 ① Metals include As, Sb, Ba, Br, Cl, Cr, Cu, Fe, Pb, Mn, Mo, Ni, Ag, Nn, Tl, Zn  
 ② Sample collected using "clean techniques"  
 ③ As, Se, Hg  
 ④ All metals to FG's using collision cell.  
 SITE HISTORY: Send copy of assu LHS to G&T  
 SUSPECTED CONTAMINATION: \_\_\_\_\_  
 FIELD READINGS: \_\_\_\_\_

 eastern analytical, inc. 25 CHERELL DRIVE | CONCORD, NH 03301 | TEL: 603.228.0525 | 1.800.287.0525 | FAX: 603.228.4591 | E-MAIL: CUSTOMER\_SERVICE@EAILABS.COM | WWW.EAILABS.COM

*Professional Laboratory Services*

(WHITE: ORIGINAL GREEN: PROJECT MANAGER)





# DRAFT

TABLE 1 WASTEWATER CHARACTERISTICS

Concord - Hall Street POTW

| METALS         | WASTE STREAM CONCENTRATION AT 100,000 GPD (mg/L) | LOWEST CONCENTRATED FLOW WHILE MEETING UCL (gpd) | CONCENTRATION AT 42,000 GPD (mg/L) | UNIFORM CONCENTRATION LIMIT (mg/L) | EXCEEDS UCL? | MASS LOADING AT MAXIMUM FLOW OF 42,000 GPD (lb/day) | CURRENT HEADWORKS CONCENTRATION (TOTAL) (mg/L) | CURRENT HEADWORKS LOADING (lb/d) | MAXIMUM ALLOWABLE HEADWORKS LOADING (MAHL) (lb/d) | EXCEEDS MAHL at 42,000 gpd? | PERCENTAGE OF MAHL AVAILABLE PRIOR TO ADDITIONAL DISCHARGE | MASS LOADING AVAILABLE PRIOR TO ADDITIONAL DISCHARGE (lb/d) | MAX ALLOWABLE DISCHARGE AT GIVEN CONCENTRATION WHILE NOT EXCEEDING MAHL (gpd) |
|----------------|--|--|------------------------------------|------------------------------------|--------------|---|--|----------------------------------|---|-----------------------------|--|---|---|
| Aluminum       | 1  | NO LIMIT   | 2.38                               | N/A                                | N/A          | 0.83  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Antimony (III) | 0.48   | NO LIMIT   | 1.14                               | N/A                                | N/A          | 0.40  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Arsenic        | 0.02   | NO LIMIT   | 0.05                               | N/A                                | N/A          | 0.02  | 0.003  | 0.13                             | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Barium         | 4.8  | NO LIMIT   | 11.43                              | N/A                                | N/A          | 4.01  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Beryllium      | 0.1  | NO LIMIT   | 0.24                               | N/A                                | N/A          | 0.08  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Cadmium        | 0.05   | 42000  | 0.12                               | 0.12                               | NO           | 0.04  | 0.001  | 0.04                             | 0.225   | NO                          | 81%  | 0.183   | 200,000   |
| Chromium       | 0.15   | NO LIMIT   | 0.36                               | N/A                                | N/A          | 0.13  | 0.005  | 0.21                             | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Copper         | 0.05   | 420  | 0.12                               | 12.00                              | NO           | 0.04  | 0.100  | 4.17                             | 18.33   | NO                          | 77%  | 14.2  | 15,480,000  |
| Iron           | 0.2  | NO LIMIT   | 0.48                               | N/A                                | N/A          | 0.17  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Lead           | 0.1  | 4000   | 0.24                               | 2.71                               | NO           | 0.08  | 0.009  | 0.38                             | 4.06  | NO                          | 91%  | 3.68  | 2,010,000   |
| Manganese (IV) | 1  | NO LIMIT   | 2.38                               | N/A                                | N/A          | 0.83  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Mercury        | 0.000014   | NO LIMIT   | 0.00                               | N/A                                | N/A          | 0.000012  | 0.0001   | 0.00                             | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Nickel         | 1  | 19000  | 2.38                               | 5.37                               | NO           | 0.83  | 0.008  | 0.33                             | 7.87  | NO                          | 96%  | 7.54  | 410,000   |
| Silver         | 0.05   | 1000   | 0.12                               | 7.90                               | NO           | 0.04  | 0.003  | 0.13                             | 10.69   | NO                          | 99%  | 10.6  | 11,550,000  |
| Zinc           | 0.05   | 1000   | 0.12                               | 6.07                               | NO           | 0.04  | 0.220  | 9.18                             | 14.05   | NO                          | 35%  | 4.87  | 5,330,000   |
| Selenium       | 3  | NO LIMIT   | 7.14                               | N/A                                | N/A          | 2.50  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |
| Thallium       | 0.57   | NO LIMIT   | 1.36                               | N/A                                | N/A          | 0.48  | -  | -                                | N/A   | N/A                         | N/A  | N/A   | NO LIMIT  |

- NOTES:
1. mg/L means milligram per liter, lb/day means pounds per day, gpd means gallons per day.
  2. The greatest concentrations measured at the Hall Street POTW influent between 2006 and 2010 and a flow of 5 million gallons per day were used to calculate current headworks loading.
  3. Waste stream concentration at 100,000 gpd represents concentrations prior to any volume reduction. The concentration at 42,000 gpd represents concentration after volume reduction (e.g. evaporation). This flow represents the greatest reduction in volume while not exceeding the UCL.
  4. Please note, several steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
  5. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTs effluent is expected to be considerably below the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.

CONFIDENTIAL

*Projected data  
 provided to the  
 City of Concord  
 4/6/11*









January 16, 2012  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Franklin Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Industrial Wastewater Discharge Monitoring  
Public Service of New Hampshire (PSNH)  
Merrimack Station  
Bow, New Hampshire

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

Dear Ms. Lesieur:

On behalf of PSNH, GZA GeoEnvironmental, Inc. is pleased to submit the attached Analytical Report from PSNH's technologically advanced wastewater treatment system (WWTS). The WWTS has now been operating in accordance with the design criteria for several weeks. The attached analytical results obtained from sampling on January 5, 2012 are representative of the Flue Gas Desulfurization (FGD) treated wastewater generated. The characteristics of the treated wastewater are expected to be consistent going forward.

In consideration of available representative analytical data, we respectfully request that the State accept the attached analytical report to satisfy the first month sampling requirements as established in PSNH's Special Agreement.

#### **ANALYTICAL NOTATION**

FGD wastewater requires specialized analytical techniques to overcome matrix interference on some trace metals analysis. Many analytical laboratories may be unaware of this. We offer an excerpt below from the Environmental Protection Agency's (EPA's) web site and a link to their draft procedure 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 standard operating procedure (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. Standard Operating Procedure: Inductively Coupled Plasma/Mass Spectrometry for Trace Element Analysis in Flue Gas Desulfurization Wastewaters (30 pp, 174K)

We trust that this submittal adequately address your informational needs. Should you have any questions, please contact me at 232-8744.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

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

RAB/tmd

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Attachment(s)

**SUMMARY ANALYTICAL DATA**  
 Public Service Company of New Hampshire  
 Merrimack Station  
 Bow, New Hampshire

| PARAMETER                 | RESULTS (mg/L) 1/05/2012 |
|---------------------------|--------------------------|
| Alkalinity                | 180                      |
| Aluminum                  | 0.0411                   |
| Ammonia                   | 0.92                     |
| Antimony                  | 0.000520                 |
| Arsenic                   | 0.00498                  |
| Barium                    | 0.300                    |
| Beryllium                 | 0.000522                 |
| BOD                       | < 6                      |
| Cadmium                   | 0.000207                 |
| Calcium                   | 5,050                    |
| Chloride                  | 11,000                   |
| Chlorine (Total Residual) | < 0.05                   |
| Chromium (T)              | < 0.00050                |
| COD                       | 130                      |
| Copper                    | < 0.00050                |
| Cyanide (T)               | 0.02                     |
| Fluoride                  | 10                       |
| Iron                      | < 0.050                  |
| Lead                      | < 0.000200               |
| Manganese                 | 0.293                    |
| Mercury                   | 0.0000105                |
| Molybdenum                | 0.140                    |
| Nitrate                   | 100                      |
| Nickel                    | 0.00803                  |
| O&G                       | < 5                      |
| pH                        | 7.3                      |
| Selenium                  | 0.074                    |
| Silver                    | < 0.000100               |
| Sodium                    | 277.4                    |
| Sulfate                   | 1,200                    |
| Sulfide                   | < 0.1                    |
| Sulfite                   | < 2                      |
| TDS                       | 21,000                   |
| Thallium                  | 0.00664                  |
| TSS                       | 14                       |
| TTO                       | ND (1)                   |
| Zinc                      | < 0.001                  |
| VOC EPA 624               | (2)                      |
| Semi VOCs 625             | ND (3)                   |
| Phenolic Compounds        | < 0.3                    |
| PCBs                      | ND (4)                   |

NOTES:

1. No TTO compounds were detected above 0.01 mg/L.
2. One compound was detected by Method 624: Toluene at 2 µg/L.
3. Semi VOCs were not detected by Method 625 above detection limits (1 µg/L and 5 µg/L depending on parameter and 50 µg/L for benzoic acid).
4. PCB compounds analyzed by method 608 were not detected at concentrations greater than 0.3 µg/L.

Arthur Auclair  
Northeast Utilities  
97 River Road  
Bow, NH 03304



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 106677  
Client Identification: Merrimack Station  
Date Received: 1/5/2012

Dear Mr. Auclair:

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 Olshaw, Lab Director

1.13.12  
Date

44  
# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Temperature upon receipt (°C): **4.7**

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) |
|-----------|--------------------------|---------------|--------------|---------------|--------------|---|
| 106677.01 | Treat Tank Eff Composite | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 106677.02 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 106677.03 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | 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#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Analysis: 1/6/12  
Analyst: KJP  
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                       | 2      |
| 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)   | 98 %R  |
| 1,2-Dichlorobenzene-d4 (surr) | 90 %R  |
| Toluene-d8 (surr)             | 100 %R |





# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name              | Blank  | LCS           | LCSD                  | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|--------|---------------|-----------------------|---------------|-------|----------|-----|--------|
| Chloromethane               | < 5    | 19 (97 %R)    | 21 (105 %R) (8 RPD)   | 1/6/2012      | ug/l  | 0 - 273  | 20  | 624    |
| Vinyl chloride              | < 2    | 18 (91 %R)    | 20 (101 %R) (10 RPD)  | 1/6/2012      | ug/l  | 0 - 251  | 20  | 624    |
| Bromomethane                | < 2    | 21 (105 %R)   | 23 (113 %R) (7 RPD)   | 1/6/2012      | ug/l  | 0 - 242  | 20  | 624    |
| Chloroethane                | < 5    | 19 (95 %R)    | 20 (101 %R) (6 RPD)   | 1/6/2012      | ug/l  | 14 - 230 | 20  | 624    |
| Trichlorofluoromethane      | < 5    | 17 (84 %R)    | 18 (88 %R) (5 RPD)    | 1/6/2012      | ug/l  | 17 - 181 | 20  | 624    |
| Acrolein                    | < 50   | < 50 (%R N/A) | < 50 (%R) ( RPD)      | 1/6/2012      | ug/l  |          |     | 624    |
| Acetone                     | < 50   | < 50 (78 %R)  | < 50 (90 %R) (14 RPD) | 1/6/2012      | ug/l  |          |     | 624    |
| 1,1-Dichloroethene          | < 1    | 17 (83 %R)    | 18 (89 %R) (7 RPD)    | 1/6/2012      | ug/l  | 0 - 234  | 20  | 624    |
| Methylene chloride          | < 5    | 18 (88 %R)    | 19 (93 %R) (6 RPD)    | 1/6/2012      | ug/l  | 0 - 221  | 20  | 624    |
| Carbon disulfide            | < 5    | 17 (%R)       | 19 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Acrylonitrile               | < 50   | < 50 (%R)     | < 50 (%R) ( RPD)      | 1/6/2012      | ug/l  |          |     | 624    |
| Methyl-t-butyl ether(MTBE)  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| trans-1,2-Dichloroethene    | < 2    | 18 (89 %R)    | 18 (92 %R) (3 RPD)    | 1/6/2012      | ug/l  | 54 - 156 | 20  | 624    |
| Vinyl acetate               | < 10   | 30 (%R)       | 30 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| 1,1-Dichloroethane          | < 2    | 19 (93 %R)    | 20 (98 %R) (5 RPD)    | 1/6/2012      | ug/l  | 59 - 155 | 20  | 624    |
| cis-1,2-Dichloroethene      | < 2    | 19 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| 2-Butanone(MEK)             | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Chloroform                  | < 2    | 19 (94 %R)    | 20 (99 %R) (5 RPD)    | 1/6/2012      | ug/l  | 51 - 138 | 20  | 624    |
| 1,1,1-Trichloroethane       | < 2    | 18 (91 %R)    | 19 (97 %R) (6 RPD)    | 1/6/2012      | ug/l  | 52 - 162 | 20  | 624    |
| Carbon tetrachloride        | < 2    | 18 (91 %R)    | 19 (95 %R) (4 RPD)    | 1/6/2012      | ug/l  | 70 - 140 | 20  | 624    |
| Benzene                     | < 1    | 19 (97 %R)    | 20 (102 %R) (5 RPD)   | 1/6/2012      | ug/l  | 37 - 151 | 20  | 624    |
| 1,2-Dichloroethane          | < 2    | 18 (91 %R)    | 19 (94 %R) (3 RPD)    | 1/6/2012      | ug/l  | 49 - 155 | 20  | 624    |
| Trichloroethene             | < 2    | 19 (93 %R)    | 20 (98 %R) (5 RPD)    | 1/6/2012      | ug/l  | 71 - 157 | 20  | 624    |
| 1,2-Dichloropropane         | < 2    | 19 (95 %R)    | 20 (98 %R) (3 RPD)    | 1/6/2012      | ug/l  | 0 - 210  | 20  | 624    |
| Bromodichloromethane        | < 2    | 19 (96 %R)    | 20 (100 %R) (4 RPD)   | 1/6/2012      | ug/l  | 35 - 155 | 20  | 624    |
| 2-Chloroethylvinylether     | < 2    | 23 (115 %R)   | 24 (121 %R) (5 RPD)   | 1/6/2012      | ug/l  | 0 - 305  | 20  | 624    |
| 4-Methyl-2-pentanone(MIBK)  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| cis-1,3-Dichloropropene     | < 2    | 22 (109 %R)   | 23 (113 %R) (4 RPD)   | 1/6/2012      | ug/l  | 0 - 227  | 20  | 624    |
| Toluene                     | < 1    | 20 (101 %R)   | 21 (103 %R) (2 RPD)   | 1/6/2012      | ug/l  | 47 - 150 | 20  | 624    |
| trans-1,3-Dichloropropene   | < 2    | 18 (90 %R)    | 19 (93 %R) (3 RPD)    | 1/6/2012      | ug/l  | 17 - 183 | 20  | 624    |
| 1,1,2-Trichloroethane       | < 2    | 20 (100 %R)   | 21 (104 %R) (4 RPD)   | 1/6/2012      | ug/l  | 52 - 150 | 20  | 624    |
| 2-Hexanone                  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Tetrachloroethene           | < 2    | 20 (100 %R)   | 21 (106 %R) (6 RPD)   | 1/6/2012      | ug/l  | 64 - 148 | 20  | 624    |
| Dibromochloromethane        | < 2    | 20 (102 %R)   | 21 (104 %R) (2 RPD)   | 1/6/2012      | ug/l  | 53 - 149 | 20  | 624    |
| Chlorobenzene               | < 2    | 20 (98 %R)    | 20 (100 %R) (2 RPD)   | 1/6/2012      | ug/l  | 37 - 160 | 20  | 624    |
| Ethylbenzene                | < 1    | 20 (101 %R)   | 21 (105 %R) (4 RPD)   | 1/6/2012      | ug/l  | 37 - 162 | 20  | 624    |
| mp-Xylene                   | < 1    | 40 (101 %R)   | 43 (106 %R) (5 RPD)   | 1/6/2012      | ug/l  | 70 - 130 | 20  | 624    |
| o-Xylene                    | < 1    | 21 (104 %R)   | 22 (109 %R) (5 RPD)   | 1/6/2012      | ug/l  | 70 - 130 | 20  | 624    |
| Styrene                     | < 1    | 21 (%R)       | 22 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Bromoform                   | < 2    | 18 (88 %R)    | 18 (90 %R) (2 RPD)    | 1/6/2012      | ug/l  | 45 - 169 | 20  | 624    |
| 1,1,2,2-Tetrachloroethane   | < 2    | 20 (99 %R)    | 20 (100 %R) (1 RPD)   | 1/6/2012      | ug/l  | 46 - 157 | 20  | 624    |
| 1,3-Dichlorobenzene         | < 1    | 20 (100 %R)   | 21 (104 %R) (4 RPD)   | 1/6/2012      | ug/l  | 59 - 156 | 20  | 624    |
| 1,4-Dichlorobenzene         | < 1    | 20 (98 %R)    | 20 (102 %R) (4 RPD)   | 1/6/2012      | ug/l  | 18 - 190 | 20  | 624    |
| 1,2-Dichlorobenzene         | < 1    | 20 (98 %R)    | 20 (102 %R) (4 RPD)   | 1/6/2012      | ug/l  | 18 - 190 | 20  | 624    |
| 4-Bromofluorobenzene (surr) | 100 %R | 101 %R        | 102 %R                | 1/6/2012      | % Rec | 70 - 130 |     | 624    |



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name                | Blank  | LCS    | LCSD   | Analysis Date | Units | Limits   | RPD | Method |
|-------------------------------|--------|--------|--------|---------------|-------|----------|-----|--------|
| 1,2-Dichlorobenzene-d4 (surr) | 93 %R  | 90 %R  | 89 %R  | 1/6/2012      | % Rec | 70 - 130 |     | 624    |
| Toluene-d8 (surr)             | 100 %R | 102 %R | 102 %R | 1/6/2012      | % 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#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Preparation: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1

|                             |      |
|-----------------------------|------|
| Phenol                      | < 1  |
| 2-Chlorophenol              | < 1  |
| 2,4-Dichlorophenol          | < 1  |
| 2,4,5-Trichlorophenol       | < 1  |
| 2,4,6-Trichlorophenol       | < 1  |
| Pentachlorophenol           | < 5  |
| 2-Nitrophenol               | < 1  |
| 4-Nitrophenol               | < 5  |
| 2,4-Dinitrophenol           | < 5  |
| 2-Methylphenol              | < 1  |
| 3/4-Methylphenol            | < 1  |
| 2,4-Dimethylphenol          | < 1  |
| 4-Chloro-3-methylphenol     | < 1  |
| 4,6-Dinitro-2-methylphenol  | < 5  |
| Benzoic Acid                | < 50 |
| N-Nitrosodimethylamine      | < 1  |
| n-Nitroso-di-n-propylamine  | < 1  |
| n-Nitrosodiphenylamine      | < 1  |
| bis(2-Chloroethyl)ether     | < 1  |
| bis(2-chloroisopropyl)ether | < 1  |
| bis(2-Chloroethoxy)methane  | < 1  |
| 1,3-Dichlorobenzene         | < 1  |
| 1,4-Dichlorobenzene         | < 1  |
| 1,2-Dichlorobenzene         | < 1  |
| 1,2,4-Trichlorobenzene      | < 1  |
| 2-Chloronaphthalene         | < 1  |
| 4-Chlorophenyl-phenylether  | < 1  |
| 4-Bromophenyl-phenylether   | < 1  |
| Hexachloroethane            | < 1  |
| Hexachlorobutadiene         | < 1  |
| Hexachlorocyclopentadiene   | < 5  |
| Hexachlorobenzene           | < 1  |
| 4-Chloroaniline             | < 1  |
| 2-Nitroaniline              | < 5  |
| 3-Nitroaniline              | < 1  |
| 4-Nitroaniline              | < 1  |
| Benzyl alcohol              | < 5  |
| Nitrobenzene                | < 1  |
| Isophorone                  | < 1  |
| 2,4-Dinitrotoluene          | < 1  |
| 2,6-Dinitrotoluene          | < 1  |
| Benzidine (estimated)       | < 5  |
| 3,3'-Dichlorobenzidine      | < 1  |
| Pyridine                    | < 5  |
| Azobenzene                  | < 1  |



# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Preparation: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1  
Carbazole < 1  
Dimethylphthalate < 1  
Diethylphthalate < 1  
Di-n-butylphthalate < 5  
Butylbenzylphthalate < 1  
bis(2-Ethylhexyl)phthalate < 5  
Di-n-octylphthalate < 1  
Dibenzofuran < 1  
Naphthalene < 1  
2-Methylnaphthalene < 1  
Acenaphthylene < 1  
Acenaphthene < 1  
Fluorene < 1  
Phenanthrene < 1  
Anthracene < 1  
Fluoranthene < 1  
Pyrene < 1  
Benzo[a]anthracene < 1  
Chrysene < 1  
Benzo[b]fluoranthene < 1  
Benzo[k]fluoranthene < 1  
Benzo[a]pyrene < 1  
Indeno[1,2,3-cd]pyrene < 1  
Dibenz[a,h]anthracene < 1  
Benzo[g,h,i]perylene < 1  
2-Fluorophenol (surr) 33 %R  
Phenol-d6 (surr) 24 %R  
2,4,6-Tribromophenol (surr) 90 %R  
Nitrobenzene-D5 (surr) 71 %R  
2-Fluorobiphenyl (surr) 72 %R  
p-Terphenyl-D14 (surr) 84 %R



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Batch ID: 734507-32510/A010512E6251

Client Designation: **Merrimack Station**

| Parameter Name              | Blank | LCS          | LCSD                 | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|--------------|----------------------|---------------|-------|----------|-----|--------|
| Phenol                      | < 1   | 14 (27 %R)   | 14 (29 %R) (7 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Chlorophenol              | < 1   | 29 (59 %R)   | 30 (60 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dichlorophenol          | < 1   | 35 (70 %R)   | 36 (72 %R) (3 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,5-Trichlorophenol       | < 1   | 18 (72 %R)   | 19 (75 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,6-Trichlorophenol       | < 1   | 34 (68 %R)   | 36 (71 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| Pentachlorophenol           | < 5   | 34 (68 %R)   | 39 (78 %R) (14 RPD)  | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2-Nitrophenol               | < 1   | 35 (70 %R)   | 37 (73 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Nitrophenol               | < 5   | 16 (32 %R)   | 17 (35 %R) (9 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2,4-Dinitrophenol           | < 5   | 38 (75 %R)   | 40 (81 %R) (8 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Methylphenol              | < 1   | 15 (61 %R)   | 16 (64 %R) (5 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 3/4-Methylphenol            | < 1   | 13 (53 %R)   | 14 (54 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dimethylphenol          | < 1   | 33 (66 %R)   | 34 (67 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Chloro-3-methylphenol     | < 1   | 36 (73 %R)   | 36 (73 %R) (0 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4,6-Dinitro-2-methylphenol  | < 5   | 39 (77 %R)   | 41 (81 %R) (5 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| Benzoic Acid                | < 50  | < 50 (31 %R) | < 50 (34 %R) (9 RPD) | 1/5/2012      | ug/l  | 15 - 140 | 20  | 625mod |
| N-Nitrosodimethylamine      | < 1   | 12 (46 %R)   | 12 (47 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitroso-di-n-propylamine  | < 1   | 17 (67 %R)   | 17 (69 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitrosodiphenylamine      | < 1   | 22 (90 %R)   | 23 (90 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethyl)ether     | < 1   | 16 (63 %R)   | 16 (64 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-chloroisopropyl)ether | < 1   | 15 (61 %R)   | 15 (62 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethoxy)methane  | < 1   | 17 (69 %R)   | 18 (70 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,3-Dichlorobenzene         | < 1   | 13 (52 %R)   | 13 (52 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,4-Dichlorobenzene         | < 1   | 13 (52 %R)   | 13 (52 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2-Dichlorobenzene         | < 1   | 14 (54 %R)   | 14 (55 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2,4-Trichlorobenzene      | < 1   | 14 (57 %R)   | 14 (58 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Chloronaphthalene         | < 1   | 16 (63 %R)   | 16 (65 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chlorophenyl-phenylether  | < 1   | 18 (71 %R)   | 18 (72 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Bromophenyl-phenylether   | < 1   | 19 (75 %R)   | 19 (75 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachloroethane            | < 1   | 11 (43 %R)   | 11 (43 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobutadiene         | < 1   | 10 (40 %R)   | 10 (42 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorocyclopentadiene   | < 5   | * 9 (37 %R)  | 10 (41 %R) (10 RPD)  | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobenzene           | < 1   | 18 (73 %R)   | 19 (78 %R) (7 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chloroaniline             | < 1   | 20 (80 %R)   | 20 (80 %R) (0 RPD)   | 1/5/2012      | ug/l  | 15 - 140 | 20  | 625mod |
| 2-Nitroaniline              | < 5   | 17 (67 %R)   | 18 (71 %R) (6 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 3-Nitroaniline              | < 1   | 18 (73 %R)   | 19 (76 %R) (4 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Nitroaniline              | < 1   | 18 (73 %R)   | 19 (77 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzyl alcohol              | < 5   | 16 (65 %R)   | 17 (67 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Nitrobenzene                | < 1   | 16 (65 %R)   | 17 (68 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Isophorone                  | < 1   | 20 (79 %R)   | 20 (81 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2,4-Dinitrotoluene          | < 1   | 20 (81 %R)   | 21 (85 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2,6-Dinitrotoluene          | < 1   | 19 (75 %R)   | 20 (79 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzidine (estimated)       | < 5   | 23 (92 %R)   | 20 (81 %R) (13 RPD)  | 1/5/2012      | ug/l  | 15 - 168 | 20  | 625mod |
| 3,3'-Dichlorobenzidine      | < 1   | 19 (75 %R)   | 19 (76 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Pyridine                    | < 5   | 11 (45 %R)   | 11 (46 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Azobenzene                  | < 1   | 18 (71 %R)   | 18 (71 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Batch ID: 734507-32510/A010512E6251

Client Designation: **Merrimack Station**

| Parameter Name              | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Carbazole                   | < 1   | 20 (79 %R) | 20 (81 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dimethylphthalate           | < 1   | 18 (73 %R) | 18 (74 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Diethylphthalate            | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-butylphthalate         | < 5   | 19 (77 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Butylbenzylphthalate        | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Ethylhexyl)phthalate  | < 5   | 19 (76 %R) | 19 (76 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-octylphthalate         | < 1   | 18 (73 %R) | 19 (75 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenzofuran                | < 1   | 16 (66 %R) | 17 (67 %R) (2 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Naphthalene                 | < 1   | 17 (67 %R) | 17 (67 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Methylnaphthalene         | < 1   | 16 (62 %R) | 16 (62 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthylene              | < 1   | 16 (63 %R) | 16 (65 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthene                | < 1   | 17 (70 %R) | 18 (71 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Fluorene                    | < 1   | 17 (70 %R) | 18 (71 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Phenanthrene                | < 1   | 19 (74 %R) | 19 (76 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Anthracene                  | < 1   | 19 (77 %R) | 19 (77 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Fluoranthene                | < 1   | 19 (75 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Pyrene                      | < 1   | 18 (73 %R) | 18 (73 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]anthracene          | < 1   | 19 (75 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Chrysene                    | < 1   | 19 (77 %R) | 19 (77 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[b]fluoranthene        | < 1   | 19 (75 %R) | 19 (77 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[k]fluoranthene        | < 1   | 19 (77 %R) | 20 (79 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]pyrene              | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Indeno[1,2,3-cd]pyrene      | < 1   | 19 (78 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenz[a,h]anthracene       | < 1   | 20 (80 %R) | 19 (77 %R) (4 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[g,h,i]perylene        | < 1   | 20 (79 %R) | 19 (77 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Fluorophenol (surr)       | 39 %R | 39 %R      | 39 %R              | 1/5/2012      | % Rec | 21 - 110 | 20  | 625mod |
| Phenol-d6 (surr)            | 28 %R | 28 %R      | 29 %R              | 1/5/2012      | % Rec | 15 - 94  | 20  | 625mod |
| 2,4,6-Tribromophenol (surr) | 76 %R | 92 %R      | 82 %R              | 1/5/2012      | % Rec | 15 - 110 | 20  | 625mod |
| Nitrobenzene-D5 (surr)      | 76 %R | 75 %R      | 77 %R              | 1/5/2012      | % Rec | 35 - 114 | 20  | 625mod |
| 2-Fluorobiphenyl (surr)     | 77 %R | 73 %R      | 75 %R              | 1/5/2012      | % Rec | 43 - 116 | 20  | 625mod |
| p-Terphenyl-D14 (surr)      | 89 %R | 95 %R      | 90 %R              | 1/5/2012      | % Rec | 33 - 130 | 20  | 625mod |

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.

Hexachlorocyclopentadiene exhibited recovery below acceptance limits in the LCS. Hexachlorocyclopentadiene was not detected in the sample.



# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff  
Grab

Lab Sample ID: 106677.02

Matrix: aqueous

Date Sampled: 1/5/12

Date Received: 1/5/12

Units: mg/L

Date of Extraction/Prep: 1/9/12

Date of Analysis: 1/9/12

Analyst: LAS

Method: 1664A

Dilution Factor: 1

Oil & Grease (HEM) < 5



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name     | Blank | LCS        | LCSD                | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|---------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 37 (93 %R) | 33 (82 %R) (13 RPD) | 1/9/2012      | 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. Any impact to data is addressed below.





# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff  
Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Prep: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JW  
Method: 608  
Dilution Factor: 1

|            |       |
|------------|-------|
| PCB-1016   | < 0.3 |
| PCB-1221   | < 0.3 |
| PCB-1232   | < 0.3 |
| PCB-1242   | < 0.3 |
| PCB-1248   | < 0.3 |
| PCB-1254   | < 0.3 |
| PCB-1260   | < 0.3 |
| TMX (surr) | 81 %R |
| DCB (surr) | 96 %R |



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Batch ID: 734508-43146/A010612E608P1

Client Designation: **Merrimack Station**

| Parameter Name | Blank | LCS            | LCSD                     | Analysis Date | Units | Limits   | RPD | Method |
|----------------|-------|----------------|--------------------------|---------------|-------|----------|-----|--------|
| PCB-1016       | < 0.3 | 2.0 (101 %R)   | 2.1 (106 %R) (5 RPD)     | 1/6/2012      | ug/l  | 40 - 140 | 20  | 608    |
| PCB-1221       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1232       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1242       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1248       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1254       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1260       | < 0.3 | 2.0 (102 %R)   | 2.1 (105 %R) (3 RPD)     | 1/6/2012      | ug/l  | 40 - 140 | 20  | 608    |
| TMX (surr)     | 84 %R | 88 %R          | 90 %R                    | 1/6/2012      | % Rec | 30 - 150 |     | 608    |
| DCB (surr)     | 95 %R | 101 %R         | 100 %R                   | 1/6/2012      | % Rec | 30 - 150 |     | 608    |

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#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Composite

Lab Sample ID: 106677.01

Matrix: aqueous

Date Sampled: 1/5/12

Date Received: 1/5/12

|                          |       |
|--------------------------|-------|
| Solids Suspended         | 14    |
| Solids Dissolved         | 21000 |
| Fluoride                 | 10    |
| Sulfate                  | 1200  |
| Chloride                 | 11000 |
| Nitrate-N                | 100   |
| Alkalinity Total (CaCO3) | 180   |
| Ammonia-N                | 0.92  |
| BOD                      | < 6   |
| COD                      | 130   |
| pH                       | 7.3   |

| Units | Analysis |       | Method   | Analyst |
|-------|----------|-------|----------|---------|
|       | Date     | Time  |          |         |
| mg/L  | 01/10/12 | 15:40 | 2540D    | DLS     |
| mg/L  | 01/11/12 | 13:15 | 2540C    | DLS     |
| mg/L  | 01/11/12 | 11:23 | 300.0    | KL      |
| mg/L  | 01/11/12 | 11:23 | 300.0    | KL      |
| mg/L  | 01/10/12 | 12:17 | 4500CIE  | DLS     |
| mg/L  | 01/06/12 | 12:57 | 353.2    | DLS     |
| mg/L  | 01/11/12 | 9:40  | 2320B    | SEL     |
| mg/L  | 01/10/12 | 8:30  | 4500NH3D | SEL     |
| mg/L  | 01/06/12 | 14:05 | 5210B    | SKC     |
| mg/L  | 01/12/12 | 10:20 | H8000    | SKC     |
| SU    | 01/05/12 | 15:10 | 4500H+B  | NZ      |

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02

Matrix: aqueous

Date Sampled: 1/5/12

Date Received: 1/5/12

|                         |        |
|-------------------------|--------|
| Cyanide Total           | 0.02   |
| Sulfide                 | < 0.1  |
| Sulfite                 | < 2    |
| Total Residual Chlorine | < 0.05 |
| Total Phenols           | < 0.3  |

| Units | Analysis |       | Method   | Analyst |
|-------|----------|-------|----------|---------|
|       | Date     | Time  |          |         |
| mg/L  | 01/11/12 | 8:45  | 4500CNE  | KJR     |
| mg/L  | 01/11/12 | 13:20 | 8131HACH | KJR     |
| mg/L  | 01/05/12 | 17:30 | 377.1    | JL      |
| mg/L  | 01/05/12 | 16:50 | 4500CIG  | NZ      |
| mg/L  | 01/09/12 | 9:00  | 420.1    | JCC     |

Total Phenols: The reporting limit for Total Phenols has been elevated due to matrix interferences.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**Client Designation: **Merrimack Station**

| Parameter Name           | Blank  | LCS           | LCSD                  | Units | Date of Analysis | Limits      | RPD | Method    |
|--------------------------|--------|---------------|-----------------------|-------|------------------|-------------|-----|-----------|
| Solids Suspended         | < 5    | 90 (90 %R)    | 93 (93 %R) (3 RPD)    | mg/L  | 1/10/12          | 90 - 110    | 20  | 2540D     |
| Solids Dissolved         | < 5    | 970 (97 %R)   | NA                    | mg/L  | 1/11/12          | 85 - 115    |     | 2540C     |
| Fluoride                 | < 0.1  | 2.0 (101 %R)  | 2.0 (101 %R) (0 RPD)  | mg/L  | 1/11/12          | 90 - 110    | 20  | 300.0     |
| Sulfate                  | < 1    | 21 (106 %R)   | 21 (103 %R) (3 RPD)   | mg/L  | 1/11/12          | 90 - 110    | 20  | 300.0     |
| Chloride                 | < 1    | 26 (103 %R)   | 26 (103 %R) (0 RPD)   | mg/L  | 1/10/12          | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N                | < 0.05 | 5.3 (106 %R)  | 5.3 (106 %R) (0 RPD)  | mg/L  | 1/6/12           | 90 - 110    | 20  | 353.2     |
| Alkalinity Total (CaCO3) | < 1    | 10 (99 %R)    | 10 (100 %R) (1 RPD)   | mg/L  | 1/11/12          | 85 - 115    | 20  | 2320B     |
| Cyanide Total            | < 0.02 | 0.27 (106 %R) | 0.23 (91 %R) (15 RPD) | mg/L  | 1/11/12          | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N                | < 0.05 | 2.0 (100 %R)  | 2.1 (105 %R) (5 RPD)  | mg/L  | 1/10/12          | 90 - 110    | 20  | 4500NH3DN |
| Sulfide                  | < 0.1  | 0.4 (98 %R)   | 0.4 (90 %R) (9 RPD)   | mg/L  | 1/11/12          | 80 - 120    | 20  | 8131HACH  |
| Sulfite                  | < 2    | NA            | NA                    | mg/L  | 1/5/12           |             |     | 377.1     |
| Total Residual Chlorine  | < 0.05 | 0.88 (101 %R) | 0.87 (100 %R) (1 RPD) | mg/L  | 1/5/12           | 80 - 120    | 20  | 4500CIG   |
| BOD                      | < 6    | 430 (109 %R)  | 390 (97 %R) (12 RPD)  | mg/L  | 1/6/12           | 84 - 115    | 20  | 5210B     |
| COD                      | < 10   | 100 (101 %R)  | 100 (98 %R) (3 RPD)   | mg/L  | 1/12/12          | 85 - 115    | 20  | H8000     |
| Total Phenols            | < 0.05 | 0.28 (112 %R) | 0.27 (106 %R) (6 RPD) | mg/L  | 1/9/12           | 85 - 115    | 20  | 420.1     |
| pH                       |        | 6.0 (101 %R)  | 6.05 (101 %R) (0 RPD) | SU    | 1/5/12           | 5.95 - 6.07 | 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.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name           | Duplicate Parent ID | Duplicate Parent | Duplicate     | Units | Date of Analysis | RPD | Method   |
|--------------------------|---------------------|------------------|---------------|-------|------------------|-----|----------|
| Solids Suspended         | 106692.03           | 180              | 160 (13 RPD)  | mg/L  | 1/10/12          | 20  | 2540D    |
| Solids Dissolved         |                     | NA               | NA            | mg/L  | 1/11/12          |     | 2540C    |
| Fluoride                 |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 300.0    |
| Sulfate                  |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 300.0    |
| Chloride                 |                     | NA               | NA            | mg/L  | 1/10/12          | 20  | 4500CIE  |
| Nitrate-N                |                     | NA               | NA            | mg/L  | 1/6/12           | 20  | 353.2    |
| Alkalinity Total (CaCO3) |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 2320B    |
| Cyanide Total            |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 4500CNE  |
| Ammonia-N                | 106627.02           | 13               | 13 (2 RPD)    | mg/L  | 1/10/12          | 20  | 4500NH3D |
| Sulfide                  |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 8131HACH |
| Sulfite                  | 106677.02           | < 2              | < 2 (RPD N/A) | mg/L  | 1/5/12           | 20  | 377.1    |
| Total Residual Chlorine  |                     | NA               | NA            | mg/L  | 1/5/12           | 20  | 4500CIG  |
| BOD                      | 106657.02           | 410              | 400 (3 RPD)   | mg/L  | 1/6/12           | 20  | 5210B    |
| COD                      |                     | NA               | NA            | mg/L  | 1/12/12          | 20  | H8000    |
| Total Phenols            |                     | NA               | NA            | mg/L  | 1/9/12           | 20  | 420.1    |
| pH                       | 106649.01           | 6.3              | 6.3 (0 RPD)   | SU    | 1/5/12           | 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.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| 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  | 1/10/12          |        | 20  | 2540D   |
| Solids Dissolved         |                  | NA            | NA           | NA                    | mg/L  | 1/11/12          |        |     | 2540C   |
| Fluoride                 |                  | NA            | NA           | NA                    | mg/L  | 1/11/12          |        | 20  | 300.0   |
| Sulfate                  |                  | NA            | NA           | NA                    | mg/L  | 1/11/12          |        | 20  | 300.0   |
| Chloride                 | 106632.02        | 11            | 22 (110 %R)  | 22 (109 %R) (1 RPD)   | mg/L  | 1/10/12          | 80-120 | 20  | 4500CIE |
| Nitrate-N                | 106678.01        | 1.2           | 12 (110 %R)  | 12 (109 %R) (1 RPD)   | mg/L  | 1/6/12           | 80-120 | 20  | 353.2   |
| Alkalinity Total (CaCO3) | 106607.01        | 29            | 48 (98 %R)   | NA                    | mg/L  | 1/11/12          | 80-120 | 20  | 2320B   |
| Cyanide Total            | 106677.02        | 0.02          | 0.25 (93 %R) | 0.23 (86 %R) (8 RPD)  | mg/L  | 1/11/12          | 75-125 | 20  | 4500CNE |
| Ammonia-N                | 106627.02        | 13            | 16 (115 %R)  | 15 (85 %R) (30 RPD)   | mg/L  | 1/10/12          | 80-120 | 20  | 4500NH3 |
| Sulfide                  |                  | NA            | NA           | NA                    | mg/L  | 1/11/12          |        | 20  | 8131HAC |
| Sulfite                  |                  | NA            | NA           | NA                    | mg/L  | 1/5/12           |        |     | 377.1   |
| Total Residual Chlorine  |                  | NA            | NA           | NA                    | mg/L  | 1/5/12           |        | 20  | 4500CIG |
| BOD                      | 106657.02        | 410           | 760 (82 %R)  | NA                    | mg/L  | 1/6/12           | 75-125 | 20  | 5210B   |
| COD                      | 106677.01        | 130           | 220 (92 %R)  | 230 (99 %R) (7 RPD)   | mg/L  | 1/12/12          | 80-120 | 20  | H8000   |
| Total Phenols            | 106677.02        | < 0.3         | 0.4 (42 %R)  | 0.4 (42 %R) (133 RPD) | mg/L  | 1/9/12           | 80-120 | 20  | 420.1   |
| pH                       |                  | NA            | NA           | NA                    | SU    | 1/5/12           |        | 10  | 4500H+B |

Total Phenols: The MS and MSD recoveries were below acceptance criteria even when the parent sample was diluted indicating a matrix interference.

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.



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11 January 2012

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

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



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Ph: 206-622-6960  
Fx: 206-622-6870

### ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                | Lab ID     | Matrix | Date Sampled    | Date Received   |
|--------------------------|------------|--------|-----------------|-----------------|
| Treat Tank Eff Composite | 1201073-01 | Water  | 05-Jan-12 10:00 | 06-Jan-12 09:50 |
| Treat Tank Eff Grab      | 1201073-02 | Water  | 05-Jan-12 08:00 | 06-Jan-12 09:50 |

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Liz Siska, Project Manager





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## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 6th, 2012. The samples were received intact, on-ice with temperatures measured at 3.4 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL AND QUALITY CONTROL ISSUES

There were no analytical difficulties experienced with analysis of these samples with the exceptions flagged in the report.

Frontier Global Sciences, Inc.

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

---

Liz Siska, Project Manager

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### CHAIN OF CUSTODY FORMS

1201073



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

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 Phone: 206-622-6960  
 Fax: 206-622-6870  
 E-mail: info@fgs.com  
 Web: www.frontiersci.com

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|  |  |                                      |  |   |  |
|--|--|--------------------------------------|--|---|--|
| ANALYST: [Blank]<br>DATE: [Blank]<br>PROJECT: [Blank]                        |  | ANALYSIS REQUESTS:<br>[Blank]        |  | ANALYSIS: [Blank]<br>[Blank]              |  |
| SAMPLE ID: [Blank]<br>MATRIX: [Blank]  |  | DATE/TIME: [Blank]<br>[Blank]        |  | COMMENTS: [Blank]                         |  |
| [Table with 6 columns: Date, Time, Location, Sample ID, Matrix, Tube & Date] |  |                                      |  |   |  |
| For Laboratory Use Only:<br>COMMENTS: [Blank]                                |  | DATE CODED: [Blank]<br>TIME: [Blank] |  | RECEIVED BY: [Signature]<br>NAME: [Blank] |  |
| CLIENT: [Blank]  |  | DEPARTMENT: [Blank]                  |  | ORGANIZATION: [Blank]                     |  |
| PROJECT: [Blank]   |  | DATE/TIME: [Blank]                   |  | DATE/TIME: [Blank]                        |  |

1201073-2012-06-12-11:07

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*Liz Siska*

Liz Siska, Project Manager

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## ANALYTICAL RESULTS

### Treat Tank Eff Composite

Matrix: Water

Laboratory ID: 1201073-01

| Analyte    | Result  | MDL   | MRL    | Units | Dilution | Batch   | Sequence | Analyzed | Method  | Notes |
|------------|---------|-------|--------|-------|----------|---------|----------|----------|---------|-------|
| Aluminum   | 41.1    | 2.2   | 20.0   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Antimony   | 0.520   | 0.023 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Barium     | 300     | 0.14  | 1.00   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Beryllium  | 0.522   | 0.114 | 0.300  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Cadmium    | 0.207   | 0.021 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Calcium    | 5050000 | 16200 | 200000 | µg/L  | 5000     | F201077 | 2A10015  | 01/10/12 | FGS-054 |       |
| Chromium   | ND      | 0.04  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Copper     | ND      | 0.05  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Iron       | ND      | 6.5   | 50.0   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Lead       | ND      | 0.020 | 0.200  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Manganese  | 293     | 0.74  | 10.0   | µg/L  | 100      | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Molybdenum | 140     | 0.03  | 0.30   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Nickel     | 8.03    | 0.04  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Silver     | ND      | 0.030 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Sodium     | 277000  | 115   | 2000   | µg/L  | 100      | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Thallium   | 6.64    | 0.006 | 0.025  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | QB-01 |
| Zinc       | ND      | 0.08  | 1.00   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |

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Liz Siska, Project Manager

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### ANALYTICAL RESULTS

#### Treat Tank Eff Grab

Matrix: Water

Laboratory ID: 1201073-02

| Analyte  | Result | MDL  | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes   |
|----------|--------|------|------|-------|----------|---------|----------|----------|-----------|---------|
| Arsenic  | 4.98   | 1.02 | 3.00 | µg/L  | 20       | F201062 | 2A10015  | 01/10/12 | FGS-054   |         |
| Mercury  | 10.5   | 0.34 | 2.02 | ng/L  | 4        | F201063 | 2A09010  | 01/09/12 | EPA 1631E | FB-1631 |
| Selenium | 74.0   | 3.88 | 12.0 | µg/L  | 20       | F201062 | 2A10015  | 01/10/12 | FGS-054   |         |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201073-02

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 10.48                        | 10.54                           | 2.02 | 0.617 | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes           |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------------|
| Beryllium  | 0.522                       | 2.0200             | 2.676                   | 107           | 75 - 135        | FGS-054 |                 |
| Aluminum   | 41.1                        | 151.50             | 210.7                   | 112           | 80 - 115        | FGS-054 |                 |
| Chromium   | 0.47                        | 7.0700             | 8.59                    | 115           | 85 - 115        | FGS-054 |                 |
| Iron       | ND                          | 505.00             | 563.6                   | 112           | 75 - 125        | FGS-054 |                 |
| Nickel     | 8.03                        | 4.0400             | 11.98                   | 97.7          | 68 - 134        | FGS-054 |                 |
| Copper     | 0.29                        | 4.0400             | 4.00                    | 91.8          | 51 - 145        | FGS-054 |                 |
| Zinc       | 0.27                        | 10.100             | 9.10                    | 87.4          | 46 - 146        | FGS-054 |                 |
| Arsenic    | 5.32                        | 15.150             | 22.17                   | 111           | 85 - 115        | FGS-054 |                 |
| Selenium   | 71.73                       | 30.300             | 100.6                   | 95.3          | 59 - 149        | FGS-054 |                 |
| Molybdenum | 140.3                       | 2.0200             | 142.1                   | 88.8          | 80 - 115        | FGS-054 |                 |
| Silver     | ND                          | 1.5150             | 1.216                   | 80.3          | 74 - 119        | FGS-054 |                 |
| Cadmium    | 0.207                       | 0.80800            | 1.076                   | 108           | 84 - 113        | FGS-054 |                 |
| Antimony   | 0.520                       | 0.80800            | 1.360                   | 104           | 79 - 122        | FGS-054 |                 |
| Barium     | 300.0                       | 10.100             | 305.0                   | 49.8          | 80 - 120        | FGS-054 | QM-02           |
| Thallium   | 6.645                       | 0.40400            | 6.882                   | 58.7          | 64 - 137        | FGS-054 | QB-01,<br>QM-02 |
| Lead       | ND                          | 1.5150             | 1.635                   | 108           | 72 - 143        | FGS-054 |                 |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 2.0200             | 2.639                    | 105            | 1.39   | 75 - 135        | 20        | FGS-054 |       |
| Aluminum   | 151.50             | 213.8                    | 114            | 1.50   | 80 - 115        | 20        | FGS-054 |       |
| Chromium   | 7.0700             | 8.59                     | 115            | 0.0611 | 85 - 115        | 20        | FGS-054 |       |
| Iron       | 505.00             | 553.8                    | 110            | 1.76   | 75 - 125        | 20        | FGS-054 |       |
| Nickel     | 4.0400             | 12.20                    | 103            | 1.83   | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0400             | 3.95                     | 90.7           | 1.15   | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.100             | 8.87                     | 85.2           | 2.51   | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.150             | 22.81                    | 115            | 2.84   | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.300             | 110.8                    | 129            | 9.65   | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0200             | 143.5                    | 159            | 0.993  | 80 - 115        | 20        | FGS-054 | QM-02 |
| Silver     | 1.5150             | 1.226                    | 81.0           | 0.852  | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80800            | 0.956                    | 92.7           | 11.8   | 84 - 113        | 20        | FGS-054 |       |

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Liz Siska, Project Manager



### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201073-01

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Antimony | 0.80800            | 1.373                    | 106            | 0.924 | 79 - 122        | 20        | FGS-054 |       |
| Barium   | 10.100             | 307.1                    | 71.1           | 0.703 | 80 - 120        | 20        | FGS-054 | QM-02 |
| Thallium | 0.40400            | 6.918                    | 67.6           | 0.520 | 64 - 137        | 20        | FGS-054 | QB-01 |
| Lead     | 1.5150             | 1.580                    | 104            | 3.44  | 72 - 143        | 20        | FGS-054 |       |

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

**SOURCE: 1201073-01RE1**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD2

| Analyte   | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|-----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Sodium    | 277400                      | 505.00             | 264500                  | -2560         | 75 - 125        | FGS-054 | QM-02 |
| Manganese | 293.1                       | 6.0600             | 287.1                   | -98.7         | 80 - 120        | FGS-054 | QM-02 |

| Analyte   | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Sodium    | 505.00             | 270000                   | -1460          | 2.06  | 75 - 125        | 20        | FGS-054 | QM-02 |
| Manganese | 6.0600             | 289.7                    | -55.3          | 0.912 | 80 - 120        | 20        | FGS-054 | QM-02 |

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Liz Siska, Project Manager





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

**SOURCE: 1201073-01**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------|
| Beryllium  | 0.522                       | 10.100             | 10.96                   | 103           | 75 - 135        | FGS-054 | AS        |
| Aluminum   | 41.1                        | 2020.0             | 2166                    | 105           | 80 - 115        | FGS-054 | AS        |
| Chromium   | 0.47                        | 202.00             | 230.0                   | 114           | 85 - 115        | FGS-054 | AS        |
| Iron       | ND                          | 1010.0             | 1103                    | 109           | 75 - 125        | FGS-054 | AS        |
| Nickel     | 8.03                        | 252.50             | 255.1                   | 97.8          | 68 - 134        | FGS-054 | AS        |
| Copper     | 0.29                        | 252.50             | 224.5                   | 88.8          | 51 - 145        | FGS-054 | AS        |
| Zinc       | 0.27                        | 505.00             | 422.7                   | 83.7          | 46 - 146        | FGS-054 | AS        |
| Arsenic    | 5.32                        | 202.00             | 235.0                   | 114           | 85 - 115        | FGS-054 | AS        |
| Selenium   | 71.73                       | 202.00             | 287.2                   | 107           | 59 - 149        | FGS-054 | AS        |
| Molybdenum | 140.3                       | 101.00             | 244.7                   | 103           | 80 - 115        | FGS-054 | AS        |
| Silver     | ND                          | 10.100             | 8.224                   | 81.4          | 74 - 119        | FGS-054 | AS        |
| Cadmium    | 0.207                       | 20.200             | 19.18                   | 93.9          | 84 - 113        | FGS-054 | AS        |
| Antimony   | 0.520                       | 10.100             | 11.16                   | 105           | 79 - 122        | FGS-054 | AS        |
| Barium     | 300.0                       | 404.00             | 775.3                   | 118           | 80 - 120        | FGS-054 | AS        |
| Thallium   | 6.645                       | 10.100             | 17.46                   | 107           | 64 - 137        | FGS-054 | AS, QB-01 |
| Lead       | ND                          | 50.500             | 51.95                   | 103           | 72 - 143        | FGS-054 | AS        |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 10.100             | 11.25                    | 106            | 2.66   | 75 - 135        | 20        | FGS-054 | AS    |
| Aluminum   | 2020.0             | 2171                     | 105            | 0.234  | 80 - 115        | 20        | FGS-054 | AS    |
| Chromium   | 202.00             | 231.3                    | 114            | 0.528  | 85 - 115        | 20        | FGS-054 | AS    |
| Iron       | 1010.0             | 1112                     | 110            | 0.802  | 75 - 125        | 20        | FGS-054 | AS    |
| Nickel     | 252.50             | 255.9                    | 98.2           | 0.346  | 68 - 134        | 20        | FGS-054 | AS    |
| Copper     | 252.50             | 225.5                    | 89.2           | 0.424  | 51 - 145        | 20        | FGS-054 | AS    |
| Zinc       | 505.00             | 425.5                    | 84.2           | 0.647  | 46 - 146        | 20        | FGS-054 | AS    |
| Arsenic    | 202.00             | 236.5                    | 114            | 0.629  | 85 - 115        | 20        | FGS-054 | AS    |
| Selenium   | 202.00             | 287.0                    | 107            | 0.0540 | 59 - 149        | 20        | FGS-054 | AS    |
| Molybdenum | 101.00             | 246.7                    | 105            | 0.806  | 80 - 115        | 20        | FGS-054 | AS    |
| Silver     | 10.100             | 8.290                    | 82.1           | 0.798  | 74 - 119        | 20        | FGS-054 | AS    |
| Cadmium    | 20.200             | 19.31                    | 94.6           | 0.670  | 84 - 113        | 20        | FGS-054 | AS    |
| Antimony   | 10.100             | 11.31                    | 107            | 1.29   | 79 - 122        | 20        | FGS-054 | AS    |

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Liz Siska, Project Manager



### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201073-01

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes     |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-----------|
| Barium   | 404.00             | 779.8                    | 119            | 0.575 | 80 - 120        | 20        | FGS-054 | AS        |
| Thallium | 10.100             | 17.56                    | 108            | 0.595 | 64 - 137        | 20        | FGS-054 | AS, QB-01 |
| Lead     | 50.500             | 52.16                    | 103            | 0.399 | 72 - 143        | 20        | FGS-054 | AS        |

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

**SOURCE: 1201073-01RE1**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD4

| Analyte   | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|-----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Sodium    | 277400                      | 202000             | 474400                  | 97.5          | 75 - 125        | FGS-054 | AS    |
| Manganese | 293.1                       | 2020.0             | 2396                    | 104           | 80 - 120        | FGS-054 | AS    |

| Analyte   | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Sodium    | 202000             | 480300                   | 100            | 1.25  | 75 - 125        | 20        | FGS-054 | AS    |
| Manganese | 2020.0             | 2405                     | 105            | 0.346 | 80 - 120        | 20        | FGS-054 | AS    |

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

**SOURCE: 1201073-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 10.48                       | 20.400             | 31.36                   | 102           | 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             | 27.08                    | 81.4           | 14.7  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1112278-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 7.61                        | 20.400             | 27.86                   | 99.2          | 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             | 28.37                    | 102            | 1.82  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201029-01**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD3

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.34                        | 10.200             | 15.58                   | 100           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.07                    | 85.6           | 10.2  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201030-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.54                        | 10.200             | 14.82                   | 91.0          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.61                    | 89.0           | 1.40  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 1515.0             | 5067000                 | 1010          | 70 - 130        | FGS-054 | QM-02 |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1515.0             | 5034000                  | -1190          | 0.660 | 70 - 130        | 20        | FGS-054 | QM-02 |

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 10100000           | 15570000                | 104           | 70 - 130        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 10100000           | 15550000                 | 104            | 0.125 | 70 - 130        | 20        | FGS-054 |       |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Beryllium  | 2.0000             | 2.039                    | 102            | 75 - 135        | FGS-054 |       |
| Sodium     | 500.00             | 487                      | 97.4           | 80 - 120        | FGS-054 |       |
| Aluminum   | 150.00             | 152.4                    | 102            | 85 - 115        | FGS-054 |       |
| Calcium    | 1500.0             | 1550                     | 103            | 80 - 120        | FGS-054 |       |
| Chromium   | 7.0000             | 6.82                     | 97.4           | 85 - 115        | FGS-054 |       |
| Manganese  | 6.0000             | 6.03                     | 101            | 85 - 115        | FGS-054 |       |
| Iron       | 500.00             | 481.5                    | 96.3           | 80 - 120        | FGS-054 |       |
| Nickel     | 4.0000             | 4.06                     | 102            | 68 - 134        | FGS-054 |       |
| Copper     | 4.0000             | 4.15                     | 104            | 51 - 145        | FGS-054 |       |
| Zinc       | 10.000             | 10.16                    | 102            | 46 - 146        | FGS-054 |       |
| Arsenic    | 15.000             | 15.38                    | 103            | 85 - 115        | FGS-054 |       |
| Selenium   | 30.000             | 31.50                    | 105            | 59 - 149        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.97                     | 98.3           | 85 - 115        | FGS-054 |       |
| Silver     | 1.5000             | 1.569                    | 105            | 74 - 119        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.850                    | 106            | 84 - 113        | FGS-054 |       |
| Antimony   | 0.80000            | 0.866                    | 108            | 79 - 122        | FGS-054 |       |
| Barium     | 10.000             | 10.41                    | 104            | 85 - 115        | FGS-054 |       |
| Thallium   | 0.40000            | 0.433                    | 108            | 64 - 134        | FGS-054 |       |
| Lead       | 1.5000             | 1.611                    | 107            | 72 - 143        | FGS-054 |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Beryllium | 2.0000             | 2.078                     | 104             | 1.91  | 75 - 135        | 20        | FGS-054 |       |
| Sodium    | 500.00             | 496                       | 99.2            | 1.88  | 80 - 120        | 20        | FGS-054 |       |
| Aluminum  | 150.00             | 154.4                     | 103             | 1.28  | 85 - 115        | 20        | FGS-054 |       |
| Calcium   | 1500.0             | 1583                      | 106             | 2.10  | 80 - 120        | 20        | FGS-054 |       |
| Chromium  | 7.0000             | 6.95                      | 99.3            | 1.90  | 85 - 115        | 20        | FGS-054 |       |
| Manganese | 6.0000             | 6.15                      | 103             | 1.97  | 85 - 115        | 20        | FGS-054 |       |
| Iron      | 500.00             | 494.6                     | 98.9            | 2.69  | 80 - 120        | 20        | FGS-054 |       |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Nickel     | 4.0000             | 4.15                      | 104             | 2.20  | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0000             | 4.28                      | 107             | 3.01  | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.000             | 10.52                     | 105             | 3.48  | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.000             | 15.69                     | 105             | 2.00  | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.000             | 32.57                     | 109             | 3.35  | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.93                      | 96.6            | 1.72  | 85 - 115        | 20        | FGS-054 |       |
| Silver     | 1.5000             | 1.557                     | 104             | 0.768 | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.868                     | 108             | 2.04  | 84 - 113        | 20        | FGS-054 |       |
| Antimony   | 0.80000            | 0.872                     | 109             | 0.661 | 79 - 122        | 20        | FGS-054 |       |
| Barium     | 10.000             | 10.54                     | 105             | 1.25  | 85 - 115        | 20        | FGS-054 |       |
| Thallium   | 0.40000            | 0.443                     | 111             | 2.27  | 64 - 134        | 20        | FGS-054 |       |
| Lead       | 1.5000             | 1.641                     | 109             | 1.85  | 72 - 143        | 20        | FGS-054 |       |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-BS/BSDI

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.50                    | 98.8           | 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             | 15.95                     | 102             | 2.89  | 80 - 120        | 24        | EPA 1631E |       |

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

**RECOVERY AND RPD**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Calcium | 1500.0             | 1517                     | 101            | 80 - 120        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1500.0             | 1571                      | 105             | 3.47  | 80 - 120        | 20        | FGS-054 |       |

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### PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2A09010

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found  | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|--------|------|-------|---------|-----------|----------|
| F201063-BLK1  | Mercury | -0.009 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK2  | Mercury | -0.006 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK3  | Mercury | -0.02  | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK4  | Mercury | 0.03   | 0.50 | ng/L  | F201063 | EPA 1631E | U, QB-04 |
| F201063-BLK5  | Mercury | 0.11   | 0.52 | ng/L  | F201063 | EPA 1631E | U, QB-06 |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found    | MRL   | Units | Batch   | Method  | Notes |
|---------------|------------|----------|-------|-------|---------|---------|-------|
| F201062-BLK1  | Beryllium  | 0.0002   | 0.060 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Sodium     | 0.09     | 20    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Aluminum   | 0.09     | 4.0   | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Calcium    | 0.5      | 40    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Chromium   | 0.03     | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Manganese  | -0.002   | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Iron       | -0.06    | 10.0  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Nickel     | 0.004    | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Copper     | -0.0003  | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Zinc       | 0.04     | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Arsenic    | -0.07    | 0.15  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Selenium   | 0.003    | 0.60  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Molybdenum | 0.005    | 0.06  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Silver     | 0.0002   | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Cadmium    | -0.00002 | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Antimony   | -0.0003  | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Barium     | -0.04    | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Thallium   | 0.007    | 0.005 | µg/L  | F201062 | FGS-054 | QB-10 |
| F201062-BLK1  | Lead       | 0.003    | 0.040 | µg/L  | F201062 | FGS-054 | U     |

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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 01/11/2012



### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found | MRL | Units | Batch   | Method  | Notes |
|---------------|---------|-------|-----|-------|---------|---------|-------|
| F201077-BLK1  | Calcium | 0.2   | 40  | µg/L  | F201077 | FGS-054 | U     |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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-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-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-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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VIA EMAIL

February 9, 2012  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Winnepesaukee River Basin Program Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
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. Lesieur:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached Wastewater Discharge Monitoring Report for sampling conducted on January 26, 2012, as requested to supplement the initial sampling requirements as outlined in *Special Agreement – PSNH and WRBP Wastewater Treatment Plant*.

The attached **Table 1** summarizes the analytical results for all required parameters as outlined in the terms of the Special Agreement. The attached **Analytical Data Report**, however, contains a more comprehensive list of parameters.

#### **ANALYTICAL DISCUSSION**

Flue Gas Desulfurization (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 United States Environmental Protection Agency (EPA) web site and a link to their draft Standard Operating Procedure (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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

RAB:mmm

P:\04Jobs\0029300s\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Franklin\FINAL 04.0029307 Franklin DATA RPT 020912.docx

Attachments: Wastewater Discharge Monitoring Report  
Analytical Data Report

**WASTEWATER DISCHARGE MONITORING REPORT**

**WASTEWATER DISCHARGE MONITORING REPORT  
WINNIPESAUKEE RIVER BASIN PROGRAM  
WASTEWATER TREATMENT PLANT**

Public Service of New Hampshire - Merrimack Station  
Special Agreement - PSNH and WRBP Wastewater Discharge Request  
Dated 9/28/2011

Permitted Flow 25,000 gallons per day

**FLOW DATA**

|                                  |   |           |
|----------------------------------|---|-----------|
| Daily Flow Rate (gallons)        | 0 | (average) |
| Monitoring Period Flow (gallons) | 0 |           |

NOTE: Discharge to WRBP Treatment Plant commenced after the 1/26/12 sampling event

**FACILITY INFORMATION**

Company Name Public Service Company of New Hampshire - Merrimack Station  
Company Owner Public Service Company of New Hampshire  
Facility Address 97 River Road  
Facility Contact Harold Keyes  
Telephone (603) 224-4081

**MONITORING REPORT**

Submittal Date 2/9/2012  
Monitoring Point End of treatment process  
Reporting Period First Month

**SAMPLE ANALYSIS**

Certified Analytical Laboratory Eastern Analytical Inc. (EAI) Certification Number 1012  
Authorized Representative Lorraine Olashaw  
Analytical Subcontractor Frontier Global Sciences Certification Number E87575

**SAMPLE COLLECTION**

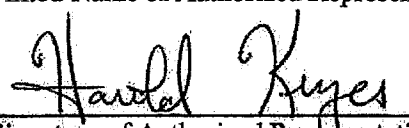
Sampler Jeff Gagne (EAI)  
Sample Type Grab  
Sample Date 1/26/2012 Sample Time 10:00 AM  
pH 7.6

**CATEGORICAL PRETREATMENT STANDARDS**

40 CFR 423.16: Steam Electric Power Generating Category  
NOTE: There are no numerical pretreatment standards for this source

**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."

Harold Keyes  
Printed Name of Authorized Representative  
  
Signature of Authorized Representative

Station Manager  
Title  
2/9/2012  
Date

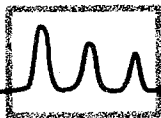
**SUMMARY ANALYTICAL DATA**  
**Treated FGD Wastewater**  
Public Service Company of New Hampshire  
Merrimack Station  
Bow, New Hampshire

| PARAMETER    | RESULTS<br>(mg/L)<br>01/26/2012<br>EAI/Frontier |
|--------------|---|
| Aluminum     | < 0.080   |
| Arsenic      | 0.00956   |
| Cadmium      | 0.000587  |
| Chloride     | 9500  |
| Chromium (T) | < 0.00200                                       |
| Copper       | 0.00261   |
| Cyanide (T)  | 0.01  |
| Iron         | < 0.200   |
| Lead         | < 0.000800                                      |
| Manganese    | 0.349   |
| Mercury      | 0.0000122                                       |
| Molybdenum   | 0.373   |
| Nickel       | 0.00776   |
| Selenium     | 0.104   |
| Silver       | < 0.000400                                      |
| Zinc         | < 0.00400                                       |

GZA GeoEnvironmental, Inc.



**ANALYTICAL DATA REPORT**



# eastern analytical

*professional laboratory services*

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107170  
Client Identification: Wastewater Analysis - **Weekly**  
Date Received: 1/26/2012

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](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

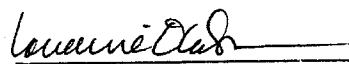
Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

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

2-8-12  
Date

35  
# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 107170

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

Client Designation: Wastewater Analysis - *Weekly*

Temperature upon receipt (°C): **4.5**

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) |
|-----------|----------------------|---------------|--------------|---------------|--------------|---|
| 107170.01 | Effluent Field Blank | 1/26/12       | 1/26/12      | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 107170.02 | Treat Tank Effluent  | 1/26/12       | 1/26/12      | 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#: 107170

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

Client Designation: **Wastewater Analysis - Weekly**

Sample ID: Treat Tank Effluent

|                               |           |
|-------------------------------|-----------|
| Lab Sample ID:                | 107170.02 |
| Matrix:                       | aqueous   |
| Date Sampled:                 | 1/26/12   |
| Date Received:                | 1/26/12   |
| Units:                        | ug/l      |
| Date of Analysis:             | 1/27/12   |
| Analyst:                      | KJP       |
| 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                       | 2         |
| 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) | 106 %R    |
| Toluene-d8 (surr)             | 99 %R     |



# QC REPORT

EAI ID#: 107170

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

Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name              | Blank | LCS           | LCSD                    | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|---------------|-------------------------|---------------|-------|----------|-----|--------|
| Chloromethane               | < 5   | 22 (110 %R)   | 22 (108 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 273  | 20  | 624    |
| Vinyl chloride              | < 2   | 20 (99 %R)    | 19 (94 %R) (5 RPD)      | 1/27/2012     | ug/l  | 0 - 251  | 20  | 624    |
| Bromomethane                | < 2   | 21 (106 %R)   | 21 (103 %R) (3 RPD)     | 1/27/2012     | ug/l  | 0 - 242  | 20  | 624    |
| Chloroethane                | < 5   | 26 (129 %R)   | 25 (123 %R) (5 RPD)     | 1/27/2012     | ug/l  | 14 - 230 | 20  | 624    |
| Trichlorofluoromethane      | < 5   | 25 (124 %R)   | 23 (116 %R) (7 RPD)     | 1/27/2012     | ug/l  | 17 - 181 | 20  | 624    |
| Acrolein                    | < 50  | < 50 (%R N/A) | < 50 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 624    |
| Acetone                     | < 50  | < 50 (100 %R) | < 50 (97 %R) (3 RPD)    | 1/27/2012     | ug/l  |          |     | 624    |
| 1,1-Dichloroethene          | < 1   | 24 (122 %R)   | 23 (115 %R) (6 RPD)     | 1/27/2012     | ug/l  | 0 - 234  | 20  | 624    |
| Methylene chloride          | < 5   | 26 (129 %R)   | 25 (126 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 221  | 20  | 624    |
| Carbon disulfide            | < 5   | 22 (%R)       | 22 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Acrylonitrile               | < 50  | < 50 (%R)     | < 50 (%R) (RPD)         | 1/27/2012     | ug/l  |          |     | 624    |
| Methyl-t-butyl ether(MTBE)  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| trans-1,2-Dichloroethene    | < 2   | 25 (124 %R)   | 24 (121 %R) (2 RPD)     | 1/27/2012     | ug/l  | 54 - 156 | 20  | 624    |
| Vinyl acetate               | < 10  | 30 (%R)       | 30 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| 1,1-Dichloroethane          | < 2   | 24 (118 %R)   | 23 (113 %R) (4 RPD)     | 1/27/2012     | ug/l  | 59 - 155 | 20  | 624    |
| cis-1,2-Dichloroethene      | < 2   | 22 (%R)       | 21 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| 2-Butanone(MEK)             | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Chloroform                  | < 2   | 22 (109 %R)   | 21 (106 %R) (3 RPD)     | 1/27/2012     | ug/l  | 51 - 138 | 20  | 624    |
| 1,1,1-Trichloroethane       | < 2   | 23 (115 %R)   | 22 (110 %R) (4 RPD)     | 1/27/2012     | ug/l  | 52 - 162 | 20  | 624    |
| Carbon tetrachloride        | < 2   | 26 (132 %R)   | 26 (129 %R) (2 RPD)     | 1/27/2012     | ug/l  | 70 - 140 | 20  | 624    |
| Benzene                     | < 1   | 22 (110 %R)   | 21 (107 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 151 | 20  | 624    |
| 1,2-Dichloroethane          | < 2   | 21 (103 %R)   | 20 (99 %R) (4 RPD)      | 1/27/2012     | ug/l  | 49 - 155 | 20  | 624    |
| Trichloroethene             | < 2   | 21 (105 %R)   | 20 (101 %R) (4 RPD)     | 1/27/2012     | ug/l  | 71 - 157 | 20  | 624    |
| 1,2-Dichloropropane         | < 2   | 21 (105 %R)   | 21 (103 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 210  | 20  | 624    |
| Bromodichloromethane        | < 2   | 21 (104 %R)   | 20 (101 %R) (3 RPD)     | 1/27/2012     | ug/l  | 35 - 155 | 20  | 624    |
| 2-Chloroethylvinylether     | < 2   | < 2 (%R N/A)  | < 2 (%R N/A) (RPD N/A)  | 1/27/2012     | ug/l  | 0 - 305  | 20  | 624    |
| 4-Methyl-2-pentanone(MIBK)  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| cis-1,3-Dichloropropene     | < 2   | 20 (102 %R)   | 20 (102 %R) (0 RPD)     | 1/27/2012     | ug/l  | 0 - 227  | 20  | 624    |
| Toluene                     | < 1   | 22 (109 %R)   | 21 (106 %R) (3 RPD)     | 1/27/2012     | ug/l  | 47 - 150 | 20  | 624    |
| trans-1,3-Dichloropropene   | < 2   | 21 (103 %R)   | 20 (101 %R) (2 RPD)     | 1/27/2012     | ug/l  | 17 - 183 | 20  | 624    |
| 1,1,2-Trichloroethane       | < 2   | 23 (113 %R)   | 22 (109 %R) (4 RPD)     | 1/27/2012     | ug/l  | 52 - 150 | 20  | 624    |
| 2-Hexanone                  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Tetrachloroethene           | < 2   | 24 (120 %R)   | 23 (116 %R) (3 RPD)     | 1/27/2012     | ug/l  | 64 - 148 | 20  | 624    |
| Dibromochloromethane        | < 2   | 24 (118 %R)   | 23 (115 %R) (3 RPD)     | 1/27/2012     | ug/l  | 53 - 149 | 20  | 624    |
| Chlorobenzene               | < 2   | 22 (111 %R)   | 22 (108 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 160 | 20  | 624    |
| Ethylbenzene                | < 1   | 23 (113 %R)   | 22 (110 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 162 | 20  | 624    |
| mp-Xylene                   | < 1   | 47 (117 %R)   | 45 (112 %R) (4 RPD)     | 1/27/2012     | ug/l  | 70 - 130 | 20  | 624    |
| o-Xylene                    | < 1   | 23 (115 %R)   | 22 (109 %R) (5 RPD)     | 1/27/2012     | ug/l  | 70 - 130 | 20  | 624    |
| Styrene                     | < 1   | 23 (%R)       | 22 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Bromoform                   | < 2   | 25 (125 %R)   | 25 (123 %R) (2 RPD)     | 1/27/2012     | ug/l  | 45 - 169 | 20  | 624    |
| 1,1,2,2-Tetrachloroethane   | < 2   | 20 (101 %R)   | 20 (100 %R) (1 RPD)     | 1/27/2012     | ug/l  | 46 - 157 | 20  | 624    |
| 1,3-Dichlorobenzene         | < 1   | 22 (110 %R)   | 21 (106 %R) (4 RPD)     | 1/27/2012     | ug/l  | 59 - 156 | 20  | 624    |
| 1,4-Dichlorobenzene         | < 1   | 22 (108 %R)   | 21 (107 %R) (1 RPD)     | 1/27/2012     | ug/l  | 18 - 190 | 20  | 624    |
| 1,2-Dichlorobenzene         | < 1   | 21 (105 %R)   | 21 (104 %R) (1 RPD)     | 1/27/2012     | ug/l  | 18 - 190 | 20  | 624    |
| 4-Bromofluorobenzene (surr) | 93 %R | 99 %R         | 102 %R                  | 1/27/2012     | % Rec | 70 - 130 |     | 624    |



# QC REPORT

EAI ID#: 107170

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

Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name                | Blank  | LCS    | LCSD   | Analysis Date | Units | Limits   | RPD | Method |
|-------------------------------|--------|--------|--------|---------------|-------|----------|-----|--------|
| 1,2-Dichlorobenzene-d4 (surr) | 103 %R | 99 %R  | 99 %R  | 1/27/2012     | % Rec | 70 - 130 |     | 624    |
| Toluene-d8 (surr)             | 99 %R  | 101 %R | 100 %R | 1/27/2012     | % 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#: 107170

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

Client Designation: **Wastewater Analysis - Weekly**

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02

Matrix: aqueous

Date Sampled: 1/26/12

Date Received: 1/26/12

Units: ug/l

Date of Extraction/Preparation 1/27/12

Date of Analysis: 1/30/12

Analyst: JMR

Method: 625mod

Dilution Factor: 1

|                             |      |
|-----------------------------|------|
| Phenol                      | < 1  |
| 2-Chlorophenol              | < 1  |
| 2,4-Dichlorophenol          | < 1  |
| 2,4,5-Trichlorophenol       | < 1  |
| 2,4,6-Trichlorophenol       | < 1  |
| Pentachlorophenol           | < 5  |
| 2-Nitrophenol               | < 1  |
| 4-Nitrophenol               | < 5  |
| 2,4-Dinitrophenol           | < 5  |
| 2-Methylphenol              | < 1  |
| 3/4-Methylphenol            | < 1  |
| 2,4-Dimethylphenol          | < 1  |
| 4-Chloro-3-methylphenol     | < 1  |
| 4,6-Dinitro-2-methylphenol  | < 5  |
| Benzoic Acid                | < 50 |
| N-Nitrosodimethylamine      | < 1  |
| n-Nitroso-di-n-propylamine  | < 1  |
| n-Nitrosodiphenylamine      | < 1  |
| bis(2-Chloroethyl)ether     | < 1  |
| bis(2-chloroisopropyl)ether | < 1  |
| bis(2-Chloroethoxy)methane  | < 1  |
| 1,3-Dichlorobenzene         | < 1  |
| 1,4-Dichlorobenzene         | < 1  |
| 1,2-Dichlorobenzene         | < 1  |
| 1,2,4-Trichlorobenzene      | < 1  |
| 2-Chloronaphthalene         | < 1  |
| 4-Chlorophenyl-phenylether  | < 1  |
| 4-Bromophenyl-phenylether   | < 1  |
| Hexachloroethane            | < 1  |
| Hexachlorobutadiene         | < 1  |
| Hexachlorocyclopentadiene   | < 5  |
| Hexachlorobenzene           | < 1  |
| 4-Chloroaniline             | < 1  |
| 2-Nitroaniline              | < 5  |
| 3-Nitroaniline              | < 1  |
| 4-Nitroaniline              | < 1  |
| Benzyl alcohol              | < 5  |
| Nitrobenzene                | < 1  |
| Isophorone                  | < 1  |
| 2,4-Dinitrotoluene          | < 1  |
| 2,6-Dinitrotoluene          | < 1  |
| Benzidine (estimated)       | < 5  |
| 3,3'-Dichlorobenzidine      | < 1  |
| Pyridine                    | < 5  |
| Azobenzene                  | < 1  |



# LABORATORY REPORT

EAI ID#: 107170

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

Client Designation: **Wastewater Analysis - Weekly**

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Extraction/Preparation: 1/27/12  
Date of Analysis: 1/30/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1  
Carbazole < 1  
Dimethylphthalate < 1  
Diethylphthalate < 1  
Di-n-butylphthalate < 5  
Butylbenzylphthalate < 1  
bis(2-Ethylhexyl)phthalate < 5  
Di-n-octylphthalate < 1  
Dibenzofuran < 1  
Naphthalene < 1  
2-Methylnaphthalene < 1  
Acenaphthylene < 1  
Acenaphthene < 1  
Fluorene < 1  
Phenanthrene < 1  
Anthracene < 1  
Fluoranthene < 1  
Pyrene < 1  
Benzo[a]anthracene < 1  
Chrysene < 1  
Benzo[b]fluoranthene < 1  
Benzo[k]fluoranthene < 1  
Benzo[a]pyrene < 1  
Indeno[1,2,3-cd]pyrene < 1  
Dibenz[a,h]anthracene < 1  
Benzo[g,h,i]perylene < 1  
2-Fluorophenol (surr) 40 %R  
Phenol-d6 (surr) 29 %R  
2,4,6-Tribromophenol (surr) 79 %R  
Nitrobenzene-D5 (surr) 81 %R  
2-Fluorobiphenyl (surr) 81 %R  
p-Terphenyl-D14 (surr) 92 %R





# QC REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)

Batch ID: 734529-39483/A012712ABN1

Client Designation: Wastewater Analysis - Weekly

| Parameter Name              | Blank | LCS          | LCSD                  | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|--------------|-----------------------|---------------|-------|----------|-----|--------|
| Phenol                      | < 1   | 15 (30 %R)   | 15 (30 %R) (0 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Chlorophenol              | < 1   | 30 (61 %R)   | 31 (61 %R) (0 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dichlorophenol          | < 1   | 36 (72 %R)   | 36 (73 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,5-Trichlorophenol       | < 1   | 21 (85 %R)   | 21 (84 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,6-Trichlorophenol       | < 1   | 38 (76 %R)   | 37 (75 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| Pentachlorophenol           | < 5   | 49 (97 %R)   | 46 (93 %R) (4 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2-Nitrophenol               | < 1   | 36 (73 %R)   | 36 (72 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Nitrophenol               | < 5   | 16 (33 %R)   | 18 (36 %R) (9 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2,4-Dinitrophenol           | < 5   | 38 (76 %R)   | 41 (83 %R) (9 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Methylphenol              | < 1   | 16 (64 %R)   | 16 (65 %R) (2 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 3/4-Methylphenol            | < 1   | 14 (55 %R)   | 14 (56 %R) (2 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dimethylphenol          | < 1   | 34 (67 %R)   | 33 (67 %R) (0 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Chloro-3-methylphenol     | < 1   | 39 (77 %R)   | 40 (79 %R) (3 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4,6-Dinitro-2-methylphenol  | < 5   | 44 (89 %R)   | 48 (95 %R) (7 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| Benzoic Acid                | < 50  | < 50 (33 %R) | < 50 (35 %R) (6 RPD)  | 1/30/2012     | ug/l  | 15 - 140 | 20  | 625mod |
| N-Nitrosodimethylamine      | < 1   | 14 (55 %R)   | 13 (51 %R) (8 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitroso-di-n-propylamine  | < 1   | 19 (76 %R)   | 18 (73 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitrosodiphenylamine      | < 1   | 25 (101 %R)  | 25 (100 %R) (1 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethyl)ether     | < 1   | 17 (67 %R)   | 17 (67 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-chloroisopropyl)ether | < 1   | 17 (70 %R)   | 17 (69 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethoxy)methane  | < 1   | 18 (72 %R)   | 17 (70 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,3-Dichlorobenzene         | < 1   | 15 (59 %R)   | 14 (54 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,4-Dichlorobenzene         | < 1   | 15 (59 %R)   | 14 (55 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2-Dichlorobenzene         | < 1   | 15 (60 %R)   | 14 (56 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2,4-Trichlorobenzene      | < 1   | 16 (65 %R)   | 15 (61 %R) (6 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Chloronaphthalene         | < 1   | 18 (73 %R)   | 18 (71 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chlorophenyl-phenylether  | < 1   | 20 (79 %R)   | 20 (80 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Bromophenyl-phenylether   | < 1   | 21 (84 %R)   | 21 (84 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachloroethane            | < 1   | 13 (54 %R)   | 13 (51 %R) (6 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobutadiene         | < 1   | 15 (61 %R)   | 14 (56 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorocyclopentadiene   | < 5   | 12 (49 %R)   | 11 (45 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobenzene           | < 1   | 22 (88 %R)   | 20 (82 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chloroaniline             | < 1   | 20 (82 %R)   | 20 (81 %R) (1 RPD)    | 1/30/2012     | ug/l  | 15 - 140 | 20  | 625mod |
| 2-Nitroaniline              | < 5   | 19 (77 %R)   | 20 (79 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 3-Nitroaniline              | < 1   | 20 (79 %R)   | 20 (82 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Nitroaniline              | < 1   | 19 (74 %R)   | 22 (88 %R) (17 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzyl alcohol              | < 5   | 17 (70 %R)   | 17 (69 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Nitrobenzene                | < 1   | 18 (71 %R)   | 18 (71 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Isophorone                  | < 1   | 22 (86 %R)   | 21 (84 %R) (2 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2,4-Dinitrotoluene          | < 1   | 22 (88 %R)   | 23 (92 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2,6-Dinitrotoluene          | < 1   | 21 (82 %R)   | 21 (85 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzidine (estimated)       | < 5   | 19 (76 %R)   | 10 (39 %R) (64 RPD) ! | 1/30/2012     | ug/l  | 15 - 168 | 20  | 625mod |
| 3,3'-Dichlorobenzidine      | < 1   | 22 (87 %R)   | 22 (88 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Pyridine                    | < 5   | 14 (54 %R)   | 12 (48 %R) (12 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Azobenzene                  | < 1   | 21 (82 %R)   | 20 (82 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |



# QC REPORT

EAI ID#: 107170

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

Batch ID: 734529-39483/A012712ABN1

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name              | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Carbazole                   | < 1   | 22 (87 %R) | 22 (90 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dimethylphthalate           | < 1   | 20 (80 %R) | 20 (82 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Diethylphthalate            | < 1   | 21 (82 %R) | 21 (85 %R) (4 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-butylphthalate         | < 5   | 22 (87 %R) | 22 (89 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Butylbenzylphthalate        | < 1   | 21 (85 %R) | 22 (88 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Ethylhexyl)phthalate  | < 5   | 21 (86 %R) | 22 (89 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-octylphthalate         | < 1   | 21 (85 %R) | 22 (89 %R) (5 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenzofuran                | < 1   | 19 (75 %R) | 19 (74 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Naphthalene                 | < 1   | 19 (77 %R) | 18 (74 %R) (4 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Methylnaphthalene         | < 1   | 18 (71 %R) | 17 (69 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthylene              | < 1   | 19 (76 %R) | 19 (74 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthene                | < 1   | 20 (81 %R) | 20 (80 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Fluorene                    | < 1   | 21 (83 %R) | 21 (83 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Phenanthrene                | < 1   | 22 (86 %R) | 22 (86 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Anthracene                  | < 1   | 21 (85 %R) | 22 (87 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Fluoranthene                | < 1   | 22 (86 %R) | 22 (88 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Pyrene                      | < 1   | 20 (82 %R) | 21 (83 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]anthracene          | < 1   | 21 (84 %R) | 22 (86 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Chrysene                    | < 1   | 22 (87 %R) | 22 (87 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[b]fluoranthene        | < 1   | 20 (81 %R) | 21 (83 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[k]fluoranthene        | < 1   | 22 (90 %R) | 22 (89 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]pyrene              | < 1   | 21 (83 %R) | 21 (84 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Indeno[1,2,3-cd]pyrene      | < 1   | 21 (86 %R) | 22 (87 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenz[a,h]anthracene       | < 1   | 23 (91 %R) | 23 (92 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[g,h,i]perylene        | < 1   | 22 (89 %R) | 22 (88 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Fluorophenol (surr)       | 42 %R | 41 %R      | 40 %R              | 1/30/2012     | % Rec | 21 - 110 | 20  | 625mod |
| Phenol-d6 (surr)            | 29 %R | 30 %R      | 30 %R              | 1/30/2012     | % Rec | 15 - 94  | 20  | 625mod |
| 2,4,6-Tribromophenol (surr) | 76 %R | 93 %R      | 95 %R              | 1/30/2012     | % Rec | 15 - 110 | 20  | 625mod |
| Nitrobenzene-D5 (surr)      | 80 %R | 79 %R      | 78 %R              | 1/30/2012     | % Rec | 35 - 114 | 20  | 625mod |
| 2-Fluorobiphenyl (surr)     | 86 %R | 81 %R      | 77 %R              | 1/30/2012     | % Rec | 43 - 116 | 20  | 625mod |
| p-Terphenyl-D14 (surr)      | 92 %R | 97 %R      | 95 %R              | 1/30/2012     | % Rec | 33 - 130 | 20  | 625mod |

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#: 107170

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

Client Designation: **Wastewater Analysis - *Weekly***

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|                                 |                        |
|---------------------------------|------------------------|
| <b>Sample ID:</b>               | Treat Tank<br>Effluent |
| <b>Lab Sample ID:</b>           | 107170.02              |
| <b>Matrix:</b>                  | aqueous                |
| <b>Date Sampled:</b>            | 1/26/12                |
| <b>Date Received:</b>           | 1/26/12                |
| <b>Units:</b>                   | mg/L                   |
| <b>Date of Extraction/Prep:</b> | 1/30/12                |
| <b>Date of Analysis:</b>        | 1/30/12                |
| <b>Analyst:</b>                 | LAS                    |
| <b>Method:</b>                  | 1664A                  |
| <b>Dilution Factor:</b>         | 1                      |
| <b>Oil &amp; Grease (HEM)</b>   | < 5                    |



# QC REPORT

EAI ID#: 107170

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

Batch ID: 734532-40799/A013012OG1661

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name     | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 37 (92 %R) | 36 (90 %R) (2 RPD) | 1/30/2012     | 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#: 107170

Client: **GZA GeoEnvironmental, Inc. (NH)**  
Client Designation: **Wastewater Analysis - Weekly**

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Extraction/Prep: 1/27/12  
Date of Analysis: 1/27/12  
Analyst: JW  
Method: 608  
Dilution Factor: 1

|            |       |
|------------|-------|
| PCB-1016   | < 0.3 |
| PCB-1221   | < 0.3 |
| PCB-1232   | < 0.3 |
| PCB-1242   | < 0.3 |
| PCB-1248   | < 0.3 |
| PCB-1254   | < 0.3 |
| PCB-1260   | < 0.3 |
| TMX (surr) | 87 %R |
| DCB (surr) | 86 %R |



# QC REPORT

EAI ID#: 107170

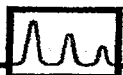
Client: **GZA GeoEnvironmental, Inc. (NH)**

Batch ID: 734529-35119/A012712E608P2

Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name | Blank  | LCS            | LCSD                     | Analysis Date | Units | Limits   | RPD | Method |
|----------------|--------|----------------|--------------------------|---------------|-------|----------|-----|--------|
| PCB-1016       | < 0.3  | 2.0 (101 %R)   | 2.0 (99 %R) (2 RPD)      | 1/27/2012     | ug/l  | 50 - 114 | 20  | 608    |
| PCB-1221       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1232       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1242       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1248       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1254       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1260       | < 0.3  | 1.9 (95 %R)    | 1.9 (93 %R) (2 RPD)      | 1/27/2012     | ug/l  | 8 - 127  | 20  | 608    |
| TMX (surr)     | 93 %R  | 92 %R          | 89 %R                    | 1/27/2012     | % Rec | 30 - 150 |     | 608    |
| DCB (surr)     | 104 %R | 103 %R         | 96 %R                    | 1/27/2012     | % Rec | 30 - 150 |     | 608    |

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.  
 \*/I Flagged analyte recoveries deviated from the QA/QC limits.



# LABORATORY REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)  
Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02

Matrix: aqueous

Date Sampled: 1/26/12

Date Received: 1/26/12

|               |       |
|---------------|-------|
| Fluoride      | 6.2   |
| Chloride      | 9500  |
| Nitrate-N     | 68    |
| Cyanide Total | 0.01  |
| Ammonia-N     | 1.2   |
| BOD           | < 6   |
| COD           | 180   |
| Total Phenols | < 0.5 |
| pH            | 7.6   |

| Units | Analysis |       | Method   | Analyst |
|-------|----------|-------|----------|---------|
|       | Date     | Time  |          |         |
| mg/L  | 2/01/12  | 13:35 | 300.0    | KL      |
| mg/L  | 1/30/12  | 13:33 | 4500CIE  | DLS     |
| mg/L  | 1/27/12  | 9:15  | 353.2    | DLS     |
| mg/L  | 1/31/12  | 9:15  | 4500CNE  | KJR     |
| mg/L  | 1/30/12  | 15:15 | 4500NH3D | SEL     |
| mg/L  | 1/27/12  | 17:30 | 5210B    | SKC     |
| mg/L  | 2/02/12  | 16:15 | H8000    | SKC     |
| mg/L  | 1/31/12  | 9:00  | 420.1    | JCC     |
| SU    | 1/27/12  | 15:56 | 4500H+B  | SEL     |

Total Phenols: The reporting limit has been elevated due to matrix interference.

Cyanide: Cyanide was re-analyzed on 2/8/2012 per client request. The re-analysis confirmed the cyanide hit. A matrix spike/matrix spike duplicate performed on this sample had acceptable recoveries.



# QC REPORT

EAI ID#: 107170

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

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name | Blank  | LCS          | LCSD                   | Units | Date of Analysis | Limits      | RPD | Method    |
|----------------|--------|--------------|------------------------|-------|------------------|-------------|-----|-----------|
| Fluoride       | < 0.1  | 2.0 (101 %R) | 2.0 (101 %R) (0 RPD)   | mg/L  | 1/31/12          | 90 - 110    | 20  | 300.0     |
| Chloride       | < 1    | 26 (102 %R)  | 25 (101 %R) (1 RPD)    | mg/L  | 1/30/12          | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N      | < 0.5  | 5.1 (103 %R) | 5.2 (103 %R) (0 RPD)   | mg/L  | 1/27/12          | 90 - 110    | 20  | 353.2     |
| Cyanide Total  | < 0.01 | 0.22 (89 %R) |                        | mg/L  | 1/31/12          | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N      | < 0.05 | 2.1 (104 %R) | 2.2 (109 %R) (5 RPD)   | mg/L  | 1/30/12          | 90 - 110    | 20  | 4500NH3DN |
| BOD            | < 6    | 330 (84 %R)  | 360 (89 %R) (6 RPD)    | mg/L  | 1/27/12          | 84 - 115    | 20  | 5210B     |
| COD            | < 10   | 100 (102 %R) | 100 (100 %R) (2 RPD)   | mg/L  | 2/2/12           | 85 - 115    | 20  | H8000     |
| Total Phenols  | < 0.05 | 0.24 (94 %R) | 0.27 (106 %R) (12 RPD) | mg/L  | 1/31/12          | 85 - 115    | 20  | 420.1     |
| pH             |        | 7.99         | 7.97                   | SU    | 1/27/12          | 7.95 - 8.07 | 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.





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03 February 2012

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

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



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### ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                   | Lab ID     | Matrix | Date Sampled    | Date Received   |
|-----------------------------|------------|--------|-----------------|-----------------|
| C-3024 Effluent Field Blank | 1201361-01 | Water  | 26-Jan-12 09:15 | 27-Jan-12 09:42 |
| Treat Tank Effluent         | 1201361-02 | Water  | 26-Jan-12 09:20 | 27-Jan-12 09:42 |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 27th, 2012. The samples were received intact, on-ice with temperatures measured at 2.9 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL ISSUES

The Effluent Field Blank was greater than the PQL, however the because the associated sample was a non-detect, re-analysis was not required.

All analytes pass according to the QC parameters of EPA Method 200.8.

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

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.

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Liz Siska, Project Manager

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### CHAIN OF CUSTODY FORMS

1201361



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

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Fax: 206-622-6870  
info@FrontierGS.com  
http://www.FrontierGS.com

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| Client: Eastern Analytical, Inc<br>Address: 15 Cheney Drive<br>Concord NH 03301<br>Project Name: Mercedes Station   |                    | Contact: Jeff Gagne<br>Phone: 603-288-3880 Fax: 603-288-4591<br>E-mail: jeff.gagne@eastlabs.com<br>Contract/PO: 27732 |              | Report To: Same<br>Address: Same                 |               | Invoice To: Same<br>Address: Same  |                      | Analyses Requested                                 |                 | FGS PM: Lia Siska<br>Date: 1/26/12<br>TAT (business days): 20 (std)<br>15 (5 4 3 2 24 hrs.<br>(For TAT - 10 days, contact PM<br>purchases order for expedited TAT)<br>Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N<br>(If yes, please contact PM)<br>EOD <input checked="" type="checkbox"/> Y <input type="checkbox"/> N<br>QA <input type="checkbox"/> Standard <input type="checkbox"/> High |  |
|---|--------------------|---|--------------|--|---------------|--|----------------------|--|-----------------|--|--|
| Phone: 603-288-3880 Fax: 603-288-4591<br>E-mail: CustomerService@eastlabs.com   |                    | Phone: Fax:   |              | E-mail: CustomerService@eastlabs.com             |               | E-mail: CustomerService@eastlabs.com   |                      | Field Prepared: HNO <sub>3</sub> HCl BCl Other (%) |                 | Total Analytes:  |  |
| No.   | Engraved Bottle ID | Sample ID   | # of Bottles | Matrix   | Date & Time   | Sampled By   | Field Filtered (Y/N) | Field Prepared: HNO <sub>3</sub> HCl BCl Other (%) | Total Analytes: | Comments   |  |
| 1   | C-3024             | EPA Loc field blank   | 1            | As   | 1/26/12 09:00 | JSG  | N                    | 1  | X               | Methods Included: Al, Sb, As, Ba, Bi, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Ti, Zn   |  |
| 2   | C-3025             | Wastewater Effluent   | 3            | Ww   | 1/26/12 09:00 | JSG  | N                    | 1  | X               | Please use certified cell - FGD effluent<br>Project - specific method multi-sample volume provided.  |  |
| 3   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 4   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 5   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 6   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 7   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 8   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 9   |                    |   |              |  |               |  |                      |  |                 |  |  |
| 10  |                    |   |              |  |               |  |                      |  |                 |  |  |
| 11  |                    |   |              |  |               |  |                      |  |                 |  |  |
| 12  |                    |   |              |  |               |  |                      |  |                 |  |  |
| For Laboratory Use Only   |                    | Matrix Codes:   |              | Relinquished By:                                 |               | Received By:   |                      | Received By:                                       |                 |  |  |
| COC Seal: <u>ND</u>   |                    | Comments: <u>710 4422</u>   |              | Name: <u>Jeff Gagne</u>                          |               | Name: <u>Jennifer Clark</u>  |                      | Name: <u>UPS</u>                                   |                 |  |  |
| Cooler Temp: <u>29°C</u>  |                    | FW: Fresh Water   |              | Organization: <u>Eastern Analytical</u>          |               | Organization: <u>EAT</u>   |                      | Organization: <u>UPS</u>                           |                 |  |  |
| Carrier: <u>UPS</u>   |                    | WW: Waste Water   |              | Date & Time: <u>1/26/12 10:45</u>                |               | Date & Time: <u>1/26/12 10:45</u>  |                      | Date & Time: <u>1/26/12 15:30</u>                  |                 |  |  |
| VTSR: <u>0927</u>   |                    | SB: Sea and Brackish Water  |              | Tracking number: <u>1E X 46 544 13 9827 4534</u> |               |  |                      |  |                 |  |  |
| # of Coolers: <u>1 (one)</u>  |                    | SS: Soil and Sediment   |              |  |               |  |                      |  |                 |  |  |
|   |                    | TST: Plant and Animal Tissue  |              |  |               |  |                      |  |                 |  |  |
|   |                    | HC: Hydrocarbons  |              |  |               |  |                      |  |                 |  |  |
|   |                    | TR: Trap  |              |  |               |  |                      |  |                 |  |  |
|   |                    | OT: Other   |              |  |               |  |                      |  |                 |  |  |
| Sample Disposal:<br><input type="checkbox"/> Return (shipping fees may apply)<br><input type="checkbox"/> Standard Disposal - 30 Days after report<br><input type="checkbox"/> Retain for <u>      </u> 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: <u>Jennifer Clark</u>   |                      | Date: <u>01/26/12</u>                              |                 |  |  |

Rec'd @ FGS - A Corp, ALEXA M BATH, PG 1-27-12  
VTSR: A2611000 0927

Frontier Global Sciences, Inc.

*Liz Siska*

Liz Siska, Project Manager

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## ANALYTICAL RESULTS

### C-3024 Effluent Field Blank

Matrix: Water

Laboratory ID: 1201361-01

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|-----------|----------|
| Aluminum   | ND     | 0.4   | 4.0   | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Antimony   | ND     | 0.005 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Arsenic    | ND     | 0.05  | 0.15  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Barium     | ND     | 0.03  | 0.20  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Beryllium  | ND     | 0.023 | 0.060 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Cadmium    | ND     | 0.004 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Chromium   | ND     | 0.009 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Copper     | ND     | 0.01  | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Iron       | ND     | 1.3   | 10.0  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Lead       | ND     | 0.004 | 0.040 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Manganese  | ND     | 0.007 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Mercury    | ND     | 0.08  | 0.50  | ng/L  | 1        | F202015 | 2B03001  | 02/02/12 | EPA 1631E | U        |
| Molybdenum | ND     | 0.006 | 0.06  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Nickel     | ND     | 0.008 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Selenium   | ND     | 0.19  | 0.60  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Silver     | ND     | 0.006 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Thallium   | ND     | 0.001 | 0.005 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-02, U |
| Zinc       | 0.25   | 0.02  | 0.20  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |

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Liz Siska, Project Manager



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## ANALYTICAL RESULTS

### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1201361-02

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|-----------|----------|
| Aluminum   | ND     | 8.9   | 80.0  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Antimony   | 0.758  | 0.092 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Arsenic    | 9.56   | 1.02  | 3.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Barium     | 208    | 0.54  | 4.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Beryllium  | ND     | 0.454 | 1.20  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Cadmium    | 0.587  | 0.083 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Chromium   | ND     | 0.18  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Copper     | 2.61   | 0.20  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Iron       | ND     | 26.0  | 200   | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Lead       | ND     | 0.078 | 0.800 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Manganese  | 349    | 0.15  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Mercury    | 12.2   | 0.34  | 2.02  | ng/L  | 4        | F202015 | 2B03001  | 02/02/12 | EPA 1631E |          |
| Molybdenum | 373    | 0.12  | 1.20  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Nickel     | 7.76   | 0.16  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Selenium   | 104    | 3.88  | 12.0  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Silver     | ND     | 0.120 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Thallium   | 5.65   | 0.022 | 0.100 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-01    |
| Zinc       | ND     | 0.33  | 4.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-02, U |

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Liz Siska, Project Manager

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201316-03

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 6.99                         | 5.98                            | 1.00 | 15.6  | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**SOURCE: 1201361-02**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

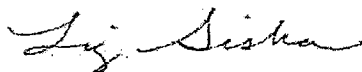
Lab Number: F201252-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes           |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------------|
| Beryllium  | ND                          | 2.0200             | 2.214                   | 110           | 75 - 125        | FGS-054 |                 |
| Aluminum   | 66.2                        | 151.50             | 213.7                   | 97.4          | 80 - 115        | FGS-054 |                 |
| Chromium   | 0.57                        | 7.0700             | 7.92                    | 104           | 85 - 115        | FGS-054 |                 |
| Manganese  | 348.7                       | 6.0600             | 353.9                   | 86.1          | 80 - 120        | FGS-054 |                 |
| Iron       | ND                          | 505.00             | 494.7                   | 98.0          | 75 - 125        | FGS-054 |                 |
| Nickel     | 7.76                        | 4.0400             | 11.66                   | 96.7          | 68 - 134        | FGS-054 |                 |
| Copper     | 2.61                        | 4.0400             | 6.22                    | 89.4          | 51 - 145        | FGS-054 |                 |
| Zinc       | ND                          | 10.100             | 9.96                    | 98.6          | 46 - 146        | FGS-054 |                 |
| Arsenic    | 9.56                        | 15.150             | 24.20                   | 96.6          | 85 - 115        | FGS-054 |                 |
| Selenium   | 104.4                       | 30.300             | 127.8                   | 77.1          | 59 - 149        | FGS-054 |                 |
| Molybdenum | 373.5                       | 2.0200             | 375.9                   | 119           | 80 - 115        | FGS-054 | QM-02           |
| Silver     | ND                          | 1.5150             | 1.289                   | 85.1          | 74 - 119        | FGS-054 |                 |
| Cadmium    | 0.587                       | 0.80800            | 1.229                   | 79.5          | 84 - 113        | FGS-054 | QM-07           |
| Antimony   | 0.758                       | 0.80800            | 1.539                   | 96.7          | 79 - 122        | FGS-054 |                 |
| Barium     | 208.4                       | 10.100             | 214.5                   | 60.3          | 80 - 120        | FGS-054 | QM-02           |
| Thallium   | 5.650                       | 0.40400            | 5.907                   | 63.6          | 64 - 137        | FGS-054 | QB-01,<br>QM-02 |
| Lead       | ND                          | 1.5150             | 1.488                   | 98.2          | 72 - 143        | FGS-054 |                 |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 2.0200             | 2.256                    | 112            | 1.88   | 75 - 125        | 20        | FGS-054 |       |
| Aluminum   | 151.50             | 213.6                    | 97.3           | 0.0484 | 80 - 115        | 20        | FGS-054 |       |
| Chromium   | 7.0700             | 7.58                     | 99.1           | 4.45   | 85 - 115        | 20        | FGS-054 |       |
| Manganese  | 6.0600             | 355.8                    | 118            | 0.544  | 80 - 120        | 20        | FGS-054 |       |
| Iron       | 505.00             | 489.5                    | 96.9           | 1.06   | 75 - 125        | 20        | FGS-054 |       |
| Nickel     | 4.0400             | 11.39                    | 89.9           | 2.39   | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0400             | 6.23                     | 89.5           | 0.117  | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.100             | 9.23                     | 91.4           | 7.53   | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.150             | 25.81                    | 107            | 6.44   | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.300             | 130.8                    | 86.9           | 2.28   | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0200             | 377.7                    | 210            | 0.491  | 80 - 115        | 20        | FGS-054 | QM-02 |

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Liz Siska, Project Manager





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### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201361-02

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Silver   | 1.5150             | 1.273                    | 84.0           | 1.28  | 74 - 119        | 20        | FGS-054 |       |
| Cadmium  | 0.80800            | 1.102                    | 63.8           | 10.8  | 84 - 113        | 20        | FGS-054 | QM-07 |
| Antimony | 0.80800            | 1.618                    | 107            | 5.02  | 79 - 122        | 20        | FGS-054 |       |
| Barium   | 10.100             | 219.6                    | 110            | 2.32  | 80 - 120        | 20        | FGS-054 |       |
| Thallium | 0.40400            | 6.127                    | 118            | 3.66  | 64 - 137        | 20        | FGS-054 | QB-01 |
| Lead     | 1.5150             | 1.502                    | 99.1           | 0.946 | 72 - 143        | 20        | FGS-054 |       |

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

**SOURCE: 1201361-02**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------|
| Beryllium  | ND                          | 20.200             | 18.23                   | 90.2          | 75 - 125        | FGS-054 | AS        |
| Aluminum   | 66.2                        | 4040.0             | 3986                    | 97.0          | 80 - 115        | FGS-054 | AS        |
| Chromium   | 0.57                        | 404.00             | 411.3                   | 102           | 85 - 115        | FGS-054 | AS        |
| Manganese  | 348.7                       | 404.00             | 755.7                   | 101           | 80 - 120        | FGS-054 | AS        |
| Iron       | ND                          | 2020.0             | 2012                    | 99.6          | 75 - 125        | FGS-054 | AS        |
| Nickel     | 7.76                        | 505.00             | 488.7                   | 95.2          | 68 - 134        | FGS-054 | AS        |
| Copper     | 2.61                        | 505.00             | 459.9                   | 90.6          | 51 - 145        | FGS-054 | AS        |
| Zinc       | ND                          | 1010.0             | 870.1                   | 86.1          | 46 - 146        | FGS-054 | AS        |
| Arsenic    | 9.56                        | 404.00             | 408.2                   | 98.7          | 85 - 115        | FGS-054 | AS        |
| Selenium   | 104.4                       | 404.00             | 480.3                   | 93.0          | 59 - 149        | FGS-054 | AS        |
| Molybdenum | 373.5                       | 202.00             | 574.9                   | 99.7          | 80 - 115        | FGS-054 | AS        |
| Silver     | ND                          | 20.200             | 17.43                   | 86.3          | 74 - 119        | FGS-054 | AS        |
| Cadmium    | 0.587                       | 40.400             | 37.52                   | 91.4          | 84 - 113        | FGS-054 | AS        |
| Antimony   | 0.758                       | 20.200             | 20.06                   | 95.5          | 79 - 122        | FGS-054 | AS        |
| Barium     | 208.4                       | 808.00             | 987.1                   | 96.4          | 80 - 120        | FGS-054 | AS        |
| Thallium   | 5.650                       | 20.200             | 25.86                   | 100           | 64 - 137        | FGS-054 | AS, QB-01 |
| Lead       | ND                          | 101.00             | 97.63                   | 96.7          | 72 - 143        | FGS-054 | AS        |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 20.200             | 18.26                    | 90.4           | 0.151  | 75 - 125        | 20        | FGS-054 | AS    |
| Aluminum   | 4040.0             | 3956                     | 96.3           | 0.751  | 80 - 115        | 20        | FGS-054 | AS    |
| Chromium   | 404.00             | 408.1                    | 101            | 0.780  | 85 - 115        | 20        | FGS-054 | AS    |
| Manganese  | 404.00             | 752.0                    | 99.8           | 0.487  | 80 - 120        | 20        | FGS-054 | AS    |
| Iron       | 2020.0             | 1989                     | 98.5           | 1.13   | 75 - 125        | 20        | FGS-054 | AS    |
| Nickel     | 505.00             | 485.4                    | 94.6           | 0.681  | 68 - 134        | 20        | FGS-054 | AS    |
| Copper     | 505.00             | 459.2                    | 90.4           | 0.161  | 51 - 145        | 20        | FGS-054 | AS    |
| Zinc       | 1010.0             | 870.5                    | 86.2           | 0.0542 | 46 - 146        | 20        | FGS-054 | AS    |
| Arsenic    | 404.00             | 412.0                    | 99.6           | 0.916  | 85 - 115        | 20        | FGS-054 | AS    |
| Selenium   | 404.00             | 470.1                    | 90.5           | 2.15   | 59 - 149        | 20        | FGS-054 | AS    |
| Molybdenum | 202.00             | 574.5                    | 99.5           | 0.0697 | 80 - 115        | 20        | FGS-054 | AS    |
| Silver     | 20.200             | 17.50                    | 86.6           | 0.385  | 74 - 119        | 20        | FGS-054 | AS    |

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### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201361-02

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes     |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-----------|
| Cadmium  | 40.400             | 38.59                    | 94.1           | 2.81   | 84 - 113        | 20        | FGS-054 | AS        |
| Antimony | 20.200             | 20.14                    | 95.9           | 0.386  | 79 - 122        | 20        | FGS-054 | AS        |
| Barium   | 808.00             | 994.4                    | 97.3           | 0.729  | 80 - 120        | 20        | FGS-054 | AS        |
| Thallium | 20.200             | 25.85                    | 100            | 0.0375 | 64 - 137        | 20        | FGS-054 | AS, QB-01 |
| Lead     | 101.00             | 97.56                    | 96.6           | 0.0774 | 72 - 143        | 20        | FGS-054 | AS        |

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

**SOURCE: 1201316-03**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 6.99                        | 20.200             | 22.10                   | 74.8          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 20.200             | 20.97                    | 69.2           | 5.22  | 71 - 125        | 24        | EPA 1631E | QM-05 |

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

**SOURCE: 1201361-02**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 12.20                       | 40.800             | 52.32                   | 98.3          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 40.800             | 52.12                    | 97.8           | 0.379 | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201359-01**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 1171                        | 1530.0             | 2618                    | 94.6          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 1530.0             | 2594                     | 93.1           | 0.888 | 71 - 125        | 24        | EPA 1631E |       |

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

**RECOVERY AND RPD**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Beryllium  | 2.0000             | 1.962                    | 98.1           | 75 - 125        | FGS-054 |       |
| Aluminum   | 150.00             | 146.0                    | 97.3           | 85 - 115        | FGS-054 |       |
| Chromium   | 7.0000             | 6.47                     | 92.5           | 85 - 115        | FGS-054 |       |
| Manganese  | 6.0000             | 5.83                     | 97.1           | 85 - 115        | FGS-054 |       |
| Iron       | 500.00             | 459.4                    | 91.9           | 80 - 120        | FGS-054 |       |
| Nickel     | 4.0000             | 3.92                     | 98.0           | 68 - 134        | FGS-054 |       |
| Copper     | 4.0000             | 4.17                     | 104            | 51 - 145        | FGS-054 |       |
| Zinc       | 10.000             | 10.48                    | 105            | 46 - 146        | FGS-054 |       |
| Arsenic    | 15.000             | 14.27                    | 95.1           | 85 - 115        | FGS-054 |       |
| Selenium   | 30.000             | 28.04                    | 93.5           | 59 - 149        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.88                     | 93.8           | 85 - 115        | FGS-054 |       |
| Silver     | 1.5000             | 1.490                    | 99.3           | 74 - 119        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.825                    | 103            | 84 - 113        | FGS-054 |       |
| Antimony   | 0.80000            | 0.780                    | 97.5           | 79 - 122        | FGS-054 |       |
| Barium     | 10.000             | 9.78                     | 97.8           | 85 - 115        | FGS-054 |       |
| Thallium   | 0.40000            | 0.417                    | 104            | 64 - 134        | FGS-054 | QB-01 |
| Lead       | 1.5000             | 1.517                    | 101            | 72 - 143        | FGS-054 |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|---------------------------|-----------------|--------|-----------------|-----------|---------|-------|
| Beryllium | 2.0000             | 1.944                     | 97.2            | 0.928  | 75 - 125        | 20        | FGS-054 |       |
| Aluminum  | 150.00             | 145.9                     | 97.2            | 0.0872 | 85 - 115        | 20        | FGS-054 |       |
| Chromium  | 7.0000             | 6.46                      | 92.2            | 0.275  | 85 - 115        | 20        | FGS-054 |       |
| Manganese | 6.0000             | 5.74                      | 95.6            | 1.55   | 85 - 115        | 20        | FGS-054 |       |
| Iron      | 500.00             | 458.2                     | 91.6            | 0.251  | 80 - 120        | 20        | FGS-054 |       |
| Nickel    | 4.0000             | 3.96                      | 99.0            | 1.01   | 68 - 134        | 20        | FGS-054 |       |
| Copper    | 4.0000             | 4.16                      | 104             | 0.0881 | 51 - 145        | 20        | FGS-054 |       |
| Zinc      | 10.000             | 10.39                     | 104             | 0.846  | 46 - 146        | 20        | FGS-054 |       |
| Arsenic   | 15.000             | 14.17                     | 94.4            | 0.731  | 85 - 115        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-BS/BSD1

LCS Source: Blank Spike Dup

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Selenium   | 30.000             | 27.98                     | 93.3            | 0.184 | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.86                      | 92.8            | 1.11  | 85 - 115        | 20        | FGS-054 |       |
| Silver     | 1.5000             | 1.501                     | 100             | 0.752 | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.757                     | 94.7            | 8.56  | 84 - 113        | 20        | FGS-054 |       |
| Antimony   | 0.80000            | 0.797                     | 99.6            | 2.18  | 79 - 122        | 20        | FGS-054 |       |
| Barium     | 10.000             | 9.76                      | 97.6            | 0.247 | 85 - 115        | 20        | FGS-054 |       |
| Thallium   | 0.40000            | 0.410                     | 103             | 1.51  | 64 - 134        | 20        | FGS-054 | QB-01 |
| Lead       | 1.5000             | 1.524                     | 102             | 0.433 | 72 - 143        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.11                    | 96.4           | 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             | 14.79                     | 94.3            | 2.16  | 80 - 120        | 24        | EPA 1631E |       |

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## PREPARATION BLANKS

Instrument: ICPMS-6

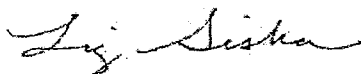
Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found   | MRL   | Units | Batch   | Method  | Notes    |
|---------------|------------|---------|-------|-------|---------|---------|----------|
| F201252-BLK1  | Beryllium  | -0.0003 | 0.060 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Aluminum   | 0.01    | 4.0   | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Chromium   | -0.04   | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Manganese  | -0.0007 | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Iron       | -0.4    | 10.0  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Nickel     | 0.004   | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Copper     | 0.02    | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Zinc       | 0.32    | 0.20  | µg/L  | F201252 | FGS-054 | QB-10    |
| F201252-BLK1  | Arsenic    | -0.15   | 0.15  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Selenium   | 0.14    | 0.60  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Molybdenum | 0.004   | 0.06  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Silver     | -0.001  | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Cadmium    | -0.010  | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Antimony   | -0.0003 | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Barium     | 0.07    | 0.20  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Thallium   | 0.002   | 0.005 | µg/L  | F201252 | FGS-054 | QB-02, U |
| F201252-BLK1  | Lead       | 0.0003  | 0.040 | µg/L  | F201252 | FGS-054 | U        |

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### PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2B03001

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|-------|------|-------|---------|-----------|----------|
| F202015-BLK1  | Mercury | 0.06  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK2  | Mercury | 0.03  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK3  | Mercury | 0.05  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK4  | Mercury | 0.06  | 0.50 | ng/L  | F202015 | EPA 1631E | QB-04, U |

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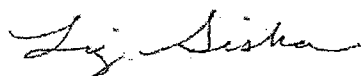
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## Notes and Definitions

- U Analyte included in the analysis, but not detected
- 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-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-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.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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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# CHAIN-OF-CUSTODY RECORD

107170 15

Date/Time  
Composites need start  
and stop dates/times

Matrix Parameters and Sample Notes

# of containers

| Sample IDs  | Date/Time | Matrix                  | Parameters and Sample Notes   | # of containers |
|---|-----------|-------------------------|---|-----------------|
| Effluent Field Blank  | 1/26/12   | aqueous<br>Grab or Comp | AqTot/SWLLMetalsSub   | 1               |
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate | 1/26/12   | aqueous<br>Grab or Comp | AqTot/SWLLMetalsSub/NH3/BOD/Cl/COD/CyanT/F/NO3/OC/1664/V624/E625/E608/PCBT/Phenols / PH *   | 17              |
| Treat Tank Effluent   | 9:20      | aqueous<br>Grab or Comp | AqTot/SWLLMetalsSub/NH3/BOD/Cl/COD/CyanT/F/NO3/OC/1664/V624/E625/E608/PCBT/Phenols / PH *   | 17              |
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate |           |                         | Circle preservative/s: HCL HNO <sub>3</sub> H <sub>2</sub> SO <sub>4</sub> NaOH MEOH Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> <input checked="" type="checkbox"/> CE<br>Circle preservative/s: HCL HNO <sub>3</sub> H <sub>2</sub> SO <sub>4</sub> NaOH MEOH Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> <input checked="" type="checkbox"/> CE<br>* AT Customers Requests<br>Dissolved Sample Field Filtered<br>Dissolved Sample Field Filtered |                 |

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAL Project ID 3902  
Project Name Wastewater Analysis - Weekly

State NH  
Client (Pro Mgr) Paul Pepler  
Customer GZA GeoEnvironmental, Inc. (NH)  
Address 380 Harvey Road  
City Manchester NH 03103

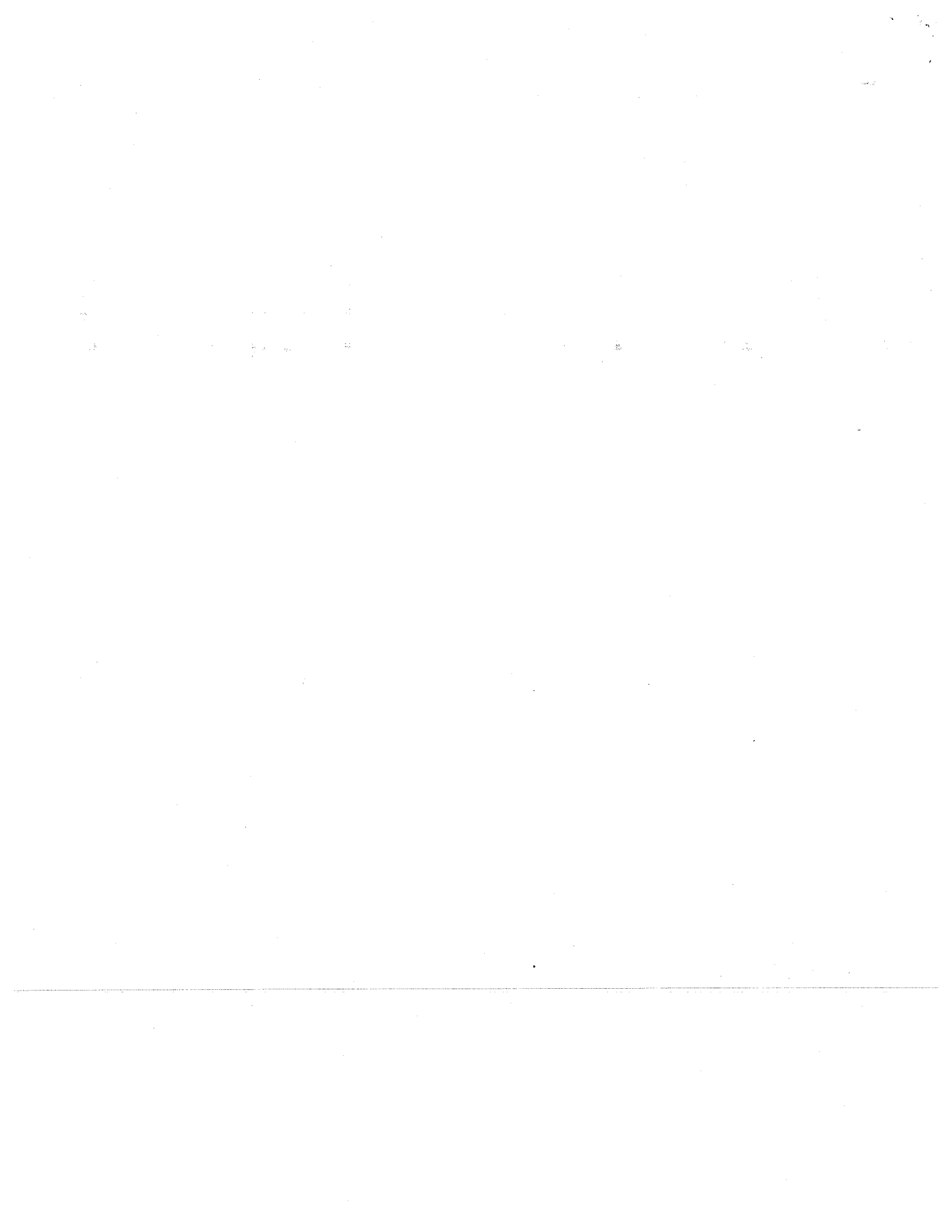
Phone 623-3600 Fax 624-9463 (37)  
Email/Address: paul.pepler@gza.com

Results Needed by: Preferred date 1/26/12  
Notes about project: (i.e. Special Limits, Billing info if different...)  
Subcontract ALL metals to Frontier Global Sciences.  
Metals include Total  
Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Tl, Zn.  
Metals analyses require project-specific MS/MSD.  
624, 625, 608 results needed

- QC deliverables  
 A  A+  B  B+  C  PC
- Reporting Options  
 HC  
 EDD PDF  
 EDD email  
 PDF prelim, NO FAX  
 e-mail Login Confirmation  
 NO FAX

Samples collected by: SB JB  
Relinquished by: [Signature]  
Date/Time: 1/26/12 10:45  
Temperature: 45 °C  
Ice present:  Yes  No

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Received by: \_\_\_\_\_



VIA EMAIL

February 23, 2012  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Winnepesaukee River Basin Program Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
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. Lesieur:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Wastewater Discharge Monitoring Report** for sampling conducted on February 2, 2012, as requested to supplement the initial sampling requirements as outlined in *Special Agreement – PSNH and WRBP Wastewater Treatment Plant*.

Table 1 included in the Wastewater Discharge Monitoring Report summarizes the analytical results for all required parameters as outlined in the terms of the Special Agreement. The attached **Analytical Data Report**, however, contains a more comprehensive list of parameters.

#### **ANALYTICAL DISCUSSION**

Flue Gas Desulfurization (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 United States Environmental Protection Agency (EPA) web site and a link to their draft Standard Operating Procedure (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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 that reads "Ronald A. Breton". The signature is written in a cursive, flowing style.

Ronald A. Breton, P.E.  
Principal

RAB:tmd

P:\04Jobs\0029300s\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Franklin\REPORT\final 04.0029307 Franklin DATA RPT 022312.docx

Attachments: Wastewater Discharge Monitoring Report  
Analytical Data Report



**WASTEWATER DISCHARGE MONITORING REPORT**

**WASTEWATER DISCHARGE MONITORING REPORT  
WINNIPESAUKEE RIVER BASIN PROGRAM  
WASTEWATER TREATMENT PLANT**

Public Service of New Hampshire - Merrimack Station  
Special Agreement - PSNH and WRBP Wastewater Discharge Request  
Dated 9/28/2011

Permitted Flow 25,000 gallons per day

**FLOW DATA**

|                                  |        |                         |
|----------------------------------|--------|-------------------------|
| Daily Flow Rate (gallons)        | 8,000  | (average)               |
| Monitoring Period Flow (gallons) | 16,000 | (1/27/2012 - 2/03/2012) |

**FACILITY INFORMATION**

Company Name Public Service Company of New Hampshire - Merrimack Station  
Company Owner Public Service Company of New Hampshire  
Facility Address 97 River Road  
Facility Contact Harold Keyes  
Telephone (603) 224-4081

**MONITORING REPORT**

Submittal Date 2/23/2012  
Monitoring Point End of treatment process  
Reporting Period First Month

**SAMPLE ANALYSIS**

Certified Analytical Laboratory Eastern Analytical Inc. (EAI) Certification Number 1012  
Authorized Representative Lorraine Olashaw  
Analytical Subcontractor Frontier Global Sciences Certification Number E87575

**SAMPLE COLLECTION**

Sampler Jeff Gagne (EAI)  
Sample Type Grab  
Sample Date 2/2/2012 Sample Time 9:15 AM  
pH 7.4

**CATEGORICAL PRETREATMENT STANDARDS**

40 CFR 423.16: Steam Electric Power Generating Category  
NOTE: There are no numerical pretreatment standards for this source

**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."

Harold Keyes  
Printed Name of Authorized Representative

Harold Keyes  
Signature of Authorized Representative

Station Manager  
Title

2/23/2012  
Date

**TABLE 1 - SUMMARY ANALYTICAL DATA**  
**Treated FGD Wastewater**  
 Public Service Company of New Hampshire  
 Merrimack Station  
 Bow, New Hampshire

| PARAMETER    | RESULTS<br>(mg/L)<br>2/2/2012<br>EAI/Frontier |
|--------------|---|
| Aluminum     | 0.218   |
| Arsenic      | 0.0121  |
| Cadmium      | < 0.00100                                     |
| Chloride     | 9,300   |
| Chromium (T) | < 0.00500                                     |
| Copper       | 0.00553                                       |
| Cyanide (T)  | < 0.01  |
| Iron         | < 0.500                                       |
| Lead         | < 0.00200                                     |
| Manganese    | 0.631   |
| Mercury      | 0.0000360                                     |
| Molybdenum   | 0.195   |
| Nickel       | < 0.00500                                     |
| Selenium     | 0.121   |
| Silver       | < 0.00100                                     |
| Zinc         | < 0.0100                                      |

**ANALYTICAL DATA REPORT**



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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107330  
Client Identification: Wastewater Analysis - **Weekly**  
Date Received: 2/2/2012

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](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

2.17.12  
Date

30  
# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 107330

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

Client Designation: Wastewater Analysis - *Weekly*

Temperature upon receipt (°C): **5.2**

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 |   |
| 107330.01 | Effluent Field Blank | 2/2/12   | 2/2/12  | aqueous |        | Adheres to Sample Acceptance Policy                           |
| 107330.02 | Treat Tank Effluent  | 2/2/12   | 2/2/12  | aqueous |        | 624, 625 and 608 placed on hold, then cancelled at customer's |

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#: 107330

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

Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank  
Effluent

Lab Sample ID: 107330.02

Matrix: aqueous

Date Sampled: 2/2/12

Date Received: 2/2/12

Units: mg/L

Date of Extraction/Prep: 2/8/12

Date of Analysis: 2/8/12

Analyst: LAS

Method: 1664A

Dilution Factor: 1

Oil & Grease (HEM) < 5





# QC REPORT

EAI ID#: 107330

Client: GZA GeoEnvironmental, Inc. (NH)

Batch ID: 734541-34922/A020812OG1661

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name     | Blank | LCS        | LCS D              | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 36 (91 %R) | 36 (90 %R) (1 RPD) | 2/8/2012      | 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#: 107330

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107330.02

Matrix: aqueous

Date Sampled: 2/2/12

Date Received: 2/2/12

|                  |        |
|------------------|--------|
| Solids Suspended | 6      |
| Solids Dissolved | 19000  |
| Fluoride         | 2.9    |
| Sulfate          | 1200   |
| Chloride         | 9300   |
| Nitrate-N        | 65     |
| Cyanide Total    | < 0.01 |
| Ammonia-N        | 1.1    |
| BOD              | < 6    |
| COD              | 140    |
| Total Phenols    | < 0.5  |
| pH               | 7.4    |

| Analysis |         |       |          |         |
|----------|---------|-------|----------|---------|
| Units    | Date    | Time  | Method   | Analyst |
| mg/L     | 2/03/12 | 10:45 | 2540D    | DLS     |
| mg/L     | 2/03/12 | 10:45 | 2540C    | DLS     |
| mg/L     | 2/08/12 | 15:01 | 300.0    | KL      |
| mg/L     | 2/08/12 | 14:46 | 300.0    | KL      |
| mg/L     | 2/03/12 | 10:35 | 4500CIE  | DLS     |
| mg/L     | 2/03/12 | 10:32 | 353.2    | DLS     |
| mg/L     | 2/08/12 | 9:30  | 4500CNE  | KJR     |
| mg/L     | 2/09/12 | 9:00  | 4500NH3D | SEL     |
| mg/L     | 2/03/12 | 11:20 | 5210B    | KJR     |
| mg/L     | 2/07/12 | 16:00 | H8000    | SKC     |
| mg/L     | 2/08/12 | 2:00  | 420.1    | JCC     |
| SU       | 2/02/12 | 16:30 | 4500H+B  | KJR     |

Total Phenols: The reporting limit has been elevated due to matrix interference.



# QC REPORT

EAI ID#: 107330

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

Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name   | Blank  | LCS           | LCSD                  | Units | Date of Analysis | Limits      | RPD | Method    |
|------------------|--------|---------------|-----------------------|-------|------------------|-------------|-----|-----------|
| Solids Suspended | < 2    | 95 (95 %R)    | 94 (94 %R) (1 RPD)    | mg/L  | 2/3/12           | 90 - 110    | 20  | 2540D     |
| Solids Dissolved | < 5    | 990 (99 %R)   | NA                    | mg/L  | 2/3/12           | 85 - 115    | 20  | 2540C     |
| Fluoride         | < 0.1  | 2.0 (99 %R)   | 2.0 (99 %R) (0 RPD)   | mg/L  | 2/8/12           | 90 - 110    | 20  | 300.0     |
| Sulfate          | < 1    | 20 (100 %R)   | 20 (101 %R) (1 RPD)   | mg/L  | 2/8/12           | 90 - 110    | 20  | 300.0     |
| Chloride         | < 1    | 24 (96 %R)    | 24 (97 %R) (1 RPD)    | mg/L  | 2/3/12           | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N        | < 0.5  | 4.9 (99 %R)   | 4.9 (98 %R) (1 RPD)   | mg/L  | 2/3/12           | 90 - 110    | 20  | 353.2     |
| Cyanide Total    | < 0.02 | 0.25 (100 %R) | NA                    | mg/L  | 2/8/12           | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N        | < 0.05 | 2.2 (109 %R)  | 2.2 (110 %R) (1 RPD)  | mg/L  | 2/9/12           | 90 - 110    | 20  | 4500NH3DN |
| BOD              | < 6    | 420 (104 %R)  | 420 (104 %R) (0 RPD)  | mg/L  | 2/3/12           | 84 - 115    | 20  | 5210B     |
| COD              | < 10   | 100 (103 %R)  | 100 (101 %R) (2 RPD)  | mg/L  | 2/7/12           | 85 - 115    | 20  | H8000     |
| Total Phenols    | < 0.05 | 0.22 (87 %R)  | 0.22 (89 %R) (2 RPD)  | mg/L  | 2/8/12           | 85 - 115    | 20  | 420.1     |
| pH               |        | 6.05 (101 %R) | 6.07 (101 %R) (0 RPD) | SU    | 2/2/12           | 5.95 - 6.07 | 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.



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

15 February 2012

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

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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                   | Lab ID     | Matrix | Date Sampled    | Date Received   |
|-----------------------------|------------|--------|-----------------|-----------------|
| C-3015 Effluent Field Blank | 1202063-01 | Water  | 02-Feb-12 08:47 | 03-Feb-12 09:30 |
| Treat Tank Effluent         | 1202063-02 | Water  | 02-Feb-12 09:15 | 03-Feb-12 09:30 |

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.*

Page 1 of 23  
1202063 Final Report  
02/15/2012



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on February 3rd, 2012. The samples were received intact, on-ice with temperatures measured at 10.6 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

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

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.

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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1202063 Final Report  
02/15/2012



414 Pontius Ave North  
 Seattle, WA 98109  
 Ph: 206-622-6960  
 Fx: 206-622-6870

### CHAIN OF CUSTODY FORMS



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

414 Pon 107330 39  
 Fax: 206-622-6870  
 info@frontiergs.com  
 http://www.frontiergs.com

Page 1 of 1

1202063

| Client: Eastern Analytical Inc<br>Address: 25 Chenell Drive<br>Concord NH 03301 |                    | Contact: Jeff Cozzano<br>Phone: 603-228-9200 Fax: 603-228-9201<br>E-mail: jeff@eastanalabs.com |              | Project Name: Merrimack Station   |               | Contract/PO:                 |                      | Report To: same  |              | Invoice To: same   |  | Address: same              |  | Address: same        |  | Phone: 603-228-9200 Fax: 603-228-9201<br>E-mail: customer@eastanalabs.com |  | Phone: Fax:<br>E-mail: customer@eastanalabs.com |  | Analyses Requested |  | FGS PM: 6:22 AM<br>Date: 2/23/12<br>TAT (business days): 20 (std)<br>15 (0 5 4 3 2 24 hrs)<br>(For TAT < 10 days, contact PM)<br>Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N<br>(If yes, please contact PM)<br>EOD <input type="checkbox"/> Y <input type="checkbox"/> N<br>QA <input type="checkbox"/> Standard <input type="checkbox"/> High |  |
|---|--------------------|--|--------------|---|---------------|------------------------------|----------------------|--|--------------|--|--|----------------------------|--|----------------------|--|---|--|---|--|--------------------|--|---|--|
| No.   | Engraved Bottle ID | Sample ID  | # of Bottles | Matrix  | Date & Time   | Sampled By                   | Field Filtered (Y/N) | Field Preserved: HNO <sub>3</sub> HCl BrCl Other (%)   | Total Metals | Comments   |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 1   | C-3818             | Effluent Field Blvd  | 1            | AQ  | 2/21/12 08:47 | JB/67                        | N                    | -  | X            | 1) Metals Include: Al, Se, As, Ba, Bi, Cd, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Si, Tl, Zn<br>2) Please see comments for field filter<br>3) request for the analysis add sample name per bottle |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 2   | C-3818             | Tank Tank Effluent   | 3            | WW  | 2/21/12 09:15 | JB/67                        | N                    | -  | X            |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 3   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 4   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 5   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 6   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 7   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 8   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 9   |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 10  |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 11  |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| 12  |                    |  |              |   |               |                              |                      |  |              |  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |
| COC Seal: No  |                    | Comments: 710-0268   |              | Matrix Codes: 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 |               | Relinquished By: [Signature] |                      | Received By: [Signature]   |              | Name: Jim Blackwell  |  | Name: [Signature]          |  | Name: ALEXA RAHMI    |  |   |  |   |  |                    |  |   |  |
| Cooler Temp: 10.6 C   |                    | Carrier: 1 PS  |              | VTSR: 0930  |               | # of Coolers: 1 (one)        |                      | 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) |              | Date & Time: 2/21/12 13:00   |  | Date & Time: 2/21/12 13:00 |  | Date & Time: 2/23/12 |  |   |  |   |  |                    |  |   |  |
| Tracking number: 1Z X46 519 01 9628 4755 1431                                   |                    |  |              |   |               |                              |                      |  |              | 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: _____  |  |                            |  |                      |  |   |  |   |  |                    |  |   |  |

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Liz Siska, Project Manager



### CHAIN OF CUSTODY FORMS

Sample Receipt Checklist

FGS Work Order: 1202063

Client: Eastern Analytical Date & Time Received: 2-3-12 14:31  
 Project: Microbiological Received By: Alexandra Polun  
 SDB: Liz Siska # of Coolers Received: 1 (one) FGS P.M.:  
 Samples Arrived By: Y Shipping Service: Hand Other (specify):  
 Tracking/Invoice Number(s): 1202063 589 019628 9755

| Cooler Information                              | Yes                                 | No                       | NA                       | Comments |
|---|-------------------------------------|--------------------------|--------------------------|----------|
| This cooler did not appear to be tampered with: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Cooler seals are present and intact:            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |
| Cooler seals signed by:                         | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> |          |

Thermal Preservation: X Loose Ice None (Ambient) Other (specify):  
 Thermometer ID: 6268 Correction Factor (CF): 0.4 degrees C

|           |         |            |    |
|-----------|---------|------------|----|
| Cooler 1: | 16.6 °C | Cooler 11: | °C |
| Cooler 2: | °C      | Cooler 12: | °C |
| Cooler 3: | °C      | Cooler 13: | °C |
| Cooler 4: | °C      | Cooler 14: | °C |
| Cooler 5: | °C      | Cooler 15: | °C |

Chain of Custody

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

| Sample ID/Sample Description:       | Yes                                 | No                       | NA                       | Comments |
|-------------------------------------|-------------------------------------|--------------------------|--------------------------|----------|
| 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/transfer: | <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"/> |          |
| pH adjusted by laboratory, noted in logbook:           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |          |

Anomalies/Non-conformances: N/A

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

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*Liz Siska*

Liz Siska, Project Manager

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## ANALYTICAL RESULTS

### C-3015 Effluent Field Blank

Matrix: Water

Laboratory ID: 1202063-01

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | ND     | 0.4   | 4.0   | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Antimony   | ND     | 0.005 | 0.020 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Arsenic    | ND     | 0.05  | 0.15  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Barium     | ND     | 0.03  | 0.20  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Beryllium  | ND     | 0.023 | 0.060 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.004 | 0.020 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.009 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Copper     | ND     | 0.01  | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Iron       | ND     | 1.3   | 10.0  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Lead       | ND     | 0.004 | 0.040 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Manganese  | 0.12   | 0.007 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Mercury    | ND     | 0.08  | 0.50  | ng/L  | 1        | F202057 | 2B06014  | 02/06/12 | EPA 1631E     | U        |
| Molybdenum | ND     | 0.006 | 0.06  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Nickel     | ND     | 0.008 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Selenium   | ND     | 0.19  | 0.60  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Silver     | ND     | 0.006 | 0.020 | µg/L  | 1        | F202159 | 2B15016  | 02/15/12 | EPA 200.8 Mod | QM-12, U |
| Thallium   | ND     | 0.001 | 0.005 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | QB-02, U |
| Zinc       | ND     | 0.02  | 0.20  | µg/L  | 1        | F202053 | 2B15001  | 02/14/12 | EPA 200.8 Mod | U        |

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## ANALYTICAL RESULTS

### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1202063-02

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | 218    | 22.2  | 200   | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Antimony   | 1.55   | 0.230 | 1.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Arsenic    | 12.1   | 2.55  | 7.50  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Barium     | 243    | 1.35  | 10.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Beryllium  | ND     | 1.14  | 3.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.208 | 1.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.45  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Copper     | 5.53   | 0.50  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Iron       | ND     | 65.0  | 500   | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Lead       | ND     | 0.195 | 2.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Manganese  | 631    | 0.37  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Mercury    | 36.0   | 0.84  | 5.05  | ng/L  | 10       | F202057 | 2B06014  | 02/06/12 | EPA 1631E     |          |
| Molybdenum | 195    | 0.30  | 3.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Nickel     | ND     | 0.40  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Selenium   | 121    | 9.69  | 30.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Silver     | ND     | 0.300 | 1.00  | µg/L  | 50       | F202159 | 2B15016  | 02/15/12 | EPA 200.8 Mod | QM-12, U |
| Thallium   | 6.85   | 0.056 | 0.250 | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | QB-01    |
| Zinc       | ND     | 0.82  | 10.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1202063-02

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-DUPI

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 36.03                        | 36.21                           | 5.05 | 0.482 | 24        | EPA 1631E |       |

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## MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1202063-02

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | ND                          | 2.0200             | 2.062                   | 102           | 70 - 130        | EPA 200.8 Mod |       |
| Aluminum   | 217.7                       | 151.50             | 355.1                   | 90.7          | 70 - 130        | EPA 200.8 Mod |       |
| Chromium   | 2.05                        | 7.0700             | 9.47                    | 105           | 70 - 130        | EPA 200.8 Mod |       |
| Manganese  | 631.1                       | 6.0600             | 611.0                   | -331          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Iron       | ND                          | 505.00             | 474.3                   | 93.9          | 70 - 130        | EPA 200.8 Mod |       |
| Nickel     | 3.25                        | 4.0400             | 7.58                    | 107           | 70 - 130        | EPA 200.8 Mod |       |
| Copper     | 5.53                        | 4.0400             | 9.39                    | 95.7          | 70 - 130        | EPA 200.8 Mod |       |
| Zinc       | 0.99                        | 10.100             | 12.68                   | 116           | 70 - 130        | EPA 200.8 Mod |       |
| Arsenic    | 12.06                       | 15.150             | 24.53                   | 82.3          | 70 - 130        | EPA 200.8 Mod |       |
| Selenium   | 121.3                       | 30.300             | 145.2                   | 79.1          | 70 - 130        | EPA 200.8 Mod |       |
| Molybdenum | 195.2                       | 2.0200             | 192.5                   | -135          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Cadmium    | 0.623                       | 0.80800            | 1.437                   | 101           | 70 - 130        | EPA 200.8 Mod |       |
| Antimony   | 1.549                       | 0.80800            | 2.358                   | 100           | 70 - 130        | EPA 200.8 Mod |       |
| Barium     | 243.3                       | 10.100             | 251.4                   | 79.3          | 70 - 130        | EPA 200.8 Mod |       |
| Thallium   | 6.848                       | 0.40400            | 7.126                   | 68.9          | 70 - 130        | EPA 200.8 Mod | QB-01 |
| Lead       | ND                          | 1.5150             | 1.334                   | 88.0          | 70 - 130        | EPA 200.8 Mod |       |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium  | 2.0200             | 2.025                    | 100            | 1.80  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Aluminum   | 151.50             | 338.6                    | 79.8           | 4.77  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Chromium   | 7.0700             | 9.09                     | 99.6           | 4.12  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Manganese  | 6.0600             | 612.2                    | -311           | 0.200 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Iron       | 505.00             | 464.8                    | 92.0           | 2.03  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Nickel     | 4.0400             | 8.13                     | 121            | 7.06  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Copper     | 4.0400             | 9.35                     | 94.8           | 0.415 | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.100             | 10.13                    | 90.4           | 22.4  | 70 - 130        | 20        | EPA 200.8 Mod | QR-08 |
| Arsenic    | 15.150             | 25.77                    | 90.5           | 4.92  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.300             | 139.9                    | 61.4           | 3.76  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Molybdenum | 2.0200             | 190.9                    | -213           | 0.823 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Cadmium    | 0.80800            | 1.230                    | 75.2           | 15.5  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80800            | 2.316                    | 95.0           | 1.77  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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

**SOURCE: 1202063-02**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes        |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|--------------|
| Barium   | 10.100             | 250.6                    | 71.7           | 0.305 | 70 - 130        | 20        | EPA 200.8 Mod |              |
| Thallium | 0.40400            | 6.963                    | 28.6           | 2.31  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02, QB-01 |
| Lead     | 1.5150             | 1.403                    | 92.6           | 5.09  | 70 - 130        | 20        | EPA 200.8 Mod |              |

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

**SOURCE: 1202063-02**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-----------|
| Beryllium  | ND                          | 50.500             | 42.91                   | 85.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Aluminum   | 217.7                       | 10100              | 9206                    | 89.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Chromium   | 2.05                        | 1010.0             | 1006                    | 99.4          | 70 - 130        | EPA 200.8 Mod | AS        |
| Manganese  | 631.1                       | 1010.0             | 1582                    | 94.2          | 70 - 130        | EPA 200.8 Mod | AS        |
| Iron       | ND                          | 5050.0             | 4849                    | 96.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Nickel     | 3.25                        | 1262.5             | 1190                    | 94.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Copper     | 5.53                        | 1262.5             | 1149                    | 90.6          | 70 - 130        | EPA 200.8 Mod | AS        |
| Zinc       | 0.99                        | 2525.0             | 2401                    | 95.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Arsenic    | 12.06                       | 1010.0             | 1050                    | 103           | 70 - 130        | EPA 200.8 Mod | AS        |
| Selenium   | 121.3                       | 1010.0             | 1168                    | 104           | 70 - 130        | EPA 200.8 Mod | AS        |
| Molybdenum | 195.2                       | 505.00             | 685.1                   | 97.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Cadmium    | 0.623                       | 101.00             | 96.95                   | 95.4          | 70 - 130        | EPA 200.8 Mod | AS        |
| Antimony   | 1.549                       | 50.500             | 50.84                   | 97.6          | 70 - 130        | EPA 200.8 Mod | AS        |
| Barium     | 243.3                       | 2020.0             | 2379                    | 106           | 70 - 130        | EPA 200.8 Mod | AS        |
| Thallium   | 6.848                       | 50.500             | 53.06                   | 91.5          | 70 - 130        | EPA 200.8 Mod | AS, QB-01 |
| Lead       | ND                          | 252.50             | 220.5                   | 87.3          | 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 |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 50.500             | 43.37                    | 85.9           | 1.08   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Aluminum   | 10100              | 9221                     | 89.1           | 0.164  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Chromium   | 1010.0             | 990.2                    | 97.8           | 1.59   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Manganese  | 1010.0             | 1562                     | 92.2           | 1.27   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Iron       | 5050.0             | 4775                     | 94.6           | 1.53   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Nickel     | 1262.5             | 1197                     | 94.6           | 0.613  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Copper     | 1262.5             | 1129                     | 89.0           | 1.79   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Zinc       | 2525.0             | 2399                     | 95.0           | 0.0456 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Arsenic    | 1010.0             | 1013                     | 99.2           | 3.57   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Selenium   | 1010.0             | 1151                     | 102            | 1.49   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Molybdenum | 505.00             | 684.8                    | 97.0           | 0.0426 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cadmium    | 101.00             | 100.4                    | 98.7           | 3.45   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Antimony   | 50.500             | 51.11                    | 98.1           | 0.531  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**SOURCE: 1202063-02**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes     |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-----------|
| Barium   | 2020.0             | 2377                     | 106            | 0.106 | 70 - 130        | 20        | EPA 200.8 Mod | AS        |
| Thallium | 50.500             | 53.45                    | 92.3           | 0.720 | 70 - 130        | 20        | EPA 200.8 Mod | AS, QB-01 |
| Lead     | 252.50             | 219.8                    | 87.0           | 0.315 | 70 - 130        | 20        | EPA 200.8 Mod | AS        |

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Liz Siska, Project Manager



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

**SOURCE: 1202063-02**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-MS/MSDI

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 36.03                       | 102.00             | 140.9                   | 103           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|--------|-----------------|-----------|-----------|-------|
| Mercury | 102.00             | 141.0                    | 103            | 0.0816 | 71 - 125        | 24        | EPA 1631E |       |

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*Liz Siska*

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

**SOURCE: 1202035-02RE1**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 38.97                       | 102.00             | 144.0                   | 103           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 102.00             | 144.5                    | 103            | 0.394 | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1202063-02RE2**

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-MS/MSDI

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 1.5150             | 1.891                   | 125           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5150             | 2.021                    | 133            | 6.64  | 70 - 130        | 20        | EPA 200.8 Mod | QM-07 |

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

**SOURCE: 1202063-02RE2**

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 50.500             | 45.54                   | 90.2          | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 50.500             | 46.21                    | 91.5           | 1.46  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Beryllium  | 2.0000             | 1.891                    | 94.5           | 85 - 115        | EPA 200.8 Mod |       |
| Aluminum   | 150.00             | 143.0                    | 95.3           | 85 - 115        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.44                     | 92.0           | 85 - 115        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 5.77                     | 96.2           | 85 - 115        | EPA 200.8 Mod |       |
| Iron       | 500.00             | 454.7                    | 90.9           | 85 - 115        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.02                     | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.18                     | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.25                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.25                    | 95.0           | 85 - 115        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 29.36                    | 97.9           | 85 - 115        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.82                     | 91.0           | 85 - 115        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.828                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.800                    | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.99                     | 99.9           | 85 - 115        | EPA 200.8 Mod |       |
| Thallium   | 0.40000            | 0.420                    | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.552                    | 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 |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium | 2.0000             | 1.863                     | 93.1            | 1.50  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Aluminum  | 150.00             | 137.5                     | 91.7            | 3.91  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Chromium  | 7.0000             | 6.29                      | 89.9            | 2.39  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Manganese | 6.0000             | 5.58                      | 93.0            | 3.37  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Iron      | 500.00             | 435.9                     | 87.2            | 4.22  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Nickel    | 4.0000             | 3.71                      | 92.9            | 7.79  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Copper    | 4.0000             | 4.03                      | 101             | 3.75  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Zinc      | 10.000             | 9.89                      | 98.9            | 3.59  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Arsenic   | 15.000             | 13.45                     | 89.7            | 5.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Selenium  | 30.000             | 29.20                     | 97.3            | 0.548 | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-BS/BSDI

LCS Source: Blank Spike Dup

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Molybdenum | 2.0000             | 1.77                      | 88.3            | 3.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.794                     | 99.2            | 4.16  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.784                     | 98.0            | 2.05  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.82                      | 98.2            | 1.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Thallium   | 0.40000            | 0.407                     | 102             | 2.98  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.535                     | 102             | 1.06  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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

**RECOVERY AND RPD**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-BS/BSD1

LCS Source: LCS

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.77                    | 101            | 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             | 16.05                     | 102             | 1.76  | 80 - 120        | 24        | EPA 1631E |       |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Silver  | 1.5000             | 2.156                    | 144            | 85 - 115        | EPA 200.8 Mod | QM-12 |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5000             | 2.141                     | 143             | 0.706 | 85 - 115        | 20        | EPA 200.8 Mod | QM-12 |

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### PREPARATION BLANKS

Instrument: Hg-16

Sequence: 2B06014

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|-------|------|-------|---------|-----------|----------|
| F202057-BLK1  | Mercury | 0.04  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK2  | Mercury | 0.04  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK3  | Mercury | 0.05  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK4  | Mercury | 0.10  | 0.50 | ng/L  | F202057 | EPA 1631E | QB-04, U |

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## PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|------------|--------|-------|-------|---------|---------------|-------|
| F202053-BLK1  | Beryllium  | 0.005  | 0.060 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Aluminum   | -0.04  | 4.0   | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Chromium   | -0.02  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Manganese  | -0.002 | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Iron       | -0.3   | 10.0  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Nickel     | -0.03  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Copper     | 0.008  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Zinc       | 0.10   | 0.20  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Arsenic    | -0.07  | 0.15  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Selenium   | -0.02  | 0.60  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Molybdenum | 0.01   | 0.06  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Cadmium    | 0.005  | 0.020 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Antimony   | 0.019  | 0.020 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Barium     | 0.005  | 0.20  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Thallium   | 0.028  | 0.005 | µg/L  | F202053 | EPA 200.8 Moc | QB-10 |
| F202053-BLK1  | Lead       | 0.004  | 0.040 | µg/L  | F202053 | EPA 200.8 Moc | U     |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|---------|--------|-------|-------|---------|---------------|-------|
| F202159-BLK1  | Silver  | 0.0006 | 0.020 | µg/L  | F202159 | 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-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-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.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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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eastern analytical, inc.  
Professional Laboratory Services

# CHAIN-OF-CUSTODY RECORD

107330  
GZANH  
03

Date/Time: 2/2/2012  
Composites need start and stop dates/times: 8:47  
Matrix: aqueous (Grab/Comp)  
Parameters and Sample Notes: AqTot/SWLLMetalsSub  
# of containers: 1

Sampler confirms ID and parameters are accurate  
Circle preservative/s: HCL HNO<sub>3</sub> H<sub>2</sub>SO<sub>4</sub> NaOH MeOH Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> ~~YES~~  
Dissolved Sample Field Filtered

Treat Tank Effluent  
2/2/2012  
aqueous  
Grab or Comp  
AqTot/SWLLMetalsSub/BOD/COD/Cyant/F/NO3/OG1664/SO4/TDS/TSS/V624A/E625/TPhenols/E600P/GB/NH3/Cl/PH  
18

Sampler confirms ID and parameters are accurate  
Circle preservative/s: ~~HCl~~ HNO<sub>3</sub> H<sub>2</sub>SO<sub>4</sub> NaOH MeOH Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> ~~YES~~  
Dissolved Sample Field Filtered

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAL Project ID 3902  
Project Name Wastewater Analysis - Weekly  
State NH  
Client (Pro Mgr) Paul Pepler  
Customer GZA GeoEnvironmental, Inc. (NH)  
Address 380 Harvey Road  
City Manchester NH 03103  
Phone 623-3600 Fax 624-9463 (37)  
Email/Address: paul.pepler@gza.com

Results Needed by: Preferred date \_\_\_\_\_  
Notes about project: (i.e. Special Limits, Billing info if different...)  
Subcontract ALL metals to Frontier Global Sciences.  
Metals include Total  
Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Ti, Zn.  
Metals analyses require project-specific MS/MSD.  
Please hold G24/G25/G05 etc. at 1705  
per GZA.

Reporting Options:  
 HC  
 EDD PDF  
 EDD email  
 PDF prelim, NO FAX  
 e-mail Login Confirmation  
 NO FAX  
PONumber: verbal 02259252  
Quote No: 1039426  
Temperature: 5.2 °C  
Ice present Yes  No   
Sample collected by: JTS GT  
Relinquished by: [Signature] Date/Time: 2/2/12 13:00  
Received by: [Signature]

QC deliverables:  A  A+  B  B+  C  PC  
Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Received by: \_\_\_\_\_  
Eastern Analytical, Inc. 25 Chenell Dr. Concord, NH 03301 Phone: (603)228-0525 1-800-287-0525 Fax: (603)228-4591

VIA EMAIL

March 9, 2012  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Winnepesaukee River Basin Program Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
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. Lesieur:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Analytical Data Report** for sampling conducted on February 9, 2012, in accordance with *Special Agreement – PSNH and WRBP Wastewater Treatment Plant*, which requires that “Any testing results on the proposed discharge after start up at your facility will need to be forwarded to us for our review and files.”

**ANALYTICAL DISCUSSION**

Flue Gas Desulfurization (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 United States Environmental Protection Agency (EPA) web site and a link to their draft Standard Operating Procedure (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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 FDG 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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

RAB:tmd

F:\04Jobs\0029300a\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Franklin\REPORT\FINAL 04.0029307 Franklin DATA RPT 030812.docx

Attachment: Analytical Data Report

**ANALYTICAL DATA REPORT**

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107558  
Client Identification: Wastewater Analysis - *Weekly*  
Date Received: 2/9/2012

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](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

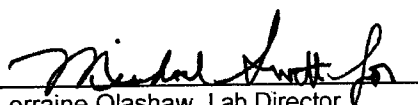
Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

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

2/29/12  
Date

41  
# of pages (excluding cover letter)





# SAMPLE CONDITIONS PAGE

EAI ID#: 107558

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

Client Designation: Wastewater Analysis - *Weekly*

**Temperature upon receipt (°C): 20**

**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) |
|-----------|----------------------|---------------|--------------|---------------|--------------|---|
| 107558.01 | Effluent Field Blank | 2/9/12        | 2/9/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 107558.02 | Treat Tank Effluent  | 2/9/12        | 2/9/12       | 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#: 107558

Client: **GZA GeoEnvironmental, Inc. (NH)**  
Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107558.02

Matrix: aqueous

Date Sampled: 2/9/12

Date Received: 2/9/12

pH 7.2

| Analysis |         |       |         |         |
|----------|---------|-------|---------|---------|
| Units    | Date    | Time  | Method  | Analyst |
| SU       | 2/09/12 | 10:56 | 4500H+B | CJJ     |



# QC REPORT

EAI ID#: 107558

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

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name | Blank | LCS          | LCSD                 | Units | Date of Analysis | Limits      | RPD | Method  |
|----------------|-------|--------------|----------------------|-------|------------------|-------------|-----|---------|
| pH             |       | 6.0 (101 %R) | 6.0 (101 %R) (0 RPD) | SU    | 2/9/12           | 5.95 - 6.07 | 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.



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

27 February 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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## 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   |
|----------------------|------------|--------|-----------------|-----------------|
| Effluent Field Blank | 1202140-01 | Water  | 09-Feb-12 00:00 | 10-Feb-12 09:25 |
| Treat Tank Effluent  | 1202140-02 | Water  | 09-Feb-12 00:00 | 10-Feb-12 09:25 |

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.*



## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on February 10th, 2012. The samples were received intact, on-ice with temperatures measured at 2.0 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

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

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.

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

---

Liz Siska, Project Manager

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414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

### CHAIN OF CUSTODY FORMS

1202140



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

107558

Seattle WA 98109  
206-622-6960  
206-622-6870  
info@FrontierGS.com  
http://www.FrontierGS.com

Page 1 of 1

1202140

|  |                        |   |   |  |        |   |   |  |   |   |  |   |  |   |  |  |  |  |  |  |  |   |  |  |  |  |  |
|--|------------------------|---|---|--|--------|---|---|--|---|---|--|---|--|---|--|--|--|--|--|--|--|---|--|--|--|--|--|
| Client: Eastern Analytical, Inc<br>Address: 25 Chenett Drive<br>Concord NH 03301 |                        | Contact: Ted & Coyle<br>Phone: 603-228-4580 Fax: 603-228-4571<br>E-mail: ted@eastanalytical.com |   | Project Name: Merrimack Station          |        | Contract/PO: 27780  |   | Report To: Same  |   | Invoice To: Same  |  | Address:  |  | Address:  |  | Phone: 603-228-4525 Fax: 603-228-4571                        |  | Phone: Fax:  |  | E-mail: CustomerService@ealabs.com                           |  | E-mail: CustomerService@ealabs.com  |  |  |  |  |  |
| Engraved Bottle ID   |                        | Sample ID   |   | # of Bottles                             |        | Matrix  |   | Date & Time  |   | Sampled By  |  | Field Filtered (Y/N)  |  | Field Preserved: HNO <sub>3</sub> HCl BrCl Other: (%)                 |  | Analyses Requested   |  | FSS PM: Lie S&S  |  | Date: 2/9/12   |  | TAT (business days): 20 (std) 15 (at 5 4 3 2 24 hrs. (For TAT - 10 days, contact PM. Surcharges apply for expedited TAT.) Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N (If yes, please contact PM) EDD <input type="checkbox"/> Y <input type="checkbox"/> N GA <input type="checkbox"/> Standard <input type="checkbox"/> High |  |  |  |  |  |
| 1  | C-3042                 | Effluent Field Blank  | 1 | AQ                                       | 2/9/12 | 6/12/12   | N | -  | X |   |  |   |  |   |  |  |  |  |  |  |  |   |  |  | Comments   |  |  |
| 2  | C-3062, C-3022, C-3018 | Treat Tank Effluent   | 3 | WW                                       | 2/9/12 | 2/10/12   | N | -  | X |   |  |   |  |   |  |  |  |  |  |  |  |   |  |  | Metals include As, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn<br>2) Adj'l volume provided for project-specific n/d/s/d<br>3) Please use EPA 200.8/ulc. FGD effluent.<br>Add Al and Mn per client.<br>2-10-12 AMB, FGS<br>ALSO: B, Co, and V. |  |  |
| For Laboratory Use Only  |                        | Matrix Codes:   |   | Relinquished By:                         |        | Received By:  |   | Received By:   |   | Comments:   |  | Comments:   |  | Comments:   |  | Comments:  |  | Comments:  |  | Comments:  |  | Comments:   |  | Comments:  |  |  |  |
| COC Seal: N/A  |                        | Cooler Temp: 2.0  |   | Carrier: UPS                             |        | VTSR: 00125   |   | # of Coolers: 1 (one)  |   | FW: Fresh Water<br>WW: Waste Water<br>SB: Sea and Brackish Water<br>SS: Soil and Sediment<br>TS: Plant and Animal Tissue<br>HC: Hydrocarbons<br>TR: Trap<br>OT: Other |  | Name: Chris Johnson<br>Organization: EAS<br>Date & Time: 2/9/12 09:30 |  | Name: Chris Johnson<br>Organization: EAS<br>Date & Time: 2/9/12 09:30 |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31 |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31 |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31 |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31  |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31 |  | Name: AMB<br>Organization: FGS<br>Date & Time: 2-10-12 10:31 |  |
| Sample Disposal:   |                        | Return (shipping fees may apply)  |   | Standard Disposal - 30 Days after report |        | 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:   |  | Customer Approval:  |  | Date:  |  | Customer Approval:   |  | Date:  |  | Customer Approval:  |  | Date:  |  |  |  |

Frontier Global Sciences, Inc.

*Liz Siska*

Liz Siska, Project Manager

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## ANALYTICAL RESULTS

### Effluent Field Blank

Matrix: Water

Laboratory ID: 1202140-01

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | ND     | 0.4   | 4.0   | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Arsenic    | ND     | 0.05  | 0.15  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.004 | 0.020 | µg/L  | 1        | F202215 | 2B21010  | 02/21/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.009 | 0.10  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Copper     | ND     | 0.01  | 0.10  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | QM-12, U |
| Lead       | ND     | 0.004 | 0.040 | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Manganese  | ND     | 0.007 | 0.10  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Mercury    | ND     | 0.08  | 0.50  | ng/L  | 1        | F202196 | 2B17024  | 02/17/12 | EPA 1631E     | U        |
| Molybdenum | ND     | 0.006 | 0.06  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Nickel     | ND     | 0.008 | 0.10  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Selenium   | ND     | 0.19  | 0.60  | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | QM-12, U |
| Silver     | ND     | 0.006 | 0.020 | µg/L  | 1        | F202149 | 2B15001  | 02/14/12 | EPA 200.8 Mod | QM-12, U |
| Zinc       | ND     | 0.02  | 0.20  | µg/L  | 1        | F202215 | 2B21010  | 02/21/12 | EPA 200.8 Mod | U        |

Frontier Global Sciences, Inc.

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Liz Siska, Project Manager





## ANALYTICAL RESULTS

### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1202140-02

| Analyte    | Result | MDL   | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | ND     | 22.2  | 200  | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Arsenic    | ND     | 2.55  | 7.50 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.208 | 1.00 | µg/L  | 50       | F202215 | 2B21010  | 02/21/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.45  | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Copper     | ND     | 0.50  | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | QM-12, U |
| Lead       | ND     | 0.195 | 2.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U        |
| Manganese  | 1730   | 0.37  | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod |          |
| Mercury    | 20.9   | 0.17  | 1.01 | ng/L  | 2        | F202196 | 2B17024  | 02/17/12 | EPA 1631E     |          |
| Molybdenum | 110    | 0.30  | 3.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod |          |
| Nickel     | 12.6   | 0.40  | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod |          |
| Selenium   | 82.2   | 9.69  | 30.0 | µg/L  | 50       | F202131 | 2B24005  | 02/23/12 | EPA 200.8 Mod |          |
| Silver     | ND     | 0.300 | 1.00 | µg/L  | 50       | F202149 | 2B15001  | 02/14/12 | EPA 200.8 Mod | QM-12, U |
| Zinc       | ND     | 0.82  | 10.0 | µg/L  | 50       | F202215 | 2B21010  | 02/21/12 | EPA 200.8 Mod | U        |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1202140-02RE1

Batch: F202196

Sequence: 2B17024

Preparation: BrCl Oxidation

Lab Number: F202196-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 24.34                        | 22.57                           | 10.1 | 7.52  | 24        | EPA 1631E |       |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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

**SOURCE: 1202140-02**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

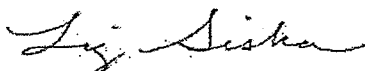
Lab Number: F202131-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Aluminum   | 48.4                        | 151.50             | 199.9                   | 100           | 70 - 130        | EPA 200.8 Mod |       |
| Chromium   | 1.07                        | 7.0700             | 8.66                    | 107           | 70 - 130        | EPA 200.8 Mod |       |
| Manganese  | 1735                        | 6.0600             | 1712                    | -373          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Nickel     | 12.62                       | 4.0400             | 17.66                   | 125           | 70 - 130        | EPA 200.8 Mod |       |
| Copper     | 0.83                        | 4.0400             | 5.07                    | 105           | 70 - 130        | EPA 200.8 Mod |       |
| Zinc       | 2.32                        | 10.100             | 81.69                   | 786           | 70 - 130        | EPA 200.8 Mod | QM-07 |
| Arsenic    | 5.61                        | 15.150             | 21.94                   | 108           | 70 - 130        | EPA 200.8 Mod |       |
| Selenium   | 97.17                       | 30.300             | 123.0                   | 85.2          | 70 - 130        | EPA 200.8 Mod |       |
| Molybdenum | 110.1                       | 2.0200             | 111.5                   | 71.9          | 70 - 130        | EPA 200.8 Mod |       |
| Lead       | ND                          | 1.5150             | 1.567                   | 103           | 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   | 151.50             | 203.2                    | 102            | 1.64  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Chromium   | 7.0700             | 8.56                     | 106            | 1.15  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Manganese  | 6.0600             | 1727                     | -131           | 0.852 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02           |
| Nickel     | 4.0400             | 16.18                    | 88.1           | 8.76  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Copper     | 4.0400             | 4.84                     | 99.3           | 4.59  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Zinc       | 10.100             | 16.88                    | 144            | 131   | 70 - 130        | 20        | EPA 200.8 Mod | QM-07,<br>QR-08 |
| Arsenic    | 15.150             | 24.85                    | 127            | 12.4  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Selenium   | 30.300             | 135.1                    | 125            | 9.38  | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Molybdenum | 2.0200             | 112.5                    | 119            | 0.846 | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Lead       | 1.5150             | 1.468                    | 96.9           | 6.56  | 70 - 130        | 20        | EPA 200.8 Mod |                 |

Frontier Global Sciences, Inc.

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Liz Siska, Project Manager



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

**SOURCE: 1202140-02**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-MS/MSD2

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Aluminum   | 48.4                        | 10100              | 10380                   | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Chromium   | 1.07                        | 1010.0             | 1060                    | 105           | 70 - 130        | EPA 200.8 Mod | AS    |
| Manganese  | 1735                        | 1010.0             | 2770                    | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Nickel     | 12.62                       | 1262.5             | 1303                    | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Copper     | 0.83                        | 1262.5             | 1253                    | 99.2          | 70 - 130        | EPA 200.8 Mod | AS    |
| Zinc       | 2.32                        | 2525.0             | 2530                    | 100           | 70 - 130        | EPA 200.8 Mod | AS    |
| Arsenic    | 5.61                        | 1010.0             | 1073                    | 106           | 70 - 130        | EPA 200.8 Mod | AS    |
| Selenium   | 97.17                       | 1010.0             | 1127                    | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Molybdenum | 110.1                       | 505.00             | 630.5                   | 103           | 70 - 130        | EPA 200.8 Mod | AS    |
| Lead       | ND                          | 252.50             | 251.4                   | 99.5          | 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   | 10100              | 10120                    | 99.8           | 2.52  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Chromium   | 1010.0             | 1050                     | 104            | 0.947 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Manganese  | 1010.0             | 2755                     | 101            | 0.548 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Nickel     | 1262.5             | 1302                     | 102            | 0.101 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Copper     | 1262.5             | 1258                     | 99.6           | 0.384 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Zinc       | 2525.0             | 2511                     | 99.3           | 0.770 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Arsenic    | 1010.0             | 1092                     | 108            | 1.73  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Selenium   | 1010.0             | 1169                     | 106            | 3.69  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Molybdenum | 505.00             | 616.8                    | 100            | 2.18  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Lead       | 252.50             | 249.9                    | 99.0           | 0.581 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager



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

**SOURCE: 1202140-02RE1**

Batch: F202149

Sequence: 2B15001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202149-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 1.5180             | 1.529                   | 101           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5180             | 1.577                    | 104            | 3.13  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager

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

**SOURCE: 1202140-02RE1**

Batch: F202149

Sequence: 2B15001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202149-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 50.500             | 44.17                   | 87.5          | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 50.500             | 43.81                    | 86.8           | 0.808 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager

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

**SOURCE: 1202223-02**

Batch: F202196

Sequence: 2B17024

Preparation: BrCl Oxidation

Lab Number: F202196-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 39.63                       | 102.00             | 145.3                   | 104           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 102.00             | 143.6                    | 102            | 1.12  | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**SOURCE: 1202140-02RE1**

Batch: F202196

Sequence: 2B17024

Preparation: BrCl Oxidation

Lab Number: F202196-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 24.34                       | 71.400             | 96.61                   | 101           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 71.400             | 96.20                    | 101            | 0.422 | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager





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

**SOURCE: 1202140-02RE1**

Batch: F202215

Sequence: 2B21010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202215-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Zinc    | ND                          | 10.100             | 9.65                    | 95.5          | 70 - 130        | EPA 200.8 Mod |       |
| Cadmium | 0.216                       | 0.80800            | 1.142                   | 115           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Zinc    | 10.100             | 9.99                     | 98.9           | 3.47  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Cadmium | 0.80800            | 1.189                    | 120            | 4.07  | 70 - 130        | 20        | EPA 200.8 Mod |       |

Frontier Global Sciences, Inc.

*Liz Siska*

Liz Siska, Project Manager

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

**SOURCE: 1202140-02RE1**

Batch: F202215

Sequence: 2B21010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202215-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Zinc    | ND                          | 2525.0             | 2297                    | 91.0          | 70 - 130        | EPA 200.8 Mod | AS    |
| Cadmium | 0.216                       | 101.00             | 87.31                   | 86.2          | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Zinc    | 2525.0             | 2300                     | 91.1           | 0.162 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cadmium | 101.00             | 89.53                    | 88.4           | 2.50  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager

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**LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE**  
**RECOVERY AND RPD**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Aluminum   | 150.00             | 145.9                    | 97.3           | 85 - 115        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.94                     | 99.1           | 85 - 115        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 5.91                     | 98.5           | 85 - 115        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.19                     | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.40                     | 110            | 85 - 115        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 11.13                    | 111            | 85 - 115        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 15.05                    | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 30.61                    | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.93                     | 96.6           | 85 - 115        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.560                    | 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             | 147.3                     | 98.2            | 0.925  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.94                      | 99.1            | 0.0117 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 6.00                      | 99.9            | 1.48   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.23                      | 106             | 1.04   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.43                      | 111             | 0.541  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.92                     | 109             | 1.97   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.83                     | 98.9            | 1.46   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 32.03                     | 107             | 4.53   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.91                      | 95.4            | 1.17   | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.586                     | 106             | 1.66   | 85 - 115        | 20        | EPA 200.8 Mod |       |

Frontier Global Sciences, Inc.

*Liz Siska*

Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F202149

Sequence: 2B15001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202149-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Silver  | 1.5000             | 1.709                    | 114            | 85 - 115        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5000             | 1.738                     | 116             | 1.68  | 85 - 115        | 20        | EPA 200.8 Mod | QM-12 |

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

**RECOVERY AND RPD**

Batch: F202196

Sequence: 2B17024

Preparation: BrCl Oxidation

Lab Number: F202196-BS/BSD1

LCS Source: LCS

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 16.27                    | 104            | 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             | 16.20                     | 103             | 0.396 | 80 - 120        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F202215

Sequence: 2B21010

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202215-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Zinc    | 10.000             | 9.99                     | 99.9           | 85 - 115        | EPA 200.8 Mod |       |
| Cadmium | 0.80000            | 0.892                    | 112            | 85 - 115        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Zinc    | 10.000             | 9.93                      | 99.3            | 0.528 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cadmium | 0.80000            | 0.897                     | 112             | 0.517 | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B15001

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found   | MRL   | Units | Batch   | Method        | Notes |
|---------------|---------|---------|-------|-------|---------|---------------|-------|
| F202149-BLK1  | Silver  | -0.0002 | 0.020 | µg/L  | F202149 | 3PA 200.8 Moc | U     |

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### PREPARATION BLANKS

Instrument: Hg-16

Sequence: 2B17024

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|-------|------|-------|---------|-----------|----------|
| F202196-BLK1  | Mercury | 0.04  | 0.50 | ng/L  | F202196 | EPA 1631E | U        |
| F202196-BLK2  | Mercury | 0.04  | 0.50 | ng/L  | F202196 | EPA 1631E | U        |
| F202196-BLK3  | Mercury | 0.05  | 0.50 | ng/L  | F202196 | EPA 1631E | U        |
| F202196-BLK4  | Mercury | 0.08  | 0.50 | ng/L  | F202196 | EPA 1631E | QB-04, U |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found | MRL   | Units | Batch   | Method        | Notes |
|---------------|------------|-------|-------|-------|---------|---------------|-------|
| F202131-BLK1  | Aluminum   | 0.09  | 4.0   | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Chromium   | -0.02 | 0.10  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Manganese  | 0.004 | 0.10  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Nickel     | 0.004 | 0.10  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Copper     | 0.005 | 0.10  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Zinc       | 0.07  | 0.20  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Arsenic    | -0.10 | 0.15  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Selenium   | -0.06 | 0.60  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Molybdenum | 0.01  | 0.06  | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Lead       | 0.002 | 0.040 | µg/L  | F202131 | EPA 200.8 Moc | U     |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B21010

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|---------|--------|-------|-------|---------|---------------|-------|
| F202215-BLK1  | Zinc    | -0.03  | 0.20  | µg/L  | F202215 | EPA 200.8 Moc | U     |
| F202215-BLK1  | Cadmium | -0.001 | 0.020 | µg/L  | F202215 | EPA 200.8 Moc | U     |

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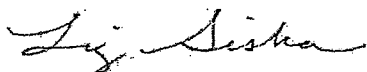
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Liz Siska, Project Manager

## 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

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Liz Siska, Project Manager

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414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

27 February 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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## 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   |
|----------------------|------------|--------|-----------------|-----------------|
| Effluent Field Blank | 1202140-01 | Water  | 09-Feb-12 00:00 | 10-Feb-12 09:25 |
| Treat Tank Effluent  | 1202140-02 | Water  | 09-Feb-12 00:00 | 10-Feb-12 09:25 |

Frontier Global Sciences, Inc.

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

Liz Siska, Project Manager

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## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on February 10th, 2012. The samples were received intact, on-ice with temperatures measured at 2.0 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

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

### ANALYTICAL ISSUES

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

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.

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

Liz Siska, Project Manager

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 Seattle, WA 98109  
 Ph: 206-622-6960  
 Fx: 206-622-6870

### CHAIN OF CUSTODY FORMS



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

107558 title WA 98109  
 206-622-6960  
 206-622-6870  
 info@FrontierGS.com  
 http://www.FrontierGS.com

Page 1 of 1

1202140

| Client: Eastern Analytical, Inc<br>Address: 25 Cheney Drive<br>Concord, NH 03301<br>Project Name: Marriage Station/<br>Report To: Same<br>Address:<br>Phone: 603/228-6525 Fax: 603/228-4571<br>E-mail: customerservice@eastlabs.com |                        | Contact: Jeff S. Goyette<br>Phone: 603/410-5580 Fax: 603/228-4191<br>E-mail: jeff@eastlabs.com<br>Contract/PO: 27780<br>Invoice To: Same<br>Address:<br>Phone: Fax:<br>E-mail: customerservice@eastlabs.com |   | Analyses Requested |  | FGS PM: Liz Siska<br>Date: 2/9/12<br>TAT (business days): 20 (std)<br>15 (10) 5 4 3 2 24 hrs.<br>(For TAT + 10 days, contact PM)<br>Surcharges apply for expedited TAT<br>Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N<br>(If yes, please contact PM)<br>EOD <input type="checkbox"/> Y <input type="checkbox"/> N<br>QA <input type="checkbox"/> Standard <input type="checkbox"/> High |                      |   |                     |   |
|---|------------------------|---|---|--------------------|--|--|----------------------|---|---------------------|---|
| No.   | Engraved Bottle ID     | Sample ID   | # of Bottles  | Matrix             | Date & Time  | Sampled By   | Field Filtered (Y/N) | Field Preserved: HNO <sub>3</sub> HCl BCl Other (%) | Total Metals        | Comments  |
| 1   | C-3042                 | Effluent Field Blank  | 1   | AQ                 | 2/9/12   | 6/1/12   | N                    | 1   | XX                  | Metals include<br>As, Cd, Cr, Cu, Pb, Hg, Mo,<br>Ni, Se, Ag, Zn<br>1) Add'l volume provided for<br>project-specific nslmsd<br>2) Please use EPA 200.9.1.c<br>FG-D Effluent.<br>Acid Al and Mn<br>per client<br>2-10-12 AMB, FGS<br>ALSO: B, Co, and V |
| 2   | C-3062, C-3002, C-3018 | Treat Tank Effluent   | 3   | WW                 | 2/9/12   | 6/1/12   | N                    | 1   | XX                  |   |
| 3   |                        |   |   |                    |  |  |                      |   |                     |   |
| 4   |                        |   |   |                    |  |  |                      |   |                     |   |
| 5   |                        |   |   |                    |  |  |                      |   |                     |   |
| 6   |                        |   |   |                    |  |  |                      |   |                     |   |
| 7   |                        |   |   |                    |  |  |                      |   |                     |   |
| 8   |                        |   |   |                    |  |  |                      |   |                     |   |
| 9   |                        |   |   |                    |  |  |                      |   |                     |   |
| 10  |                        |   |   |                    |  |  |                      |   |                     |   |
| 11  |                        |   |   |                    |  |  |                      |   |                     |   |
| 12  |                        |   |   |                    |  |  |                      |   |                     |   |
| COC Seal: N/A   |                        | Comments: 12 X46 5999 01  | Matrix Codes: FW: Fresh Water, WW: Waste Water, SB: Sea and Brackish Water, SS: Soil and Sediment, TS: Plant and Animal Tissue, HC: Hydrocarbons, TR: Trap, OR: Other |                    | Relinquished By: [Signature]   | Received By: [Signature]   | Name: [Name]         |   | Name: [Name]        |   |
| Cooler Temp: 2.0  |                        | 9210 8582   |   |                    | Name: [Name]   | Name: [Name]   | Organization: [Org]  |   | Organization: [Org] |   |
| Carrier: UPS  |                        | 710: 0368   |   |                    | Date & Time: [Date]  | Date & Time: [Date]  | Date & Time: [Date]  |   | Date & Time: [Date] |   |
| VTSR: 07:25   |                        |   |   |                    | Tracking number:   |  |                      |   |                     |   |
| # of Coolers: 1 (one)   |                        |   |   |                    | By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analysis. |  |                      |   |                     |   |
| 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)  |                        |   |   |                    |  | Customer Approval: [Signature]   |                      | Date: [Date]  |                     |   |

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*Liz Siska*

Liz Siska, Project Manager



## ANALYTICAL RESULTS

### Effluent Field Blank

Matrix: Water

Laboratory ID: 1202140-01

| Analyte  | Result | MDL   | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes              |
|----------|--------|-------|------|-------|----------|---------|----------|----------|---------------|--------------------|
| Boron    | ND     | 0.21  | 3.00 | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | QB-02,<br>QM-12, U |
| Cobalt   | ND     | 0.007 | 0.10 | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U                  |
| Vanadium | ND     | 0.01  | 0.10 | µg/L  | 1        | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U                  |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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### ANALYTICAL RESULTS

#### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1202140-02

| Analyte  | Result | MDL  | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes |
|----------|--------|------|------|-------|----------|---------|----------|----------|---------------|-------|
| Boron    | 357000 | 412  | 6000 | µg/L  | 2000     | F202131 | 2B24005  | 02/23/12 | EPA 200.8 Mod |       |
| Cobalt   | ND     | 0.34 | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U     |
| Vanadium | ND     | 0.68 | 5.00 | µg/L  | 50       | F202131 | 2B18016  | 02/17/12 | EPA 200.8 Mod | U     |

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Liz Siska, Project Manager

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

**SOURCE: 1202140-02**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-MS/MSD1

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Vanadium | 1.21                        | 5.0500             | 8.07                    | 136           | 70 - 130        | EPA 200.8 Mod | QM-07 |
| Cobalt   | 0.76                        | 5.0500             | 5.83                    | 100           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Vanadium | 5.0500             | 6.58                     | 106            | 20.2  | 70 - 130        | 20        | EPA 200.8 Mod | QR-08 |
| Cobalt   | 5.0500             | 6.06                     | 105            | 3.84  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**SOURCE: 1202140-02**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-MS/MSD2

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Vanadium | 1.21                        | 1010.0             | 1097                    | 108           | 70 - 130        | EPA 200.8 Mod | AS    |
| Cobalt   | 0.76                        | 505.00             | 517.4                   | 102           | 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 |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Vanadium | 1010.0             | 1052                     | 104            | 4.20  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cobalt   | 505.00             | 518.3                    | 102            | 0.187 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager



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

**SOURCE: 1202140-02RE2**

Batch: F202131

Sequence: 2B24005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-MS/MSD5

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Boron   | 356800                      | 75.750             | 356500                  | -478          | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Boron   | 75.750             | 359700                   | 3820           | 0.909 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |

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Liz Siska, Project Manager



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

**SOURCE: 1202140-02RE2**

Batch: F202131

Sequence: 2B24005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-MS/MSD6

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Boron   | 356800                      | 161600             | 530100                  | 107           | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Boron   | 161600             | 497000                   | 86.8           | 6.43  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F202131

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202131-BS/BSD1

LCS Source: Blank Spike

| Analyte  | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Boron    | 75.000             | 76.23                    | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Vanadium | 5.0000             | 4.57                     | 91.4           | 85 - 115        | EPA 200.8 Mod |       |
| Cobalt   | 5.0000             | 5.06                     | 101            | 85 - 115        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Boron    | 75.000             | 77.22                     | 103             | 1.29  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Vanadium | 5.0000             | 4.93                      | 98.6            | 7.59  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cobalt   | 5.0000             | 5.15                      | 103             | 1.81  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B18016

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte  | Found  | MRL  | Units | Batch   | Method        | Notes |
|---------------|----------|--------|------|-------|---------|---------------|-------|
| F202131-BLK1  | Boron    | 1.13   | 3.00 | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Vanadium | -0.06  | 0.10 | µg/L  | F202131 | EPA 200.8 Moc | U     |
| F202131-BLK1  | Cobalt   | 0.0001 | 0.10 | µg/L  | F202131 | EPA 200.8 Moc | U     |

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Liz Siska, Project Manager

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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-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

Frontier Global Sciences, Inc.



Liz Siska, Project Manager

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eastern analytical, inc.  
professional laboratory services

# CHAIN-OF-CUSTODY RECORD

107558

GLANH

41

Date/Time  
Composites need start  
and stop dates/times

Matrix

Parameters and Sample Notes

# of containers

|                      |        |                         |                    |  |  |  |  |
|----------------------|--------|-------------------------|--------------------|--|--|--|--|
| Effluent Field Blank | 2/9/12 | aqueous<br>Grab or Comp | AqTo/SWLLMetalsSub |  |  |  |  |
|----------------------|--------|-------------------------|--------------------|--|--|--|--|

|   |        |                         |                       |  |  |  |  |
|---|--------|-------------------------|-----------------------|--|--|--|--|
| <input type="checkbox"/> Sampler confirms ID and parameters are accurate  |        |                         |                       |  |  |  |  |
| Circle preservative/s: HCL, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, MECH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> , (ICE) |        |                         |                       |  |  |  |  |
| Dissolved Sample Field Filtered <input type="checkbox"/>  |        |                         |                       |  |  |  |  |
| Treat Tank Effluent   | 2/9/12 | aqueous<br>Grab or Comp | AqTo/SWLLMetalsSub/pH |  |  |  |  |

|   |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|
| <input type="checkbox"/> Sampler confirms ID and parameters are accurate  |  |  |  |  |  |  |  |
| Circle preservative/s: HCL, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, MECH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> , (ICE) |  |  |  |  |  |  |  |
| Dissolved Sample Field Filtered <input type="checkbox"/>  |  |  |  |  |  |  |  |

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAL Project ID 3902  
 Project Name Wastewater Analysis - Weekly  
 State NH  
 Client (Pro Mgr) Paul Pepler  
 Customer GZA GeoEnvironmental, Inc. (NH)  
 Address 380 Harvey Road  
 City Manchester NH 03103  
 Phone 623-3600 Fax 624-9463 (37)  
 Email/Address: paul.pepler@gza.com

Results Needed by: Preferred date \_\_\_\_\_  
 Notes about project: (i.e. Special Limits, Billing Info if different...)  
 Subcontract ALL metals to Frontier Global Sciences. Metals include Total As, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn. Metals analyses require project-specific MS/MSD.

Reporting Options  
 HC  
 EDD PDF  
 EDD email  
 PDF prelim, NO FAX  
 e-mail Login Confirmation  
 NO FAX

PONumber: 02259252  
 Quote No: 1009476  
 Temperature 20 °C  
 Ice present Yes  No

Samples Collected by: BT/PA  
 Relinquished by: [Signature] Date/Time: 2/9/12 09:50  
 Received by: [Signature] Date/Time: [Blank]

QC deliverables  
 A  A+  B  B+  C  PC

Relinquished by \_\_\_\_\_ Date/Time \_\_\_\_\_ Received by \_\_\_\_\_



VIA EMAIL

April 6, 2011  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Winnepesaukee River Basin Program Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Wastewater Discharge Analytical Data Report  
Treated Wastewater  
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. Lesieur:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Analytical Data Report** for sampling conducted on March 2, 2012, in accordance with *Special Agreement – PSNH and WRBP Wastewater Treatment Plant*, which requires that “Any testing results on the proposed discharge after start up at your facility will need to be forwarded to us for our review and files.” The analysis on samples collected on March 2, 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 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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

A handwritten signature in black ink that reads 'Michael P. North'.

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

RAB/MPN:tmd

P:\04\Jobs\0029300s\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Franklin\REPORT\final 04.0029307 Franklin March RPT 040612.docx

Attachment: Analytical Data Report

**ANALYTICAL DATA REPORT**



**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 Received | Date Sampled | Sample Matrix | % Dry Weight | Exceptions/Comments (other than thermal preservation) |
|-----------|---|---------------|--------------|---------------|--------------|---|
| 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

**eastern analytical, inc.**

www.eailabs.com

Phone: (603) 228-0525



# 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,<br>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

| Analysis |         |       |         |         |
|----------|---------|-------|---------|---------|
| Units    | Date    | Time  | Method  | Analyst |
| 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.  
 \*If/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



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   |
|-----------------------------|------------|--------|-----------------|-----------------|
| 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

*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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1203055 Revised Report  
03/27/2012



## 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.

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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03/27/2012



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

### CHAIN OF CUSTODY FORMS



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

414 Pontius Ave. N. Seattle WA 98109  
 Phone: 206-622-6960  
 Fax: 206-622-6870  
 Info@FrontierGS.com  
 http://www.FrontierGS.com

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| Client: <i>Eastern Analytical Inc.</i>   |                                 | Contact: <i>Jeff Gynn</i>                       |              | Address: <i>25 Cheney Drive<br/>Concord NH 03301</i>  |                       | Phone: <i>238-4325</i> Fax: <i>238-4591</i> |                      | E-mail: <i>jeffg@eastlabs.com</i>                   |              | Contract/PO: _____   |  | Invoice To: <i>Same PO 278242</i>  |  | Address: _____                   |  | Phone: _____ Fax: _____                          |  | E-mail: <i>customerservice@eastlabs.com</i> |  | E-mail: <i>customerservice@eastlabs.com</i>                  |  | Analyses Requested  |  | FGS PM: <i>Liz Siska</i>   |  |   |  |  |  |
|--|---------------------------------|---|--------------|---|-----------------------|---|----------------------|---|--------------|--|--|------------------------------------|--|----------------------------------|--|--|--|---|--|--|--|---|--|--|--|---|--|--|--|
| Project Name: <i>American E. Station</i>   |                                 | Report To: <i>Same</i>                          |              | Address: _____  |                       | Phone: _____ Fax: _____                     |                      | E-mail: _____                                       |              | E-mail: _____  |  | Field Preserved: _____             |  | Field Filtered (Y/N) _____       |  | HNO <sub>3</sub> : _____ HCl: _____ Other: _____ |  | Total Metals                                |  | TAT (business days): <i>20 (std) 15 (10) 5 4 3 2 24 hrs.</i> |  | (For TAT < 10 days, contact PM. Surcharges apply for expedited TAT) |  | Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N (If yes, please contact PM) |  | EED: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N |  | QA <input type="checkbox"/> Standard <input type="checkbox"/> High |  |
| No.  | Engraved Bottle ID              | Sample ID                                       | # of Bottles | Matrix  | Date & Time           | Sampled By                                  | Field Filtered (Y/N) | Field Preserved: HNO <sub>3</sub> : HCl: Other: (%) | Total Metals | Comments   |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 1  | <i>B-3621</i>                   | <i>Effluent field blank</i>                     | <i>1</i>     | <i>AQ</i>   | <i>1/2/2012 11:00</i> | <i>GT/SB</i>                                | <i>-</i>             | <i>-</i>  |              | <i>Metals include Se, Hg, As, Fe, Cd, Cr, Cu, Ni, Mn, Ag, Zn</i> |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 3  | <i>B-3625 B-3721<br/>Q-3722</i> | <i>Final Effluent</i>                           | <i>3</i>     | <i>WW</i>   | <i>1/2/2012 11:00</i> | <i>GT/SB</i>                                | <i>-</i>             | <i>-</i>  |              | <i>2005 Prod<br/>FGD WW</i>                                      |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 2  |                                 |   |              |   |                       |   |                      |   |              | <b>108078</b>  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 4  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 5  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 6  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 7  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 8  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 9  |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 10   |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 11   |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 12   |                                 |   |              |   |                       |   |                      |   |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| COC Seal: <i>N/A</i>   |                                 | Comments: <i>TID 360</i>                        |              | Matrix Codes: 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 |                       | Relinquished By: _____                      |                      | Received By: <i>H. Gynn</i>                         |              | Name: <i>Jim Bladenwell</i>                                      |  | Name: <i>Deane Zink</i>            |  | Name: _____                      |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| Cooler Temp: <i>5.2°C</i>  |                                 | Carrier: <i>UPS</i>                             |              | VTSR: <i>0851</i>   |                       | # of Coolers: _____                         |                      | Organization: <i>Eastern Analytical Inc.</i>        |              | Organization: <i>EA1</i>   |  | Date & Time: <i>3/2/2012 13:50</i> |  | Date & Time: <i>3/2/12 13:50</i> |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |
| 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) |                                 | Tracking number: <i>1Z X46 599 15 9152 8312</i> |              | By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analyses.                                  |                       | Customer Approval: <i>L. Siska</i>          |                      | Date: <i>3/2/12</i>                                 |              |  |  |                                    |  |                                  |  |  |  |   |  |  |  |   |  |  |  |   |  |  |  |

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### CHAIN OF CUSTODY FORMS

FGS Work Order: 1203054, 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: \_\_\_\_\_ FGS PM: Liz  
 Samples Arrived By: UPS Shipping Service Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (specify) \_\_\_\_\_  
 Tracking/Airbill Number(s): 1Z x46 599 B 952 8312

| Cooler Information                             | Yes                                 | No                                  | NA                                  | Comments |
|--|-------------------------------------|-------------------------------------|-------------------------------------|----------|
| The coolers do not appear to be tampered with: | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Custody seals are present and intact:          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     |          |
| Custody seals signed by:                       |                                     |                                     | <input checked="" 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 (°C)   | Cooler     | Temp (°C) | Cooler     | Temp (°C) |
|-----------|-------------|------------|-----------|------------|-----------|
| Cooler 1: | <u>13.2</u> | Cooler 6:  | <u>/</u>  | Cooler 11: | <u>/</u>  |
| Cooler 2: | <u>/</u>    | Cooler 7:  | <u>/</u>  | Cooler 12: | <u>/</u>  |
| Cooler 3: | <u>/</u>    | Cooler 8:  | <u>/</u>  | Cooler 13: | <u>/</u>  |
| Cooler 4: | <u>/</u>    | Cooler 9:  | <u>/</u>  | Cooler 14: | <u>/</u>  |
| Cooler 5: | <u>/</u>    | Cooler 10: | <u>/</u>  | Cooler 15: | <u>/</u>  |

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

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

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

Anomalies/Non-conformances:  
 \_\_\_\_\_  
 \_\_\_\_\_

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

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*Liz Siska*

Liz Siska, Project Manager

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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<br>ng/L | Duplicate Concentration<br>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/BS1

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 |       |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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 |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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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Liz Siska, Project Manager



## 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

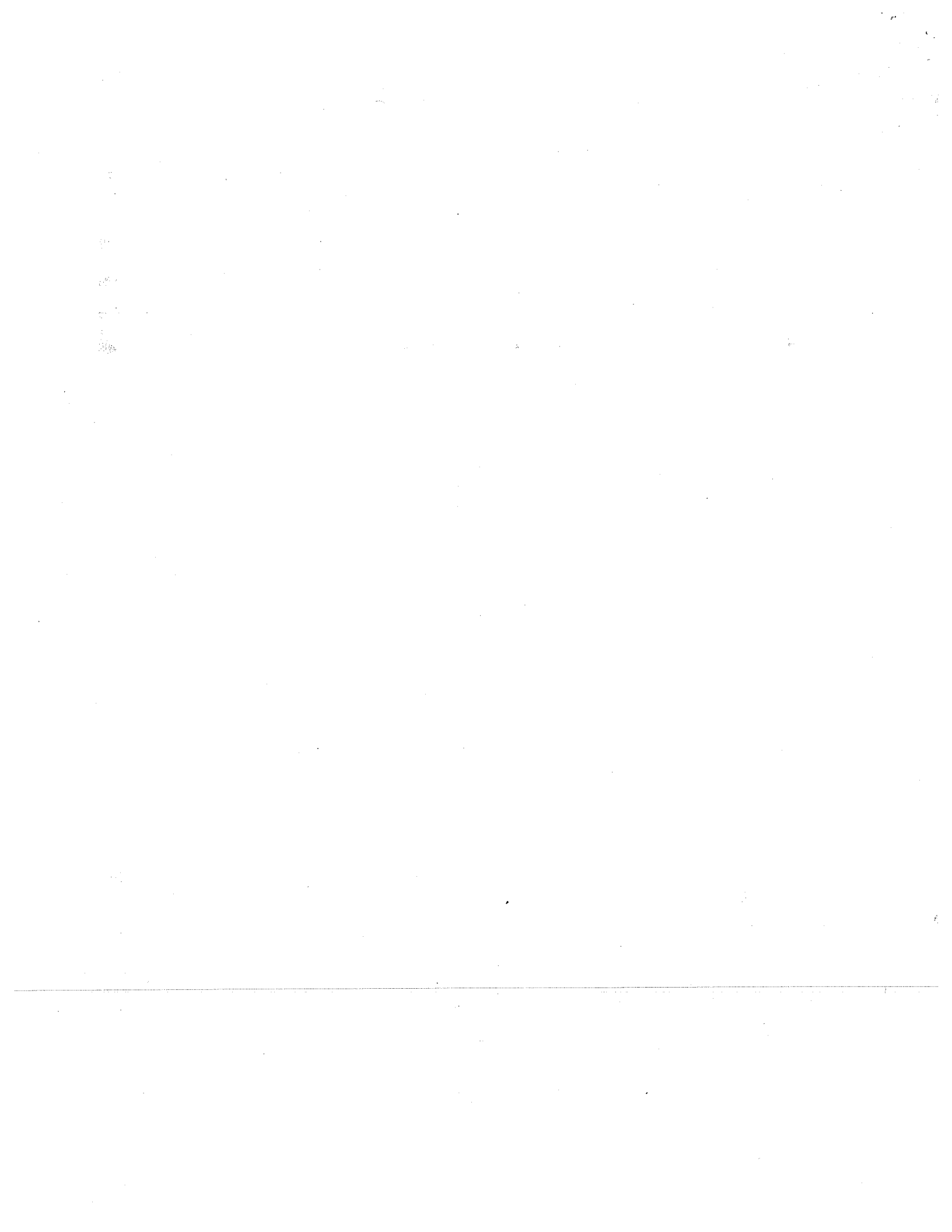
Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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**VIA EMAIL**

April 27, 2012  
File No. 04.0029307.00



Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Winnepesaukee River Basin Program Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Analytical Data Report  
Treated Wastewater  
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. Lesieur:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Analytical Data Report** for sampling conducted on January 5, 2012, previously submitted on January 16, 2012. In anticipation of extremely low metals concentrations, the previous analysis was performed by Environmental Protection Agency (EPA) Method 1638 which was specifically developed by EPA to enable metals detection by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS) at extremely low concentrations in ambient water when used in conjunction with sampling Method 1669: Sampling Ambient Water for Determination of Trace Metals at EPA Water Quality Criteria Levels.

Total metals were reanalyzed using Method 200.8MOD within the sample hold time, in accordance 40 CFR 136. This method is specified in the United States EPA draft Standard Operating Procedure (SOP) for trace metals analysis of flue gas desulfurization (FGD) wastewater. The SOP is discussed 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 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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 FDG 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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

A handwritten signature in black ink that reads 'Michael P. North'.

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

RAB/MPN:tmd

\\GZAMANN\Jobs\04\Jobs\00293008\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Franklin\final 04.0029307.00 Franklin 010512.rerun 042712.docx

Attachment: Analytical Data Report

**ANALYTICAL DATA REPORT**



# eastern analytical

*professional laboratory services*

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107555  
Client Identification: Merrimack Station  
Date Received: 1/5/2012

Dear Mr. Pepler :

Enclosed please find the report of analysis for the above identified project.  
As discussed, analyses were subcontracted and are listed as follows:

Analysis: Subcontract - Metals Method 200.8  
(Al, Sb, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mn, Mo, Na, Ni, Ag, Tl, Zn, As, Se & Hg)

Subcontractor Lab: Frontier Global Sciences, Inc

A complete copy of the report is attached. This report may not be reproduced except in full,  
without the written approval of the laboratory.

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

Sincerely,

Lorraine Olashaw, Lab Director

4/25/12

Date

29

# of pages (excluding cover letter)

**REVISED**  
Pg 4/25/12





# SAMPLE CONDITIONS PAGE

EAI ID#: 107555

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

Client Designation: **Merrimack Station**

**Temperature upon receipt (°C): 4.7**

**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) |
|-----------|--------------------------|---------------|--------------|---------------|--------------|---|
| 107555.01 | Treat Tank Eff Composite | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 107555.02 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | 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*



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

25 April 2012

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

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



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

| Sample ID                | Lab ID     | Matrix | Date Sampled    | Date Received   |
|--------------------------|------------|--------|-----------------|-----------------|
| Treat Tank Eff Composite | 1201073-01 | Water  | 05-Jan-12 10:00 | 06-Jan-12 09:50 |
| Treat Tank Eff Grab      | 1201073-02 | Water  | 05-Jan-12 08:00 | 06-Jan-12 09:50 |

Frontier Global Sciences, Inc.

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

Liz Siska, Project Manager

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1201073 Final Report  
04/25/2012



## CASE NARRATIVE

Revised Report 4/25/12:

Per client request Boron was removed from report.

Revised Report 3/28/12:

Per client request samples were prepared and analyzed for total metals in accordance with EPA 200.8 (modified).

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 6th, 2012. The samples were received intact, on-ice with temperatures measured at 3.4 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL AND QUALITY CONTROL ISSUES

There were no analytical difficulties experienced with analysis of these samples with the exceptions flagged in the 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  
 Fx: 425-686-3096

### CHAIN OF CUSTODY FORMS

1201073

Chain of Custody Record & Laboratory Analysis Request: 424 River Rd. Ste. 100, Bothell, WA 98011  
 Air, Water, Sediments, Plant and Animal Tissue, Phone: 425-686-1996  
 Hydrocarbon & Other Samples Fax: 425-686-3096  
 Email: info@frontiergs.com  
 Website: www.frontiergs.com



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1201073

|   |  |   |  |   |  |   |  |   |  |   |  |   |  |   |  |
|---|--|---|--|---|--|---|--|---|--|---|--|---|--|---|--|
| Client: <i>Alena Barua</i>                                |  | Project: <i>1201073</i>                                   |  | Requester: <i>Alena Barua</i>                             |  | Request Date: <i>04/25/12</i>                             |  | Request Time: <i>10:22 AM</i>                             |  | Requester Phone: <i>425-442-2211</i>                      |  | Requester Email: <i>alena@frontiergs.com</i>              |  | Requester Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  |
| Report To: <i>Alena Barua</i>                             |  | Invoice To: <i>Alena Barua</i>                            |  | Contract PO#: <i>1201073</i>                              |  | Field Labels (VOC)  |  | Field Labels (Pesticides)                                 |  | Field Labels (Other)                                      |  | Field Labels (Other)                                      |  | Comments  |  |
| Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i> |  | Address: <i>424 River Rd. Ste. 100, Bothell, WA 98011</i>           |  |
| Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>                                |  | Phone: <i>425-442-2211</i>  |  |
| Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>                                  |  | Fax: <i>425-686-3096</i>  |  |
| Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                        |  | Email: <i>alena@frontiergs.com</i>                                  |  |
| Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                        |  | Website: <i>www.frontiergs.com</i>                                  |  |
| Sample ID: <i>1201073-001</i>                             |  | Sample ID: <i>1201073-002</i>                             |  | Sample ID: <i>1201073-003</i>                             |  | Sample ID: <i>1201073-004</i>                             |  | Sample ID: <i>1201073-005</i>                             |  | Sample ID: <i>1201073-006</i>                             |  | Sample ID: <i>1201073-007</i>                             |  | Sample ID: <i>1201073-008</i>                                       |  |
| Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                               |  |
| Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>                               |  | Sampler: <i>Alena Barua</i>   |  |
| Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                           |  | Received By: <i>Alena Barua</i>                                     |  |
| Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                     |  | Date & Time: <i>04/25/12 10:22 AM</i>                               |  |
| Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                             |  | Signature: <i>Alena Barua</i>                                       |  |
| Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>                                     |  | Date: <i>04/25/12</i>   |  |
| Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                      |  | Comments: <i>See attached report</i>                                |  |

Received by: *Alena Barua*, FG-S, 1-6-12, 11:07

Frontier Global Sciences, Inc.

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*Liz Siska*

Liz Siska, Project Manager



## ANALYTICAL RESULTS

### Treat Tank Eff Composite

Matrix: Water

Laboratory ID: 1201073-01

| Analyte    | Result  | MDL   | MRL    | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes |
|------------|---------|-------|--------|-------|----------|---------|----------|----------|---------------|-------|
| Aluminum   | ND      | 8.9   | 80.0   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Antimony   | 0.408   | 0.092 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Barium     | 240     | 0.54  | 4.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Beryllium  | ND      | 0.454 | 1.20   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Cadmium    | ND      | 0.083 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Calcium    | 5010000 | 16200 | 200000 | µg/L  | 5000     | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Chromium   | ND      | 0.18  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Copper     | ND      | 0.20  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Iron       | ND      | 26.0  | 200    | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Lead       | ND      | 0.078 | 0.800  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Manganese  | 280     | 0.15  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Molybdenum | 134     | 0.12  | 1.20   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Nickel     | 9.79    | 0.16  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Silver     | ND      | 0.120 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Sodium     | 259000  | 23    | 400    | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Thallium   | 5.56    | 0.250 | 1.00   | µg/L  | 100      | F203314 | 2C25005  | 03/25/12 | EPA 200.8 Mod |       |
| Zinc       | ND      | 0.33  | 4.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |

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## ANALYTICAL RESULTS

### Treat Tank Eff Grab

Matrix: Water

Laboratory ID: 1201073-02

| Analyte  | Result | MDL  | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes   |
|----------|--------|------|------|-------|----------|---------|----------|----------|---------------|---------|
| Arsenic  | 8.51   | 1.02 | 3.00 | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |         |
| Mercury  | 10.5   | 0.34 | 2.02 | ng/L  | 4        | F201063 | 2A09010  | 01/09/12 | EPA 1631E     | FB-1631 |
| Selenium | 68.9   | 3.88 | 12.0 | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |         |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201073-02

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 10.48                        | 10.54                           | 2.02 | 0.617 | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 10.48                       | 20.400             | 31.36                   | 102           | 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             | 27.08                    | 81.4           | 14.7  | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager



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

**SOURCE: 1112278-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 7.61                        | 20.400             | 27.86                   | 99.2          | 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             | 28.37                    | 102            | 1.82  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201029-01**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD3

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.34                        | 10.200             | 15.58                   | 100           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.07                    | 85.6           | 10.2  | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager



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

**SOURCE: 1201030-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.54                        | 10.200             | 14.82                   | 91.0          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.61                    | 89.0           | 1.40  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01RE3**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Calcium | 5013000                     | 1515.0             | 4802000                 | -13900        | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Calcium | 1515.0             | 4943000                  | -4600          | 2.89  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |

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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD2

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | 0.507                       | 2.0200             | 2.442                   | 95.8          | 70 - 130        | EPA 200.8 Mod |       |
| Sodium     | 258800                      | 505.00             | 257700                  | -213          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Aluminum   | 52.9                        | 151.50             | 202.3                   | 98.6          | 70 - 130        | EPA 200.8 Mod |       |
| Chromium   | 0.57                        | 7.0700             | 8.04                    | 106           | 70 - 130        | EPA 200.8 Mod |       |
| Manganese  | 280.5                       | 6.0600             | 283.4                   | 47.6          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Iron       | ND                          | 505.00             | 520.0                   | 103           | 70 - 130        | EPA 200.8 Mod |       |
| Nickel     | 9.79                        | 4.0400             | 14.11                   | 107           | 70 - 130        | EPA 200.8 Mod |       |
| Copper     | 0.55                        | 4.0400             | 4.34                    | 93.9          | 70 - 130        | EPA 200.8 Mod |       |
| Zinc       | 0.40                        | 10.100             | 8.42                    | 79.4          | 70 - 130        | EPA 200.8 Mod |       |
| Arsenic    | 10.30                       | 15.150             | 24.18                   | 91.6          | 70 - 130        | EPA 200.8 Mod |       |
| Selenium   | 63.40                       | 30.300             | 89.73                   | 86.9          | 70 - 130        | EPA 200.8 Mod |       |
| Molybdenum | 133.8                       | 2.0200             | 136.7                   | 142           | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Silver     | ND                          | 1.5150             | 1.388                   | 91.6          | 70 - 130        | EPA 200.8 Mod |       |
| Cadmium    | 0.332                       | 0.80800            | 1.105                   | 95.6          | 70 - 130        | EPA 200.8 Mod |       |
| Antimony   | 0.408                       | 0.80800            | 1.259                   | 105           | 70 - 130        | EPA 200.8 Mod |       |
| Barium     | 239.7                       | 10.100             | 249.5                   | 96.8          | 70 - 130        | EPA 200.8 Mod |       |
| Lead       | ND                          | 1.5150             | 1.542                   | 102           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 2.0200             | 2.561                    | 102            | 4.74   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Sodium     | 505.00             | 257100                   | -336           | 0.243  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Aluminum   | 151.50             | 203.4                    | 99.3           | 0.564  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Chromium   | 7.0700             | 7.73                     | 101            | 3.85   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Manganese  | 6.0600             | 285.2                    | 76.9           | 0.625  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Iron       | 505.00             | 518.7                    | 103            | 0.242  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Nickel     | 4.0400             | 13.81                    | 99.5           | 2.13   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Copper     | 4.0400             | 4.19                     | 90.2           | 3.47   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.100             | 9.16                     | 86.8           | 8.49   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Arsenic    | 15.150             | 22.25                    | 78.9           | 8.31   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.300             | 94.00                    | 101            | 4.64   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Molybdenum | 2.0200             | 136.6                    | 137            | 0.0771 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |

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Liz Siska, Project Manager



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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD2

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Silver   | 1.5150             | 1.387                    | 91.5           | 0.0874 | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Cadmium  | 0.80800            | 1.061                    | 90.2           | 4.03   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Antimony | 0.80800            | 1.274                    | 107            | 1.21   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Barium   | 10.100             | 251.4                    | 116            | 0.781  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Lead     | 1.5150             | 1.534                    | 101            | 0.525  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**SOURCE: 1201073-01RE3**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD3

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Calcium | 5013000                     | 10100000           | 15120000                | 100           | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Calcium | 10100000           | 16140000                 | 110            | 6.53  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD4

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | 0.507                       | 20.200             | 20.41                   | 98.5          | 70 - 130        | EPA 200.8 Mod | AS    |
| Sodium     | 258800                      | 40400              | 292900                  | 84.5          | 70 - 130        | EPA 200.8 Mod | AS    |
| Aluminum   | 52.9                        | 4040.0             | 3956                    | 96.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Chromium   | 0.57                        | 404.00             | 430.1                   | 106           | 70 - 130        | EPA 200.8 Mod | AS    |
| Manganese  | 280.5                       | 404.00             | 704.2                   | 105           | 70 - 130        | EPA 200.8 Mod | AS    |
| Iron       | ND                          | 2020.0             | 2121                    | 105           | 70 - 130        | EPA 200.8 Mod | AS    |
| Nickel     | 9.79                        | 505.00             | 511.2                   | 99.3          | 70 - 130        | EPA 200.8 Mod | AS    |
| Copper     | 0.55                        | 505.00             | 475.4                   | 94.0          | 70 - 130        | EPA 200.8 Mod | AS    |
| Zinc       | 0.40                        | 1010.0             | 907.4                   | 89.8          | 70 - 130        | EPA 200.8 Mod | AS    |
| Arsenic    | 10.30                       | 404.00             | 431.7                   | 104           | 70 - 130        | EPA 200.8 Mod | AS    |
| Selenium   | 63.40                       | 404.00             | 468.8                   | 100           | 70 - 130        | EPA 200.8 Mod | AS    |
| Molybdenum | 133.8                       | 202.00             | 338.1                   | 101           | 70 - 130        | EPA 200.8 Mod | AS    |
| Silver     | ND                          | 20.200             | 18.50                   | 91.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Cadmium    | 0.332                       | 40.400             | 39.37                   | 96.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Antimony   | 0.408                       | 20.200             | 20.91                   | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Barium     | 239.7                       | 808.00             | 1056                    | 101           | 70 - 130        | EPA 200.8 Mod | AS    |
| Lead       | ND                          | 101.00             | 99.32                   | 98.3          | 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 |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 20.200             | 20.07                    | 96.8           | 1.71   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Sodium     | 40400              | 292600                   | 83.7           | 0.114  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Aluminum   | 4040.0             | 3954                     | 96.6           | 0.0362 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Chromium   | 404.00             | 428.7                    | 106            | 0.337  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Manganese  | 404.00             | 694.4                    | 102            | 1.40   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Iron       | 2020.0             | 2077                     | 103            | 2.11   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Nickel     | 505.00             | 512.6                    | 99.6           | 0.276  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Copper     | 505.00             | 470.7                    | 93.1           | 0.997  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Zinc       | 1010.0             | 905.9                    | 89.6           | 0.166  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Arsenic    | 404.00             | 429.9                    | 104            | 0.419  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Selenium   | 404.00             | 468.2                    | 100            | 0.141  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Molybdenum | 202.00             | 336.5                    | 100            | 0.473  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager



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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD4

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver   | 20.200             | 18.95                    | 93.8           | 2.42  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cadmium  | 40.400             | 39.33                    | 96.5           | 0.104 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Antimony | 20.200             | 21.07                    | 102            | 0.736 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Barium   | 808.00             | 1058                     | 101            | 0.205 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Lead     | 101.00             | 98.77                    | 97.8           | 0.549 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**SOURCE: 1201073-01RE6**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-MS/MSD2

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Thallium | 5.563                       | 0.40400            | 5.875                   | 77.3          | 70 - 130        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Thallium | 0.40400            | 5.880                    | 78.5           | 0.0859 | 70 - 130        | 20        | EPA 200.8 Mod |       |

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

**SOURCE: 1201073-01RE6**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-MS/MSD4

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Thallium | 5.563                       | 101.00             | 103.3                   | 96.8          | 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 |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Thallium | 101.00             | 103.7                    | 97.1           | 0.341 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**RECOVERY AND RPD**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.50                    | 98.8           | 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             | 15.95                     | 102             | 2.89  | 80 - 120        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Beryllium  | 2.0000             | 1.930                    | 96.5           | 85 - 115        | EPA 200.8 Mod |       |
| Sodium     | 500.00             | 499                      | 99.8           | 85 - 115        | EPA 200.8 Mod |       |
| Aluminum   | 150.00             | 146.0                    | 97.3           | 85 - 115        | EPA 200.8 Mod |       |
| Calcium    | 1500.0             | 1528                     | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.57                     | 93.9           | 85 - 115        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 5.86                     | 97.6           | 85 - 115        | EPA 200.8 Mod |       |
| Iron       | 500.00             | 475.3                    | 95.1           | 85 - 115        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.01                     | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.18                     | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.33                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.37                    | 95.8           | 85 - 115        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 29.66                    | 98.9           | 85 - 115        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.81                     | 90.5           | 85 - 115        | EPA 200.8 Mod |       |
| Silver     | 1.5000             | 1.517                    | 101            | 85 - 115        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.781                    | 97.6           | 85 - 115        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.815                    | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.69                     | 96.9           | 85 - 115        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.597                    | 106            | 85 - 115        | EPA 200.8 Mod |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium | 2.0000             | 1.949                     | 97.4            | 0.955 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Sodium    | 500.00             | 500                       | 100             | 0.216 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Aluminum  | 150.00             | 148.5                     | 99.0            | 1.71  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Calcium   | 1500.0             | 1544                      | 103             | 1.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Chromium  | 7.0000             | 6.67                      | 95.3            | 1.48  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Manganese | 6.0000             | 5.96                      | 99.4            | 1.75  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Iron      | 500.00             | 485.2                     | 97.0            | 2.06  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Nickel    | 4.0000             | 4.02                      | 101             | 0.246 | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Copper     | 4.0000             | 4.28                      | 107             | 2.24  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.39                     | 104             | 0.570 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.52                     | 96.8            | 0.977 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 30.15                     | 101             | 1.66  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.82                      | 91.0            | 0.564 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Silver     | 1.5000             | 1.502                     | 100             | 1.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.828                     | 103             | 5.85  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.808                     | 101             | 0.848 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.86                      | 98.6            | 1.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.620                     | 108             | 1.42  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-BS/BSD1

LCS Source: Blank Spike

| Analyte  | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Thallium | 0.40000            | 0.396                    | 98.9           | 85 - 115        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Thallium | 0.40000            | 0.391                     | 97.8            | 1.12  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager





### PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2A09010

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found  | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|--------|------|-------|---------|-----------|----------|
| F201063-BLK1  | Mercury | -0.009 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK2  | Mercury | -0.006 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK3  | Mercury | -0.02  | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK4  | Mercury | 0.03   | 0.50 | ng/L  | F201063 | EPA 1631E | U, QB-04 |
| F201063-BLK5  | Mercury | 0.11   | 0.52 | ng/L  | F201063 | EPA 1631E | U, QB-06 |

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Liz Siska, Project Manager

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found   | MRL   | Units | Batch   | Method        | Notes |
|---------------|------------|---------|-------|-------|---------|---------------|-------|
| F203271-BLK1  | Beryllium  | 0.00008 | 0.060 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Sodium     | 2       | 20    | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Aluminum   | -0.04   | 4.0   | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Calcium    | 1       | 40    | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Chromium   | -0.02   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Manganese  | 0.01    | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Iron       | -0.02   | 10.0  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Nickel     | 0.004   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Copper     | 0.003   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Zinc       | 0.007   | 0.20  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Arsenic    | -0.06   | 0.15  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Selenium   | -0.02   | 0.60  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Molybdenum | 0.01    | 0.06  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Silver     | -0.0005 | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Cadmium    | 0.004   | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Antimony   | 0.002   | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Barium     | 0.01    | 0.20  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Lead       | 0.010   | 0.040 | µg/L  | F203271 | EPA 200.8 Moc | U     |

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Liz Siska, Project Manager



### PREPARATION BLANKS

Instrument: ICPMS-3

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte  | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|----------|--------|-------|-------|---------|---------------|-------|
| F203314-BLK1  | Thallium | 0.0007 | 0.010 | µg/L  | F203314 | EPA 200.8 Moa | U     |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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-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.
- 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

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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January 16, 2012  
File No. 04.0029307.00



Mr. Bruce Kudrick  
Superintendent, Hooksett Sewer Commission  
Town of Hooksett  
1 Egawes Drive  
Hooksett, New Hampshire 03106

Re: Industrial Wastewater Discharge Monitoring  
Public Service of New Hampshire (PSNH)  
Merrimack Station  
Bow, New Hampshire

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

Dear Bruce:

On behalf of PSNH, GZA GeoEnvironmental, Inc. is pleased to submit the attached Analytical Report from PSNH's technologically advanced wastewater treatment system (WWTS). The WWTS has now been operating in accordance with the design criteria for several weeks. The attached analytical results obtained from sampling on January 5, 2012 are representative of the Flue Gas Desulfurization (FGD) treated wastewater generated. The characteristics of the treated wastewater are expected to be consistent going forward.

In consideration of available representative analytical data, we respectfully request that the Town accept the attached analytical report to satisfy the first month sampling requirements as established in Special Condition 11 of PSNH's Waste Disposal Agreement No. WDA-001.

#### **ANALYTICAL NOTATION**

FGD wastewater requires specialized analytical techniques to overcome matrix interference on some trace metals analysis. Many analytical laboratories may be unaware of this. We offer an excerpt below from the Environmental Protection Agency's (EPA's) web site and a link to their draft procedure 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 standard operating procedure (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. Standard Operating Procedure: Inductively Coupled Plasma/Mass Spectrometry for Trace Element Analysis in Flue Gas Desulfurization Wastewaters (30 pp, 174K)

We trust that this submittal adequately address your informational needs. Should you have any questions, please contact me at 232-8744.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in black ink that reads "Ronald A. Breton". The signature is written in a cursive, flowing style.

Ronald A. Breton, P.E.  
Principal

RAB/tmd

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Attachment(s)

**SUMMARY ANALYTICAL DATA**  
 Public Service Company of New Hampshire  
 Merrimack Station  
 Bow, New Hampshire

| PARAMETER                 | RESULTS (mg/L) 1/05/2012 |
|---------------------------|--------------------------|
| Alkalinity                | 180                      |
| Aluminum                  | 0.0411                   |
| Ammonia                   | 0.92                     |
| Antimony                  | 0.000520                 |
| Arsenic                   | 0.00498                  |
| Barium                    | 0.300                    |
| Beryllium                 | 0.000522                 |
| BOD                       | < 6                      |
| Cadmium                   | 0.000207                 |
| Calcium                   | 5,050                    |
| Chloride                  | 11,000                   |
| Chlorine (Total Residual) | < 0.05                   |
| Chromium (T)              | < 0.00050                |
| COD                       | 130                      |
| Copper                    | < 0.00050                |
| Cyanide (T)               | 0.02                     |
| Fluoride                  | 10                       |
| Iron                      | < 0.050                  |
| Lead                      | < 0.000200               |
| Manganese                 | 0.293                    |
| Mercury                   | 0.0000105                |
| Molybdenum                | 0.140                    |
| Nitrate                   | 100                      |
| Nickel                    | 0.00803                  |
| O&G                       | < 5                      |
| pH                        | 7.3                      |
| Selenium                  | 0.074                    |
| Silver                    | < 0.000100               |
| Sodium                    | 277.4                    |
| Sulfate                   | 1,200                    |
| Sulfide                   | < 0.1                    |
| Sulfite                   | < 2                      |
| TDS                       | 21,000                   |
| Thallium                  | 0.00664                  |
| TSS                       | 14                       |
| TTO                       | ND (1)                   |
| Zinc                      | < 0.001                  |
| VOC EPA 624               | (2)                      |
| Semi VOCs 625             | ND (3)                   |
| Phenolic Compounds        | < 0.3                    |
| PCBs                      | ND (4)                   |

NOTES:

1. No TTO compounds were detected above 0.01 mg/L.
2. One compound was detected by Method 624: Toluene at 2 µg/L.
3. Semi VOCs were not detected by Method 625 above detection limits (1 µg/L and 5 µg/L depending on parameter and 50 µg/L for benzoic acid).
4. PCB compounds analyzed by method 608 were not detected at concentrations greater than 0.3 µg/L.

Arthur Auclair  
Northeast Utilities  
97 River Road  
Bow, NH 03304



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 106677  
Client Identification: Merrimack Station  
Date Received: 1/5/2012

Dear Mr. Auclair:

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

1.13.12  
Date

44  
# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Temperature upon receipt (°C): **4.7**

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) |
|-----------|--------------------------|---------------|--------------|---------------|--------------|---|
| 106677.01 | Treat Tank Eff Composite | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 106677.02 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 106677.03 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | 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#: 106677

Client: **Northeast Utilities**Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Analysis: 1/6/12  
Analyst: KJP  
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 2  
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) 98 %R  
1,2-Dichlorobenzene-d4 (surr) 90 %R  
Toluene-d8 (surr) 100 %R



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**Client Designation: **Merrimack Station**

| Parameter Name              | Blank  | LCS           | LCSD                  | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|--------|---------------|-----------------------|---------------|-------|----------|-----|--------|
| Chloromethane               | < 5    | 19 (97 %R)    | 21 (105 %R) (8 RPD)   | 1/6/2012      | ug/l  | 0 - 273  | 20  | 624    |
| Vinyl chloride              | < 2    | 18 (91 %R)    | 20 (101 %R) (10 RPD)  | 1/6/2012      | ug/l  | 0 - 251  | 20  | 624    |
| Bromomethane                | < 2    | 21 (105 %R)   | 23 (113 %R) (7 RPD)   | 1/6/2012      | ug/l  | 0 - 242  | 20  | 624    |
| Chloroethane                | < 5    | 19 (95 %R)    | 20 (101 %R) (6 RPD)   | 1/6/2012      | ug/l  | 14 - 230 | 20  | 624    |
| Trichlorofluoromethane      | < 5    | 17 (84 %R)    | 18 (88 %R) (5 RPD)    | 1/6/2012      | ug/l  | 17 - 181 | 20  | 624    |
| Acrolein                    | < 50   | < 50 (%R N/A) | < 50 (%R) ( RPD)      | 1/6/2012      | ug/l  |          |     | 624    |
| Acetone                     | < 50   | < 50 (78 %R)  | < 50 (90 %R) (14 RPD) | 1/6/2012      | ug/l  |          |     | 624    |
| 1,1-Dichloroethene          | < 1    | 17 (83 %R)    | 18 (89 %R) (7 RPD)    | 1/6/2012      | ug/l  | 0 - 234  | 20  | 624    |
| Methylene chloride          | < 5    | 18 (88 %R)    | 19 (93 %R) (6 RPD)    | 1/6/2012      | ug/l  | 0 - 221  | 20  | 624    |
| Carbon disulfide            | < 5    | 17 (%R)       | 19 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Acrylonitrile               | < 50   | < 50 (%R)     | < 50 (%R) ( RPD)      | 1/6/2012      | ug/l  |          |     | 624    |
| Methyl-t-butyl ether(MTBE)  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| trans-1,2-Dichloroethene    | < 2    | 18 (89 %R)    | 18 (92 %R) (3 RPD)    | 1/6/2012      | ug/l  | 54 - 156 | 20  | 624    |
| Vinyl acetate               | < 10   | 30 (%R)       | 30 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| 1,1-Dichloroethane          | < 2    | 19 (93 %R)    | 20 (98 %R) (5 RPD)    | 1/6/2012      | ug/l  | 59 - 155 | 20  | 624    |
| cis-1,2-Dichloroethene      | < 2    | 19 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| 2-Butanone(MEK)             | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Chloroform                  | < 2    | 19 (94 %R)    | 20 (99 %R) (5 RPD)    | 1/6/2012      | ug/l  | 51 - 138 | 20  | 624    |
| 1,1,1-Trichloroethane       | < 2    | 18 (91 %R)    | 19 (97 %R) (6 RPD)    | 1/6/2012      | ug/l  | 52 - 162 | 20  | 624    |
| Carbon tetrachloride        | < 2    | 18 (91 %R)    | 19 (95 %R) (4 RPD)    | 1/6/2012      | ug/l  | 70 - 140 | 20  | 624    |
| Benzene                     | < 1    | 19 (97 %R)    | 20 (102 %R) (5 RPD)   | 1/6/2012      | ug/l  | 37 - 151 | 20  | 624    |
| 1,2-Dichloroethane          | < 2    | 18 (91 %R)    | 19 (94 %R) (3 RPD)    | 1/6/2012      | ug/l  | 49 - 155 | 20  | 624    |
| Trichloroethene             | < 2    | 19 (93 %R)    | 20 (98 %R) (5 RPD)    | 1/6/2012      | ug/l  | 71 - 157 | 20  | 624    |
| 1,2-Dichloropropane         | < 2    | 19 (95 %R)    | 20 (98 %R) (3 RPD)    | 1/6/2012      | ug/l  | 0 - 210  | 20  | 624    |
| Bromodichloromethane        | < 2    | 19 (96 %R)    | 20 (100 %R) (4 RPD)   | 1/6/2012      | ug/l  | 35 - 155 | 20  | 624    |
| 2-Chloroethylvinylether     | < 2    | 23 (115 %R)   | 24 (121 %R) (5 RPD)   | 1/6/2012      | ug/l  | 0 - 305  | 20  | 624    |
| 4-Methyl-2-pentanone(MIBK)  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| cis-1,3-Dichloropropene     | < 2    | 22 (109 %R)   | 23 (113 %R) (4 RPD)   | 1/6/2012      | ug/l  | 0 - 227  | 20  | 624    |
| Toluene                     | < 1    | 20 (101 %R)   | 21 (103 %R) (2 RPD)   | 1/6/2012      | ug/l  | 47 - 150 | 20  | 624    |
| trans-1,3-Dichloropropene   | < 2    | 18 (90 %R)    | 19 (93 %R) (3 RPD)    | 1/6/2012      | ug/l  | 17 - 183 | 20  | 624    |
| 1,1,2-Trichloroethane       | < 2    | 20 (100 %R)   | 21 (104 %R) (4 RPD)   | 1/6/2012      | ug/l  | 52 - 150 | 20  | 624    |
| 2-Hexanone                  | < 10   | 20 (%R)       | 20 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Tetrachloroethene           | < 2    | 20 (100 %R)   | 21 (106 %R) (6 RPD)   | 1/6/2012      | ug/l  | 64 - 148 | 20  | 624    |
| Dibromochloromethane        | < 2    | 20 (102 %R)   | 21 (104 %R) (2 RPD)   | 1/6/2012      | ug/l  | 53 - 149 | 20  | 624    |
| Chlorobenzene               | < 2    | 20 (98 %R)    | 20 (100 %R) (2 RPD)   | 1/6/2012      | ug/l  | 37 - 160 | 20  | 624    |
| Ethylbenzene                | < 1    | 20 (101 %R)   | 21 (105 %R) (4 RPD)   | 1/6/2012      | ug/l  | 37 - 162 | 20  | 624    |
| mp-Xylene                   | < 1    | 40 (101 %R)   | 43 (106 %R) (5 RPD)   | 1/6/2012      | ug/l  | 70 - 130 | 20  | 624    |
| o-Xylene                    | < 1    | 21 (104 %R)   | 22 (109 %R) (5 RPD)   | 1/6/2012      | ug/l  | 70 - 130 | 20  | 624    |
| Styrene                     | < 1    | 21 (%R)       | 22 (%R) ( RPD)        | 1/6/2012      | ug/l  |          |     | 624    |
| Bromoform                   | < 2    | 18 (88 %R)    | 18 (90 %R) (2 RPD)    | 1/6/2012      | ug/l  | 45 - 169 | 20  | 624    |
| 1,1,1,2-Tetrachloroethane   | < 2    | 20 (99 %R)    | 20 (100 %R) (1 RPD)   | 1/6/2012      | ug/l  | 46 - 157 | 20  | 624    |
| 1,3-Dichlorobenzene         | < 1    | 20 (100 %R)   | 21 (104 %R) (4 RPD)   | 1/6/2012      | ug/l  | 59 - 156 | 20  | 624    |
| 1,4-Dichlorobenzene         | < 1    | 20 (98 %R)    | 20 (102 %R) (4 RPD)   | 1/6/2012      | ug/l  | 18 - 190 | 20  | 624    |
| 1,2-Dichlorobenzene         | < 1    | 20 (98 %R)    | 20 (102 %R) (4 RPD)   | 1/6/2012      | ug/l  | 18 - 190 | 20  | 624    |
| 4-Bromofluorobenzene (surr) | 100 %R | 101 %R        | 102 %R                | 1/6/2012      | % Rec | 70 - 130 |     | 624    |



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name                | Blank  | LCS    | LCSD   | Analysis Date | Units | Limits   | RPD | Method |
|-------------------------------|--------|--------|--------|---------------|-------|----------|-----|--------|
| 1,2-Dichlorobenzene-d4 (surr) | 93 %R  | 90 %R  | 89 %R  | 1/6/2012      | % Rec | 70 - 130 |     | 624    |
| Toluene-d8 (surr)             | 100 %R | 102 %R | 102 %R | 1/6/2012      | % 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#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Preparation: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1

|                             |      |
|-----------------------------|------|
| Phenol                      | < 1  |
| 2-Chlorophenol              | < 1  |
| 2,4-Dichlorophenol          | < 1  |
| 2,4,5-Trichlorophenol       | < 1  |
| 2,4,6-Trichlorophenol       | < 1  |
| Pentachlorophenol           | < 5  |
| 2-Nitrophenol               | < 1  |
| 4-Nitrophenol               | < 5  |
| 2,4-Dinitrophenol           | < 5  |
| 2-Methylphenol              | < 1  |
| 3/4-Methylphenol            | < 1  |
| 2,4-Dimethylphenol          | < 1  |
| 4-Chloro-3-methylphenol     | < 1  |
| 4,6-Dinitro-2-methylphenol  | < 5  |
| Benzoic Acid                | < 50 |
| N-Nitrosodimethylamine      | < 1  |
| n-Nitroso-di-n-propylamine  | < 1  |
| n-Nitrosodiphenylamine      | < 1  |
| bis(2-Chloroethyl)ether     | < 1  |
| bis(2-chloroisopropyl)ether | < 1  |
| bis(2-Chloroethoxy)methane  | < 1  |
| 1,3-Dichlorobenzene         | < 1  |
| 1,4-Dichlorobenzene         | < 1  |
| 1,2-Dichlorobenzene         | < 1  |
| 1,2,4-Trichlorobenzene      | < 1  |
| 2-Chloronaphthalene         | < 1  |
| 4-Chlorophenyl-phenylether  | < 1  |
| 4-Bromophenyl-phenylether   | < 1  |
| Hexachloroethane            | < 1  |
| Hexachlorobutadiene         | < 1  |
| Hexachlorocyclopentadiene   | < 5  |
| Hexachlorobenzene           | < 1  |
| 4-Chloroaniline             | < 1  |
| 2-Nitroaniline              | < 5  |
| 3-Nitroaniline              | < 1  |
| 4-Nitroaniline              | < 1  |
| Benzyl alcohol              | < 5  |
| Nitrobenzene                | < 1  |
| Isophorone                  | < 1  |
| 2,4-Dinitrotoluene          | < 1  |
| 2,6-Dinitrotoluene          | < 1  |
| Benzidine (estimated)       | < 5  |
| 3,3'-Dichlorobenzidine      | < 1  |
| Pyridine                    | < 5  |
| Azobenzene                  | < 1  |



# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Preparation: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1  
Carbazole < 1  
Dimethylphthalate < 1  
Diethylphthalate < 1  
Di-n-butylphthalate < 5  
Butylbenzylphthalate < 1  
bis(2-Ethylhexyl)phthalate < 5  
Di-n-octylphthalate < 1  
Dibenzofuran < 1  
Naphthalene < 1  
2-Methylnaphthalene < 1  
Acenaphthylene < 1  
Acenaphthene < 1  
Fluorene < 1  
Phenanthrene < 1  
Anthracene < 1  
Fluoranthene < 1  
Pyrene < 1  
Benzo[a]anthracene < 1  
Chrysene < 1  
Benzo[b]fluoranthene < 1  
Benzo[k]fluoranthene < 1  
Benzo[a]pyrene < 1  
Indeno[1,2,3-cd]pyrene < 1  
Dibenz[a,h]anthracene < 1  
Benzo[g,h,i]perylene < 1  
2-Fluorophenol (surr) 33 %R  
Phenol-d6 (surr) 24 %R  
2,4,6-Tribromophenol (surr) 90 %R  
Nitrobenzene-D5 (surr) 71 %R  
2-Fluorobiphenyl (surr) 72 %R  
p-Terphenyl-D14 (surr) 84 %R



# QC REPORT

EAI ID#: 106677

Client: Northeast Utilities

Batch ID: 734507-32510/A010512E6251

Client Designation: Merrimack Station

| Parameter Name              | Blank | LCS          | LCSD                 | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|--------------|----------------------|---------------|-------|----------|-----|--------|
| Phenol                      | < 1   | 14 (27 %R)   | 14 (29 %R) (7 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Chlorophenol              | < 1   | 29 (59 %R)   | 30 (60 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dichlorophenol          | < 1   | 35 (70 %R)   | 36 (72 %R) (3 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,5-Trichlorophenol       | < 1   | 18 (72 %R)   | 19 (75 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,6-Trichlorophenol       | < 1   | 34 (68 %R)   | 36 (71 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| Pentachlorophenol           | < 5   | 34 (68 %R)   | 39 (78 %R) (14 RPD)  | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2-Nitrophenol               | < 1   | 35 (70 %R)   | 37 (73 %R) (4 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Nitrophenol               | < 5   | 16 (32 %R)   | 17 (35 %R) (9 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2,4-Dinitrophenol           | < 5   | 38 (75 %R)   | 40 (81 %R) (8 RPD)   | 1/5/2012      | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Methylphenol              | < 1   | 15 (61 %R)   | 16 (64 %R) (5 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 3/4-Methylphenol            | < 1   | 13 (53 %R)   | 14 (54 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dimethylphenol          | < 1   | 33 (66 %R)   | 34 (67 %R) (2 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Chloro-3-methylphenol     | < 1   | 36 (73 %R)   | 36 (73 %R) (0 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| 4,6-Dinitro-2-methylphenol  | < 5   | 39 (77 %R)   | 41 (81 %R) (5 RPD)   | 1/5/2012      | ug/l  | 30 - 130 | 20  | 625mod |
| Benzoic Acid                | < 50  | < 50 (31 %R) | < 50 (34 %R) (9 RPD) | 1/5/2012      | ug/l  | 15 - 140 | 20  | 625mod |
| N-Nitrosodimethylamine      | < 1   | 12 (46 %R)   | 12 (47 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitroso-di-n-propylamine  | < 1   | 17 (67 %R)   | 17 (69 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitrosodiphenylamine      | < 1   | 22 (90 %R)   | 23 (90 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethyl)ether     | < 1   | 16 (63 %R)   | 16 (64 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-chloroisopropyl)ether | < 1   | 15 (61 %R)   | 15 (62 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethoxy)methane  | < 1   | 17 (69 %R)   | 18 (70 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,3-Dichlorobenzene         | < 1   | 13 (52 %R)   | 13 (52 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,4-Dichlorobenzene         | < 1   | 13 (52 %R)   | 13 (52 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2-Dichlorobenzene         | < 1   | 14 (54 %R)   | 14 (55 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2,4-Trichlorobenzene      | < 1   | 14 (57 %R)   | 14 (58 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Chloronaphthalene         | < 1   | 16 (63 %R)   | 16 (65 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chlorophenyl-phenylether  | < 1   | 18 (71 %R)   | 18 (72 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Bromophenyl-phenylether   | < 1   | 19 (75 %R)   | 19 (75 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachloroethane            | < 1   | 11 (43 %R)   | 11 (43 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobutadiene         | < 1   | 10 (40 %R)   | 10 (42 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorocyclopentadiene   | < 5   | * 9 (37 %R)  | 10 (41 %R) (10 RPD)  | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobenzene           | < 1   | 18 (73 %R)   | 19 (78 %R) (7 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chloroaniline             | < 1   | 20 (80 %R)   | 20 (80 %R) (0 RPD)   | 1/5/2012      | ug/l  | 15 - 140 | 20  | 625mod |
| 2-Nitroaniline              | < 5   | 17 (67 %R)   | 18 (71 %R) (6 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 3-Nitroaniline              | < 1   | 18 (73 %R)   | 19 (76 %R) (4 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Nitroaniline              | < 1   | 18 (73 %R)   | 19 (77 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzyl alcohol              | < 5   | 16 (65 %R)   | 17 (67 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Nitrobenzene                | < 1   | 16 (65 %R)   | 17 (68 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Isophorone                  | < 1   | 20 (79 %R)   | 20 (81 %R) (3 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2,4-Dinitrotoluene          | < 1   | 20 (81 %R)   | 21 (85 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2,6-Dinitrotoluene          | < 1   | 19 (75 %R)   | 20 (79 %R) (5 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzidine (estimated)       | < 5   | 23 (92 %R)   | 20 (81 %R) (13 RPD)  | 1/5/2012      | ug/l  | 15 - 168 | 20  | 625mod |
| 3,3'-Dichlorobenzidine      | < 1   | 19 (75 %R)   | 19 (76 %R) (1 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Pyridine                    | < 5   | 11 (45 %R)   | 11 (46 %R) (2 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Azobenzene                  | < 1   | 18 (71 %R)   | 18 (71 %R) (0 RPD)   | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |



# QC REPORT

EAI ID#: 106677

Client: Northeast Utilities

Batch ID: 734507-32510/A010512E6251

Client Designation: Merrimack Station

| Parameter Name              | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Carbazole                   | < 1   | 20 (79 %R) | 20 (81 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dimethylphthalate           | < 1   | 18 (73 %R) | 18 (74 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Diethylphthalate            | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-butylphthalate         | < 5   | 19 (77 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Butylbenzylphthalate        | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Ethylhexyl)phthalate  | < 5   | 19 (76 %R) | 19 (76 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-octylphthalate         | < 1   | 18 (73 %R) | 19 (75 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenzofuran                | < 1   | 16 (66 %R) | 17 (67 %R) (2 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Naphthalene                 | < 1   | 17 (67 %R) | 17 (67 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Methylnaphthalene         | < 1   | 16 (62 %R) | 16 (62 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthylene              | < 1   | 16 (63 %R) | 16 (65 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthene                | < 1   | 17 (70 %R) | 18 (71 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Fluorene                    | < 1   | 17 (70 %R) | 18 (71 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Phenanthrene                | < 1   | 19 (74 %R) | 19 (76 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Anthracene                  | < 1   | 19 (77 %R) | 19 (77 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Fluoranthene                | < 1   | 19 (75 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Pyrene                      | < 1   | 18 (73 %R) | 18 (73 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]anthracene          | < 1   | 19 (75 %R) | 19 (76 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Chrysene                    | < 1   | 19 (77 %R) | 19 (77 %R) (0 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[b]fluoranthene        | < 1   | 19 (75 %R) | 19 (77 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[k]fluoranthene        | < 1   | 19 (77 %R) | 20 (79 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]pyrene              | < 1   | 19 (76 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Indeno[1,2,3-cd]pyrene      | < 1   | 19 (78 %R) | 19 (77 %R) (1 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenz[a,h]anthracene       | < 1   | 20 (80 %R) | 19 (77 %R) (4 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[g,h,i]perylene        | < 1   | 20 (79 %R) | 19 (77 %R) (3 RPD) | 1/5/2012      | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Fluorophenol (surr)       | 39 %R | 39 %R      | 39 %R              | 1/5/2012      | % Rec | 21 - 110 | 20  | 625mod |
| Phenol-d6 (surr)            | 28 %R | 28 %R      | 29 %R              | 1/5/2012      | % Rec | 15 - 94  | 20  | 625mod |
| 2,4,6-Tribromophenol (surr) | 76 %R | 92 %R      | 82 %R              | 1/5/2012      | % Rec | 15 - 110 | 20  | 625mod |
| Nitrobenzene-D5 (surr)      | 76 %R | 75 %R      | 77 %R              | 1/5/2012      | % Rec | 35 - 114 | 20  | 625mod |
| 2-Fluorobiphenyl (surr)     | 77 %R | 73 %R      | 75 %R              | 1/5/2012      | % Rec | 43 - 116 | 20  | 625mod |
| p-Terphenyl-D14 (surr)      | 89 %R | 95 %R      | 90 %R              | 1/5/2012      | % Rec | 33 - 130 | 20  | 625mod |

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.  
 \*/If flagged analyte recoveries deviated from the QA/QC limits.

Hexachlorocyclopentadiene exhibited recovery below acceptance limits in the LCS. Hexachlorocyclopentadiene was not detected in the sample.



# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff  
Grab

Lab Sample ID: 106677.02

Matrix: aqueous

Date Sampled: 1/5/12

Date Received: 1/5/12

Units: mg/L

Date of Extraction/Prep: 1/9/12

Date of Analysis: 1/9/12

Analyst: LAS

Method: 1664A

Dilution Factor: 1

Oil & Grease (HEM) < 5



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name     | Blank | LCS        | LCSD                | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|---------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 37 (93 %R) | 33 (82 %R) (13 RPD) | 1/9/2012      | 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. Any impact to data is addressed below.



# LABORATORY REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

Sample ID: Treat Tank Eff  
Grab

Lab Sample ID: 106677.02  
Matrix: aqueous  
Date Sampled: 1/5/12  
Date Received: 1/5/12  
Units: ug/l  
Date of Extraction/Prep: 1/6/12  
Date of Analysis: 1/6/12  
Analyst: JW  
Method: 608  
Dilution Factor: 1

|            |       |
|------------|-------|
| PCB-1016   | < 0.3 |
| PCB-1221   | < 0.3 |
| PCB-1232   | < 0.3 |
| PCB-1242   | < 0.3 |
| PCB-1248   | < 0.3 |
| PCB-1254   | < 0.3 |
| PCB-1260   | < 0.3 |
| TMX (surr) | 81 %R |
| DCB (surr) | 96 %R |



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Batch ID: 734508-43146/A010612E608P1

Client Designation: **Merrimack Station**

| Parameter Name | Blank | LCS            | LCSD                     | Analysis Date | Units | Limits   | RPD | Method |
|----------------|-------|----------------|--------------------------|---------------|-------|----------|-----|--------|
| PCB-1016       | < 0.3 | 2.0 (101 %R)   | 2.1 (106 %R) (5 RPD)     | 1/6/2012      | ug/l  | 40 - 140 | 20  | 608    |
| PCB-1221       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1232       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1242       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1248       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1254       | < 0.3 | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/6/2012      | ug/l  |          |     | 608    |
| PCB-1260       | < 0.3 | 2.0 (102 %R)   | 2.1 (105 %R) (3 RPD)     | 1/6/2012      | ug/l  | 40 - 140 | 20  | 608    |
| TMX (surr)     | 84 %R | 88 %R          | 90 %R                    | 1/6/2012      | % Rec | 30 - 150 |     | 608    |
| DCB (surr)     | 95 %R | 101 %R         | 100 %R                   | 1/6/2012      | % Rec | 30 - 150 |     | 608    |

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#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

**Sample ID:** Treat Tank Eff Composite

**Lab Sample ID:** 106677.01

**Matrix:** aqueous

**Date Sampled:** 1/5/12

**Date Received:** 1/5/12

|                                       |       |
|---------------------------------------|-------|
| Solids Suspended                      | 14    |
| Solids Dissolved                      | 21000 |
| Fluoride                              | 10    |
| Sulfate                               | 1200  |
| Chloride                              | 11000 |
| Nitrate-N                             | 100   |
| Alkalinity Total (CaCO <sub>3</sub> ) | 180   |
| Ammonia-N                             | 0.92  |
| BOD                                   | < 6   |
| COD                                   | 130   |
| pH                                    | 7.3   |

| Units | Analysis |       |          | Method | Analyst |
|-------|----------|-------|----------|--------|---------|
|       | Date     | Time  |          |        |         |
| mg/L  | 01/10/12 | 15:40 | 2540D    | DLS    |         |
| mg/L  | 01/11/12 | 13:15 | 2540C    | DLS    |         |
| mg/L  | 01/11/12 | 11:23 | 300.0    | KL     |         |
| mg/L  | 01/11/12 | 11:23 | 300.0    | KL     |         |
| mg/L  | 01/10/12 | 12:17 | 4500CIE  | DLS    |         |
| mg/L  | 01/06/12 | 12:57 | 353.2    | DLS    |         |
| mg/L  | 01/11/12 | 9:40  | 2320B    | SEL    |         |
| mg/L  | 01/10/12 | 8:30  | 4500NH3D | SEL    |         |
| mg/L  | 01/06/12 | 14:05 | 5210B    | SKC    |         |
| mg/L  | 01/12/12 | 10:20 | H8000    | SKC    |         |
| SU    | 01/05/12 | 15:10 | 4500H+B  | NZ     |         |

**Sample ID:** Treat Tank Eff Grab

**Lab Sample ID:** 106677.02

**Matrix:** aqueous

**Date Sampled:** 1/5/12

**Date Received:** 1/5/12

|                         |        |
|-------------------------|--------|
| Cyanide Total           | 0.02   |
| Sulfide                 | < 0.1  |
| Sulfite                 | < 2    |
| Total Residual Chlorine | < 0.05 |
| Total Phenols           | < 0.3  |

| Units | Analysis |       |          | Method | Analyst |
|-------|----------|-------|----------|--------|---------|
|       | Date     | Time  |          |        |         |
| mg/L  | 01/11/12 | 8:45  | 4500CNE  | KJR    |         |
| mg/L  | 01/11/12 | 13:20 | 8131HACH | KJR    |         |
| mg/L  | 01/05/12 | 17:30 | 377.1    | JL     |         |
| mg/L  | 01/05/12 | 16:50 | 4500CIG  | NZ     |         |
| mg/L  | 01/09/12 | 9:00  | 420.1    | JCC    |         |

Total Phenols: The reporting limit for Total Phenols has been elevated due to matrix interferences.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name           | Blank  | LCS           | LCSD                  | Units | Date of Analysis | Limits      | RPD | Method    |
|--------------------------|--------|---------------|-----------------------|-------|------------------|-------------|-----|-----------|
| Solids Suspended         | < 5    | 90 (90 %R)    | 93 (93 %R) (3 RPD)    | mg/L  | 1/10/12          | 90 - 110    | 20  | 2540D     |
| Solids Dissolved         | < 5    | 970 (97 %R)   | NA                    | mg/L  | 1/11/12          | 85 - 115    |     | 2540C     |
| Fluoride                 | < 0.1  | 2.0 (101 %R)  | 2.0 (101 %R) (0 RPD)  | mg/L  | 1/11/12          | 90 - 110    | 20  | 300.0     |
| Sulfate                  | < 1    | 21 (106 %R)   | 21 (103 %R) (3 RPD)   | mg/L  | 1/11/12          | 90 - 110    | 20  | 300.0     |
| Chloride                 | < 1    | 26 (103 %R)   | 26 (103 %R) (0 RPD)   | mg/L  | 1/10/12          | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N                | < 0.05 | 5.3 (106 %R)  | 5.3 (106 %R) (0 RPD)  | mg/L  | 1/6/12           | 90 - 110    | 20  | 353.2     |
| Alkalinity Total (CaCO3) | < 1    | 10 (99 %R)    | 10 (100 %R) (1 RPD)   | mg/L  | 1/11/12          | 85 - 115    | 20  | 2320B     |
| Cyanide Total            | < 0.02 | 0.27 (106 %R) | 0.23 (91 %R) (15 RPD) | mg/L  | 1/11/12          | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N                | < 0.05 | 2.0 (100 %R)  | 2.1 (105 %R) (5 RPD)  | mg/L  | 1/10/12          | 90 - 110    | 20  | 4500NH3DN |
| Sulfide                  | < 0.1  | 0.4 (98 %R)   | 0.4 (90 %R) (9 RPD)   | mg/L  | 1/11/12          | 80 - 120    | 20  | 8131HACH  |
| Sulfite                  | < 2    | NA            | NA                    | mg/L  | 1/5/12           |             |     | 377.1     |
| Total Residual Chlorine  | < 0.05 | 0.88 (101 %R) | 0.87 (100 %R) (1 RPD) | mg/L  | 1/5/12           | 80 - 120    | 20  | 4500CIG   |
| BOD                      | < 6    | 430 (109 %R)  | 390 (97 %R) (12 RPD)  | mg/L  | 1/6/12           | 84 - 115    | 20  | 5210B     |
| COD                      | < 10   | 100 (101 %R)  | 100 (98 %R) (3 RPD)   | mg/L  | 1/12/12          | 85 - 115    | 20  | H8000     |
| Total Phenols            | < 0.05 | 0.28 (112 %R) | 0.27 (106 %R) (6 RPD) | mg/L  | 1/9/12           | 85 - 115    | 20  | 420.1     |
| pH                       |        | 6.0 (101 %R)  | 6.05 (101 %R) (0 RPD) | SU    | 1/5/12           | 5.95 - 6.07 | 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.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name           | Duplicate Parent ID | Duplicate Parent | Duplicate     | Units | Date of Analysis | RPD | Method   |
|--------------------------|---------------------|------------------|---------------|-------|------------------|-----|----------|
| Solids Suspended         | 106692.03           | 180              | 160 (13 RPD)  | mg/L  | 1/10/12          | 20  | 2540D    |
| Solids Dissolved         |                     | NA               | NA            | mg/L  | 1/11/12          |     | 2540C    |
| Fluoride                 |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 300.0    |
| Sulfate                  |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 300.0    |
| Chloride                 |                     | NA               | NA            | mg/L  | 1/10/12          | 20  | 4500CIE  |
| Nitrate-N                |                     | NA               | NA            | mg/L  | 1/6/12           | 20  | 353.2    |
| Alkalinity Total (CaCO3) |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 2320B    |
| Cyanide Total            |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 4500CNE  |
| Ammonia-N                | 106627.02           | 13               | 13 (2 RPD)    | mg/L  | 1/10/12          | 20  | 4500NH3D |
| Sulfide                  |                     | NA               | NA            | mg/L  | 1/11/12          | 20  | 8131HACH |
| Sulfite                  | 106677.02           | < 2              | < 2 (RPD N/A) | mg/L  | 1/5/12           | 20  | 377.1    |
| Total Residual Chlorine  |                     | NA               | NA            | mg/L  | 1/5/12           | 20  | 4500CIG  |
| BOD                      | 106657.02           | 410              | 400 (3 RPD)   | mg/L  | 1/6/12           | 20  | 5210B    |
| COD                      |                     | NA               | NA            | mg/L  | 1/12/12          | 20  | H8000    |
| Total Phenols            |                     | NA               | NA            | mg/L  | 1/9/12           | 20  | 420.1    |
| pH                       | 106649.01           | 6.3              | 6.3 (0 RPD)   | SU    | 1/5/12           | 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.



# QC REPORT

EAI ID#: 106677

Client: **Northeast Utilities**

Client Designation: **Merrimack Station**

| Parameter Name           | MS/MSD Parent ID | MS/MSD Parent | Matrix Spike | MSD                   | Date of Units Analysis | Limits | RPD | Method  |
|--------------------------|------------------|---------------|--------------|-----------------------|------------------------|--------|-----|---------|
| Solids Suspended         |                  | NA            | NA           | NA                    | mg/L 1/10/12           |        | 20  | 2540D   |
| Solids Dissolved         |                  | NA            | NA           | NA                    | mg/L 1/11/12           |        |     | 2540C   |
| Fluoride                 |                  | NA            | NA           | NA                    | mg/L 1/11/12           |        | 20  | 300.0   |
| Sulfate                  |                  | NA            | NA           | NA                    | mg/L 1/11/12           |        | 20  | 300.0   |
| Chloride                 | 106632.02        | 11            | 22 (110 %R)  | 22 (109 %R) (1 RPD)   | mg/L 1/10/12           | 80-120 | 20  | 4500CIE |
| Nitrate-N                | 106678.01        | 1.2           | 12 (110 %R)  | 12 (109 %R) (1 RPD)   | mg/L 1/6/12            | 80-120 | 20  | 353.2   |
| Alkalinity Total (CaCO3) | 106607.01        | 29            | 48 (98 %R)   | NA                    | mg/L 1/11/12           | 80-120 | 20  | 2320B   |
| Cyanide Total            | 106677.02        | 0.02          | 0.25 (93 %R) | 0.23 (86 %R) (8 RPD)  | mg/L 1/11/12           | 75-125 | 20  | 4500CNE |
| Ammonia-N                | 106627.02        | 13            | 16 (115 %R)  | 15 (85 %R) (30 RPD)   | mg/L 1/10/12           | 80-120 | 20  | 4500NH3 |
| Sulfide                  |                  | NA            | NA           | NA                    | mg/L 1/11/12           |        | 20  | 8131HAC |
| Sulfite                  |                  | NA            | NA           | NA                    | mg/L 1/5/12            |        |     | 377.1   |
| Total Residual Chlorine  |                  | NA            | NA           | NA                    | mg/L 1/5/12            |        | 20  | 4500CIG |
| BOD                      | 106657.02        | 410           | 760 (82 %R)  | NA                    | mg/L 1/6/12            | 75-125 | 20  | 5210B   |
| COD                      | 106677.01        | 130           | 220 (92 %R)  | 230 (99 %R) (7 RPD)   | mg/L 1/12/12           | 80-120 | 20  | H8000   |
| Total Phenols            | 106677.02        | < 0.3         | 0.4 (42 %R)  | 0.4 (42 %R) (133 RPD) | mg/L 1/9/12            | 80-120 | 20  | 420.1   |
| pH                       |                  | NA            | NA           | NA                    | SU 1/5/12              |        | 10  | 4500H+B |

Total Phenols: The MS and MSD recoveries were below acceptance criteria even when the parent sample was diluted indicating a matrix interference.

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.



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

11 January 2012

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

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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                | Lab ID     | Matrix | Date Sampled    | Date Received   |
|--------------------------|------------|--------|-----------------|-----------------|
| Treat Tank Eff Composite | 1201073-01 | Water  | 05-Jan-12 10:00 | 06-Jan-12 09:50 |
| Treat Tank Eff Grab      | 1201073-02 | Water  | 05-Jan-12 08:00 | 06-Jan-12 09:50 |

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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1201073 Final Report  
01/11/2012



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 6th, 2012. The samples were received intact, on-ice with temperatures measured at 3.4 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL AND QUALITY CONTROL ISSUES

There were no analytical difficulties experienced with analysis of these samples with the exceptions flagged in the report.

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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01/11/2012



### CHAIN OF CUSTODY FORMS

1201073

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

414 Pontius Ave. N. Seattle WA 98107  
 Phone: 206-622-6960  
 Fax: 206-622-6870  
 www.frontiersci.com



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1201073

|  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
|--|------------|--|---|--------------------------------------|---------|-------------------------------|--|------------------------------------|--|------------------------------------|---|
| Client: <u>Seattle Department of Public Health</u>   |            | Contact: <u>Shirley Green</u>                          |   | 414 Pontius Ave. N. Seattle WA 98107 |         | Phone: 206-622-6960           |  | Fax: 206-622-6870                  |  | www.frontiersci.com                |   |
| Address: <u>1000 1st Avenue</u>  |            | Phone: <u>206-462-2000</u>                             |   | Contract No: <u>1201073</u>          |         | Date: <u>1/12/12</u>          |  | TAT (business days): <u>20</u> hrs |  | TAT (business days): <u>20</u> hrs |   |
| Project Name: <u>Water &amp; Sediment</u>  |            | E-mail: <u>shirley.green@seattle.gov</u>               |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| Report For: <u>Water &amp; Sediment</u>  |            | Invoice To: <u>Seattle Department of Public Health</u> |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| Address: <u>1000 1st Avenue</u>  |            | Address: <u>1000 1st Avenue</u>                        |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| City: <u>Seattle</u>   |            | City: <u>Seattle</u>                                   |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| State: <u>WA</u>   |            | State: <u>WA</u>                                       |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| Country: <u>USA</u>  |            | Country: <u>USA</u>                                    |   | Contract POC: <u>Shirley Green</u>   |         | Project Start: <u>1/12/12</u> |  | Project End: <u>1/12/12</u>        |  | Project Status: <u>Completed</u>   |   |
| Engraved Bottle ID   |            | Sample ID  |   | Bottles                              |         | Matrix                        |  | Date & Time                        |  | Comments                           |   |
| 1  | 1201073-01 | 1201073-01   | 1 | Water                                | 1/12/12 | 12:00                         |  |                                    |  |                                    | 1. Hatched: 1/12/12, Re: 1201073-01, 1201073-02, 1201073-03, 1201073-04, 1201073-05, 1201073-06, 1201073-07, 1201073-08, 1201073-09, 1201073-10, 1201073-11, 1201073-12 |
| 2  | 1201073-02 | 1201073-02   | 2 | Water                                | 1/12/12 | 12:00                         |  |                                    |  |                                    | 2. Hatched: 1/12/12, Re: 1201073-01, 1201073-02, 1201073-03, 1201073-04, 1201073-05, 1201073-06, 1201073-07, 1201073-08, 1201073-09, 1201073-10, 1201073-11, 1201073-12 |
| 3  | 1201073-03 | 1201073-03   | 3 | Water                                | 1/12/12 | 12:00                         |  |                                    |  |                                    | 3. Hatched: 1/12/12, Re: 1201073-01, 1201073-02, 1201073-03, 1201073-04, 1201073-05, 1201073-06, 1201073-07, 1201073-08, 1201073-09, 1201073-10, 1201073-11, 1201073-12 |
| 4  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 5  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 6  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 7  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 8  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 9  |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 10   |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 11   |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| 12   |            |  |   |                                      |         |                               |  |                                    |  |                                    |   |
| For Laboratory Use Only  |            | Matrix Codes:  |   | Requisitioned By:                    |         | Received By:                  |  | Name:                              |  | Name:                              |   |
| Comments: <u>NO</u>  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| Cooler Temp: <u>4°C</u>  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| Carrier: <u>LPS</u>  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| Vial: <u>6950</u>  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| # of Coolers: <u>1</u>   |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| Sample Disposal:   |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| <input type="checkbox"/> Return (shipping fees may apply)  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| <input type="checkbox"/> Standard Disposal - 30 Days after report  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| <input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply)  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| By signing, you declare that you agree with FGS' terms and conditions, and that you authorize FGS to perform the specified analyses. |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |
| Customer Approval: <u>[Signature]</u>  |            | Matrix Code: <u>W</u>                                  |   | Name: <u>Shirley Green</u>           |         | Name: <u>LPS</u>              |  | Name: <u>LPS</u>                   |  | Name: <u>LPS</u>                   |   |

Rec'd by: Alexa Berman, FGS 1-6-12, 11:07

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Liz Siska, Project Manager





## ANALYTICAL RESULTS

### Treat Tank Eff Composite

Matrix: Water

Laboratory ID: 1201073-01

| Analyte    | Result  | MDL   | MRL    | Units | Dilution | Batch   | Sequence | Analyzed | Method  | Notes |
|------------|---------|-------|--------|-------|----------|---------|----------|----------|---------|-------|
| Aluminium  | 41.1    | 2.2   | 20.0   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Antimony   | 0.520   | 0.023 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Barium     | 300     | 0.14  | 1.00   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Beryllium  | 0.522   | 0.114 | 0.300  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Cadmium    | 0.207   | 0.021 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Calcium    | 5050000 | 16200 | 200000 | µg/L  | 5000     | F201077 | 2A10015  | 01/10/12 | FGS-054 |       |
| Chromium   | ND      | 0.04  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Copper     | ND      | 0.05  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Iron       | ND      | 6.5   | 50.0   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Lead       | ND      | 0.020 | 0.200  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Manganese  | 293     | 0.74  | 10.0   | µg/L  | 100      | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Molybdenum | 140     | 0.03  | 0.30   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Nickel     | 8.03    | 0.04  | 0.50   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Silver     | ND      | 0.030 | 0.100  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |
| Sodium     | 277000  | 115   | 2000   | µg/L  | 100      | F201062 | 2A10002  | 01/09/12 | FGS-054 |       |
| Thallium   | 6.64    | 0.006 | 0.025  | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | QB-01 |
| Zinc       | ND      | 0.08  | 1.00   | µg/L  | 5        | F201062 | 2A10002  | 01/09/12 | FGS-054 | U     |

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## ANALYTICAL RESULTS

### Treat Tank Eff Grab

Matrix: Water

Laboratory ID: 1201073-02

| Analyte  | Result | MDL  | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes   |
|----------|--------|------|------|-------|----------|---------|----------|----------|-----------|---------|
| Arsenic  | 4.98   | 1.02 | 3.00 | µg/L  | 20       | F201062 | 2A10015  | 01/10/12 | FGS-054   |         |
| Mercury  | 10.5   | 0.34 | 2.02 | ng/L  | 4        | F201063 | 2A09010  | 01/09/12 | EPA 1631E | FB-1631 |
| Selenium | 74.0   | 3.88 | 12.0 | µg/L  | 20       | F201062 | 2A10015  | 01/10/12 | FGS-054   |         |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201073-02

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 10.48                        | 10.54                           | 2.02 | 0.617 | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes           |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------------|
| Beryllium  | 0.522                       | 2.0200             | 2.676                   | 107           | 75 - 135        | FGS-054 |                 |
| Aluminum   | 41.1                        | 151.50             | 210.7                   | 112           | 80 - 115        | FGS-054 |                 |
| Chromium   | 0.47                        | 7.0700             | 8.59                    | 115           | 85 - 115        | FGS-054 |                 |
| Iron       | ND                          | 505.00             | 563.6                   | 112           | 75 - 125        | FGS-054 |                 |
| Nickel     | 8.03                        | 4.0400             | 11.98                   | 97.7          | 68 - 134        | FGS-054 |                 |
| Copper     | 0.29                        | 4.0400             | 4.00                    | 91.8          | 51 - 145        | FGS-054 |                 |
| Zinc       | 0.27                        | 10.100             | 9.10                    | 87.4          | 46 - 146        | FGS-054 |                 |
| Arsenic    | 5.32                        | 15.150             | 22.17                   | 111           | 85 - 115        | FGS-054 |                 |
| Selenium   | 71.73                       | 30.300             | 100.6                   | 95.3          | 59 - 149        | FGS-054 |                 |
| Molybdenum | 140.3                       | 2.0200             | 142.1                   | 88.8          | 80 - 115        | FGS-054 |                 |
| Silver     | ND                          | 1.5150             | 1.216                   | 80.3          | 74 - 119        | FGS-054 |                 |
| Cadmium    | 0.207                       | 0.80800            | 1.076                   | 108           | 84 - 113        | FGS-054 |                 |
| Antimony   | 0.520                       | 0.80800            | 1.360                   | 104           | 79 - 122        | FGS-054 |                 |
| Barium     | 300.0                       | 10.100             | 305.0                   | 49.8          | 80 - 120        | FGS-054 | QM-02           |
| Thallium   | 6.645                       | 0.40400            | 6.882                   | 58.7          | 64 - 137        | FGS-054 | QB-01,<br>QM-02 |
| Lead       | ND                          | 1.5150             | 1.635                   | 108           | 72 - 143        | FGS-054 |                 |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 2.0200             | 2.639                    | 105            | 1.39   | 75 - 135        | 20        | FGS-054 |       |
| Aluminum   | 151.50             | 213.8                    | 114            | 1.50   | 80 - 115        | 20        | FGS-054 |       |
| Chromium   | 7.0700             | 8.59                     | 115            | 0.0611 | 85 - 115        | 20        | FGS-054 |       |
| Iron       | 505.00             | 553.8                    | 110            | 1.76   | 75 - 125        | 20        | FGS-054 |       |
| Nickel     | 4.0400             | 12.20                    | 103            | 1.83   | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0400             | 3.95                     | 90.7           | 1.15   | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.100             | 8.87                     | 85.2           | 2.51   | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.150             | 22.81                    | 115            | 2.84   | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.300             | 110.8                    | 129            | 9.65   | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0200             | 143.5                    | 159            | 0.993  | 80 - 115        | 20        | FGS-054 | QM-02 |
| Silver     | 1.5150             | 1.226                    | 81.0           | 0.852  | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80800            | 0.956                    | 92.7           | 11.8   | 84 - 113        | 20        | FGS-054 |       |

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### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201073-01

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Antimony | 0.80800            | 1.373                    | 106            | 0.924 | 79 - 122        | 20        | FGS-054 |       |
| Barium   | 10.100             | 307.1                    | 71.1           | 0.703 | 80 - 120        | 20        | FGS-054 | QM-02 |
| Thallium | 0.40400            | 6.918                    | 67.6           | 0.520 | 64 - 137        | 20        | FGS-054 | QB-01 |
| Lead     | 1.5150             | 1.580                    | 104            | 3.44  | 72 - 143        | 20        | FGS-054 |       |

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

**SOURCE: 1201073-01RE1**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD2

| Analyte   | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|-----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Sodium    | 277400                      | 505.00             | 264500                  | -2560         | 75 - 125        | FGS-054 | QM-02 |
| Manganese | 293.1                       | 6.0600             | 287.1                   | -98.7         | 80 - 120        | FGS-054 | QM-02 |

| Analyte   | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Sodium    | 505.00             | 270000                   | -1460          | 2.06  | 75 - 125        | 20        | FGS-054 | QM-02 |
| Manganese | 6.0600             | 289.7                    | -55.3          | 0.912 | 80 - 120        | 20        | FGS-054 | QM-02 |

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

**SOURCE: 1201073-01**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------|
| Beryllium  | 0.522                       | 10.100             | 10.96                   | 103           | 75 - 135        | FGS-054 | AS        |
| Aluminum   | 41.1                        | 2020.0             | 2166                    | 105           | 80 - 115        | FGS-054 | AS        |
| Chromium   | 0.47                        | 202.00             | 230.0                   | 114           | 85 - 115        | FGS-054 | AS        |
| Iron       | ND                          | 1010.0             | 1103                    | 109           | 75 - 125        | FGS-054 | AS        |
| Nickel     | 8.03                        | 252.50             | 255.1                   | 97.8          | 68 - 134        | FGS-054 | AS        |
| Copper     | 0.29                        | 252.50             | 224.5                   | 88.8          | 51 - 145        | FGS-054 | AS        |
| Zinc       | 0.27                        | 505.00             | 422.7                   | 83.7          | 46 - 146        | FGS-054 | AS        |
| Arsenic    | 5.32                        | 202.00             | 235.0                   | 114           | 85 - 115        | FGS-054 | AS        |
| Selenium   | 71.73                       | 202.00             | 287.2                   | 107           | 59 - 149        | FGS-054 | AS        |
| Molybdenum | 140.3                       | 101.00             | 244.7                   | 103           | 80 - 115        | FGS-054 | AS        |
| Silver     | ND                          | 10.100             | 8.224                   | 81.4          | 74 - 119        | FGS-054 | AS        |
| Cadmium    | 0.207                       | 20.200             | 19.18                   | 93.9          | 84 - 113        | FGS-054 | AS        |
| Antimony   | 0.520                       | 10.100             | 11.16                   | 105           | 79 - 122        | FGS-054 | AS        |
| Barium     | 300.0                       | 404.00             | 775.3                   | 118           | 80 - 120        | FGS-054 | AS        |
| Thallium   | 6.645                       | 10.100             | 17.46                   | 107           | 64 - 137        | FGS-054 | AS, QB-01 |
| Lead       | ND                          | 50.500             | 51.95                   | 103           | 72 - 143        | FGS-054 | AS        |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 10.100             | 11.25                    | 106            | 2.66   | 75 - 135        | 20        | FGS-054 | AS    |
| Aluminum   | 2020.0             | 2171                     | 105            | 0.234  | 80 - 115        | 20        | FGS-054 | AS    |
| Chromium   | 202.00             | 231.3                    | 114            | 0.528  | 85 - 115        | 20        | FGS-054 | AS    |
| Iron       | 1010.0             | 1112                     | 110            | 0.802  | 75 - 125        | 20        | FGS-054 | AS    |
| Nickel     | 252.50             | 255.9                    | 98.2           | 0.346  | 68 - 134        | 20        | FGS-054 | AS    |
| Copper     | 252.50             | 225.5                    | 89.2           | 0.424  | 51 - 145        | 20        | FGS-054 | AS    |
| Zinc       | 505.00             | 425.5                    | 84.2           | 0.647  | 46 - 146        | 20        | FGS-054 | AS    |
| Arsenic    | 202.00             | 236.5                    | 114            | 0.629  | 85 - 115        | 20        | FGS-054 | AS    |
| Selenium   | 202.00             | 287.0                    | 107            | 0.0540 | 59 - 149        | 20        | FGS-054 | AS    |
| Molybdenum | 101.00             | 246.7                    | 105            | 0.806  | 80 - 115        | 20        | FGS-054 | AS    |
| Silver     | 10.100             | 8.290                    | 82.1           | 0.798  | 74 - 119        | 20        | FGS-054 | AS    |
| Cadmium    | 20.200             | 19.31                    | 94.6           | 0.670  | 84 - 113        | 20        | FGS-054 | AS    |
| Antimony   | 10.100             | 11.31                    | 107            | 1.29   | 79 - 122        | 20        | FGS-054 | AS    |

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

**SOURCE: 1201073-01**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes     |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-----------|
| Barium   | 404.00             | 779.8                    | 119            | 0.575 | 80 - 120        | 20        | FGS-054 | AS        |
| Thallium | 10.100             | 17.56                    | 108            | 0.595 | 64 - 137        | 20        | FGS-054 | AS, QB-01 |
| Lead     | 50.500             | 52.16                    | 103            | 0.399 | 72 - 143        | 20        | FGS-054 | AS        |

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

**SOURCE: 1201073-01RE1**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-MS/MSD4

| Analyte   | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|-----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Sodium    | 277400                      | 202000             | 474400                  | 97.5          | 75 - 125        | FGS-054 | AS    |
| Manganese | 293.1                       | 2020.0             | 2396                    | 104           | 80 - 120        | FGS-054 | AS    |

| Analyte   | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Sodium    | 202000             | 480300                   | 100            | 1.25  | 75 - 125        | 20        | FGS-054 | AS    |
| Manganese | 2020.0             | 2405                     | 105            | 0.346 | 80 - 120        | 20        | FGS-054 | AS    |

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

**SOURCE: 1201073-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 10.48                       | 20.400             | 31.36                   | 102           | 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             | 27.08                    | 81.4           | 14.7  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1112278-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 7.61                        | 20.400             | 27.86                   | 99.2          | 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             | 28.37                    | 102            | 1.82  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201029-01**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD3

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.34                        | 10.200             | 15.58                   | 100           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.07                    | 85.6           | 10.2  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201030-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.54                        | 10.200             | 14.82                   | 91.0          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.61                    | 89.0           | 1.40  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 1515.0             | 5067000                 | 1010          | 70 - 130        | FGS-054 | QM-02 |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1515.0             | 5034000                  | -1190          | 0.660 | 70 - 130        | 20        | FGS-054 | QM-02 |

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

**SOURCE: 1201073-01RE2**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201077-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-------|
| Calcium | 5052000                     | 10100000           | 15570000                | 104           | 70 - 130        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 10100000           | 15550000                 | 104            | 0.125 | 70 - 130        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Beryllium  | 2.0000             | 2.039                    | 102            | 75 - 135        | FGS-054 |       |
| Sodium     | 500.00             | 487                      | 97.4           | 80 - 120        | FGS-054 |       |
| Aluminum   | 150.00             | 152.4                    | 102            | 85 - 115        | FGS-054 |       |
| Calcium    | 1500.0             | 1550                     | 103            | 80 - 120        | FGS-054 |       |
| Chromium   | 7.0000             | 6.82                     | 97.4           | 85 - 115        | FGS-054 |       |
| Manganese  | 6.0000             | 6.03                     | 101            | 85 - 115        | FGS-054 |       |
| Iron       | 500.00             | 481.5                    | 96.3           | 80 - 120        | FGS-054 |       |
| Nickel     | 4.0000             | 4.06                     | 102            | 68 - 134        | FGS-054 |       |
| Copper     | 4.0000             | 4.15                     | 104            | 51 - 145        | FGS-054 |       |
| Zinc       | 10.000             | 10.16                    | 102            | 46 - 146        | FGS-054 |       |
| Arsenic    | 15.000             | 15.38                    | 103            | 85 - 115        | FGS-054 |       |
| Selenium   | 30.000             | 31.50                    | 105            | 59 - 149        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.97                     | 98.3           | 85 - 115        | FGS-054 |       |
| Silver     | 1.5000             | 1.569                    | 105            | 74 - 119        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.850                    | 106            | 84 - 113        | FGS-054 |       |
| Antimony   | 0.80000            | 0.866                    | 108            | 79 - 122        | FGS-054 |       |
| Barium     | 10.000             | 10.41                    | 104            | 85 - 115        | FGS-054 |       |
| Thallium   | 0.40000            | 0.433                    | 108            | 64 - 134        | FGS-054 |       |
| Lead       | 1.5000             | 1.611                    | 107            | 72 - 143        | FGS-054 |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Beryllium | 2.0000             | 2.078                     | 104             | 1.91  | 75 - 135        | 20        | FGS-054 |       |
| Sodium    | 500.00             | 496                       | 99.2            | 1.88  | 80 - 120        | 20        | FGS-054 |       |
| Aluminum  | 150.00             | 154.4                     | 103             | 1.28  | 85 - 115        | 20        | FGS-054 |       |
| Calcium   | 1500.0             | 1583                      | 106             | 2.10  | 80 - 120        | 20        | FGS-054 |       |
| Chromium  | 7.0000             | 6.95                      | 99.3            | 1.90  | 85 - 115        | 20        | FGS-054 |       |
| Manganese | 6.0000             | 6.15                      | 103             | 1.97  | 85 - 115        | 20        | FGS-054 |       |
| Iron      | 500.00             | 494.6                     | 98.9            | 2.69  | 80 - 120        | 20        | FGS-054 |       |

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Liz Siska, Project Manager





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

**RECOVERY AND RPD**

Batch: F201062

Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201062-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Nickel     | 4.0000             | 4.15                      | 104             | 2.20  | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0000             | 4.28                      | 107             | 3.01  | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.000             | 10.52                     | 105             | 3.48  | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.000             | 15.69                     | 105             | 2.00  | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.000             | 32.57                     | 109             | 3.35  | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.93                      | 96.6            | 1.72  | 85 - 115        | 20        | FGS-054 |       |
| Silver     | 1.5000             | 1.557                     | 104             | 0.768 | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.868                     | 108             | 2.04  | 84 - 113        | 20        | FGS-054 |       |
| Antimony   | 0.80000            | 0.872                     | 109             | 0.661 | 79 - 122        | 20        | FGS-054 |       |
| Barium     | 10.000             | 10.54                     | 105             | 1.25  | 85 - 115        | 20        | FGS-054 |       |
| Thallium   | 0.40000            | 0.443                     | 111             | 2.27  | 64 - 134        | 20        | FGS-054 |       |
| Lead       | 1.5000             | 1.641                     | 109             | 1.85  | 72 - 143        | 20        | FGS-054 |       |

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

**RECOVERY AND RPD**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.50                    | 98.8           | 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             | 15.95                     | 102             | 2.89  | 80 - 120        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F201077

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

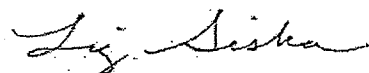
Lab Number: F201077-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Calcium | 1500.0             | 1517                     | 101            | 80 - 120        | FGS-054 |       |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Calcium | 1500.0             | 1571                      | 105             | 3.47  | 80 - 120        | 20        | FGS-054 |       |

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## PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2A09010

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found  | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|--------|------|-------|---------|-----------|----------|
| F201063-BLK1  | Mercury | -0.009 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK2  | Mercury | -0.006 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK3  | Mercury | -0.02  | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK4  | Mercury | 0.03   | 0.50 | ng/L  | F201063 | EPA 1631E | U, QB-04 |
| F201063-BLK5  | Mercury | 0.11   | 0.52 | ng/L  | F201063 | EPA 1631E | U, QB-06 |

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## PREPARATION BLANKS

Instrument: ICPMS-6

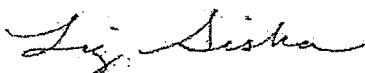
Sequence: 2A10002

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found    | MRL   | Units | Batch   | Method  | Notes |
|---------------|------------|----------|-------|-------|---------|---------|-------|
| F201062-BLK1  | Beryllium  | 0.0002   | 0.060 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Sodium     | 0.09     | 20    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Aluminum   | 0.09     | 4.0   | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Calcium    | 0.5      | 40    | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Chromium   | 0.03     | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Manganese  | -0.002   | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Iron       | -0.06    | 10.0  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Nickel     | 0.004    | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Copper     | -0.0003  | 0.10  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Zinc       | 0.04     | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Arsenic    | -0.07    | 0.15  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Selenium   | 0.003    | 0.60  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Molybdenum | 0.005    | 0.06  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Silver     | 0.0002   | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Cadmium    | -0.00002 | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Antimony   | -0.0003  | 0.020 | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Barium     | -0.04    | 0.20  | µg/L  | F201062 | FGS-054 | U     |
| F201062-BLK1  | Thallium   | 0.007    | 0.005 | µg/L  | F201062 | FGS-054 | QB-10 |
| F201062-BLK1  | Lead       | 0.003    | 0.040 | µg/L  | F201062 | FGS-054 | U     |

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Liz Siska, Project Manager



### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2A10015

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found | MRL | Units | Batch   | Method  | Notes |
|---------------|---------|-------|-----|-------|---------|---------|-------|
| F201077-BLK1  | Calcium | 0.2   | 40  | µg/L  | F201077 | FGS-054 | U     |

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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-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-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-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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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CHAIN-OF-CUSTODY RECORD

106677

BOLD FIELDS REQUIRED. PLEASE CIRCLE REQUESTED ANALYSIS.

| SAMPLE I.D.              | SAMPLING DATE / TIME<br>*IF COMPOSITE, INDICATE BOTH START & FINISH DATE / TIME | MATRIX (SEE BELOW) | GRAB / % COMPOSITE | VOC   |   | SVOC                          |                 | TCMP METALS |  | INORGANICS |  | MICRO | OTHER | NOTES<br>MEQH VAL. # |
|--------------------------|---|--------------------|--------------------|---|---|-------------------------------|-----------------|-------------|--|------------|--|-------|-------|----------------------|
|                          |   |                    |                    | 524.2<br>524.2 BTEX<br>8260B<br>1, 4 DIOXANE<br>8021B<br>8015B GRO<br>8270D<br>TPH8100<br>8015B DRO<br>PEST 608<br>PEST 8081A<br>OIL & GREASE 1664<br>TCMP 1311<br>DISSOLVED METALS (LIST BELOW)<br>TOTAL METALS (LIST BELOW)<br>TS<br>BR NO.<br>BOD<br>TKN<br>pH<br>COD<br>TOTAL CYANIDE<br>REACTIVE CYANIDE<br>FLASHPOINT<br>TOTAL COLIFORM<br>FECAL COLIFORM<br>ENTEROCOCCI<br>HETEROTROPHIC PLATE COUNT | 524.2 MTBE ONLY<br>VTICS<br>EDB<br>DBCP<br>HALOS<br>MEGRO<br>MAVPH<br>SVTICS<br>BN<br>PAH<br>LI<br>L2<br>MEDRO<br>MAEPH<br>PCB 608<br>PCB 8082<br>TPH 1664<br>ABN METALS<br>PEST<br>HEXB<br>SPEC. CON.<br>SO <sub>4</sub><br>NO <sub>3</sub><br>NO <sub>2</sub><br>T. ALA<br>T. PHOS.<br>O. PHOS.<br>T. RES. CHLORINE<br>PHENOLS<br>TOC<br>DOC<br>REACTIVE SULFIDE<br>IGNITABILITY<br>E. COLI<br>ENTEROCOCCI<br>HETEROTROPHIC PLATE COUNT | TRC, Sulfite<br>Total Phenols | # OF CONTAINERS |             |  |            |  |       |       |                      |
| Treat Tank Eff Composite | 1/11/12 10:00 TO 1/11/12 10:00  | WV C               |                    |   |   |                               |                 |             |  |            |  |       |       | 4 (D) (4)            |
| Treat Tank Eff Grab      | 1/11/12 10:00   | WV G               | X                  |   |   |                               |                 |             |  |            |  |       |       | 16                   |
| Treat Tank Eff Grab      | 1/11/12 08:00   | WV G               |                    |   |   |                               |                 |             |  |            |  |       |       | 3 (2) (3) (4)        |

MATRIX: A-AIR; S-SOIL; GW-GROUND WATER; SW-SURFACE WATER; DW-DRINKING WATER; WWM-WASTE WATER  
PRESERVATIVE: H-HCL; N-HNO<sub>3</sub>; S-H<sub>2</sub>SO<sub>4</sub>; Na-NAOH; M-MECH

PROJECT MANAGER: Arthur Auclair  
 COMPANY: Northeast Utilities  
 ADDRESS: 97 River Rd  
 CITY: Bond STATE: NH ZIP: 03304  
 PHONE: 224-4051 EXT: \_\_\_\_\_  
 FAX: \_\_\_\_\_  
 E-MAIL: aauclair@nu.com  
 SITE NAME: Merrimack Station  
 PROJECT #: \_\_\_\_\_  
 STATE: NH MA ME VT OTHER: \_\_\_\_\_  
 REGULATORY PROGRAM: NPDES: RGP POTW STORMWATER OR GWP, OIL FUND, BROWNFIELD OR OTHER: \_\_\_\_\_  
 QUOTE #: \_\_\_\_\_ PO #: 02259252

DATE NEEDED: 1/12/12  
 QA/QC REPORTING LEVEL: A B C OR \_\_\_\_\_  
 PRESUMPTIVE CERTAINTY \_\_\_\_\_  
 REPORTING OPTIONS: PRELIMS: YES OR NO; IF YES: FAX OR PDF; ELECTRONIC OPTIONS: NO FAX E-MAIL PDF EQUIS  
 REPORTING BY: \_\_\_\_\_  
 RECEIVED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 RECEIVED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 RELINQUISHED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ TIME: \_\_\_\_\_  
 RECEIVED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

METALS: 8 RCRA 13 PP FE, MN PB, CU  
 OTHER METALS: \_\_\_\_\_  
 DISCOURSED METALS FIELD FILTERED? YES NO  
 NOTES: (IE: SPECIAL DETECTION LIMITS, BILLING INFO, IF DIFFERENT)  
 ① Metals include As, Sb, Ba, Bi, Cd, Cr, Cu, Fe, Pb, Mn, Mo, Ni, Ag, Na, Tl, Zn  
 ② Sample collected using "clean techniques"  
 ③ As, Se, Hg  
 ④ All metals to RGS using collision cell.  
 SITE HISTORY: ⑤ send copy of results to G&T  
 SUSPECTED CONTAMINATION: \_\_\_\_\_  
 FIELD READINGS: \_\_\_\_\_



**eastern analytical, inc.** 25 CHENELL DRIVE | CONCORD, NH 03301 | TEL: 603.228.0525 | 1.800.287.0525 | FAX: 603.228.4591 | E-MAIL: CUSTOMER\_SERVICE@EALABS.COM | WWW.EALABS.COM  
 professional laboratory services (WHITE: ORIGINAL GREEN: PROJECT MANAGER)



**VIA EMAIL**

February 9, 2012  
File No. 04.0029307.00



Mr. Bruce Kudrick  
Superintendent, Hooksett Sewer Commission  
Town of Hooksett  
1 Egawes Drive  
Hooksett, New Hampshire 03106

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

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
Merrimack Station  
Public Service of New Hampshire  
Bow, New Hampshire

Dear Bruce:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached Wastewater Discharge Monitoring Report for sampling conducted on January 26, 2012, intended to satisfy the second of three initial sampling requirements as established in Special Condition 11 of PSNH's Waste Disposal Agreement No. WDA-001 (WDA).

The analytical results presented in the attached **Analytical Data Report** are summarized in the attached **Table 1**.

**ANALYTICAL DISCUSSION**

Flue Gas Desulfurization (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 United States Environmental Protection Agency (EPA) web site and a link to their draft Standard Operating Procedure (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

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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 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, see:



Standard Operating Procedure: 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](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 that reads "Ronald A. Breton".

Ronald A. Breton, P.E.  
Principal

RAB:mm

P:\04Jobs\0029300s\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Hooksett\final 04.0029307 Hooksett 2of3 LTR 020912.docx

Attachments: Wastewater Discharge Monitoring Report  
Analytical Data report

**WASTEWATER DISCHARGE MONITORING REPORT**

**WASTEWATER DISCHARGE MONITORING REPORT  
HOOKSETT WASTEWATER TREATMENT PLANT**

Public Service of New Hampshire - Merrimack Station  
Waste Disposal Agreement No. WDA-001  
Issued October 1, 2011  
Expires September 30, 2012

Permitted Flow 70,000 gallons per day

**FLOW DATA**

Daily Flow Rate 10,672 gallons (average)  
Monitoring Period Flow 32,017 gallons (1/24/12 - 1/26/12)

**FACILITY INFORMATION**

Company Name Public Service Company of New Hampshire - Merrimack Station  
Company Owner Public Service Company of New Hampshire  
Facility Address 97 River Road  
Facility Contact Harold Keyes  
Telephone (603) 224-4081

**MONITORING REPORT**

Submittal Date 2/9/2012  
Monitoring Point End of treatment process  
Reporting Period First Month

**SAMPLE ANALYSIS**

Certified Analytical Laboratory Eastern Analytical Inc. (EAI) Certification Number 1012  
Authorized Representative Lorraine Olashaw  
Analytical Subcontractor Frontier Global Sciences Certification Number E87575

**SAMPLE COLLECTION**

Sampler Jeff Gagne (EAI)  
Sample Type Grab  
Sample Date 1/26/2012 Sample Time 10:00 AM  
pH 7.6

**CATEGORICAL PRETREATMENT STANDARDS**

40 CFR 423.16: Steam Electric Power Generating Category  
NOTE: There are no numerical pretreatment standards for this source

**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."

Harold Keyes  
Printed Name of Authorized Representative

Harold Keyes  
Signature of Authorized Representative

Station Manager  
Title

2/9/2012  
Date

**SUMMARY ANALYTICAL DATA**  
**Treated FGD Wastewater**  
Public Service Company of New Hampshire  
Merrimack Station  
Bow, New Hampshire

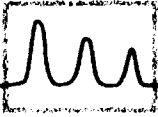
| PARAMETER          | RESULTS<br>(mg/L)<br>01/26/2012<br>EAI/Frontier |
|--------------------|---|
| Aluminum           | < 0.080   |
| Ammonia            | 1.2   |
| Antimony           | 0.000758  |
| Arsenic            | 0.00956   |
| Barium             | 0.208   |
| Beryllium          | < 0.00120                                       |
| BOD                | < 6   |
| Cadmium            | 0.000587  |
| Chromium (T)       | < 0.00200                                       |
| COD                | 180   |
| Copper             | 0.00261   |
| Cyanide (T)        | 0.01  |
| Fluoride           | 6.2   |
| Iron               | < 0.200   |
| Lead               | < 0.000800                                      |
| Manganese          | 0.349   |
| Mercury            | 0.0000122                                       |
| Molybdenum         | 0.373   |
| Nitrate            | 68  |
| Nickel             | 0.00776   |
| O&G                | < 5   |
| pH                 | 7.6   |
| Selenium           | 0.104   |
| Silver             | < 0.000400                                      |
| Thallium           | 0.00565   |
| TTO                | ND (1)  |
| Zinc               | < 0.00400                                       |
| VOC EPA 624        | (2)   |
| Semi VOCs 625      | ND (3)  |
| Phenolic Compounds | < 0.5   |
| PCBs               | ND (4)  |

Note:

1. No TTO compounds were detected above 0.01 mg/L.
2. One compound was detected above its reporting limit by Method 624: Toluene at 2 µg/L.
3. No individual semi VOC was detected by Method 625 above its reporting limit.
4. No individual PCB compound was detected by Method 608 at concentrations greater than 0.3 µg/L.

GZA GeoEnvironmental, Inc.

**ANALYTICAL DATA REPORT**



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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107170  
Client Identification: Wastewater Analysis - **Weekly**  
Date Received: 1/26/2012

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](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 Olshaw, Lab Director

2-8-12  
Date

35  
# of pages (excluding cover letter)





# SAMPLE CONDITIONS PAGE

EAI ID#: 107170

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

Client Designation: Wastewater Analysis - *Weekly*

Temperature upon receipt (°C): **4.5**

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) |
|-----------|----------------------|---------------|--------------|---------------|--------------|---|
| 107170.01 | Effluent Field Blank | 1/26/12       | 1/26/12      | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 107170.02 | Treat Tank Effluent  | 1/26/12       | 1/26/12      | 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#: 107170

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

Client Designation: Wastewater Analysis - **Weekly**

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Analysis: 1/27/12  
Analyst: KJP  
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 2  
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) 106 %R  
Toluene-d8 (surr) 99 %R



# QC REPORT

EAI ID#: 107170

Client: **GZA GeoEnvironmental, Inc. (NH)**  
 Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name              | Blank | LCS           | LCSD                    | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|---------------|-------------------------|---------------|-------|----------|-----|--------|
| Chloromethane               | < 5   | 22 (110 %R)   | 22 (108 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 273  | 20  | 624    |
| Vinyl chloride              | < 2   | 20 (99 %R)    | 19 (94 %R) (5 RPD)      | 1/27/2012     | ug/l  | 0 - 251  | 20  | 624    |
| Bromomethane                | < 2   | 21 (106 %R)   | 21 (103 %R) (3 RPD)     | 1/27/2012     | ug/l  | 0 - 242  | 20  | 624    |
| Chloroethane                | < 5   | 26 (129 %R)   | 25 (123 %R) (5 RPD)     | 1/27/2012     | ug/l  | 14 - 230 | 20  | 624    |
| Trichlorofluoromethane      | < 5   | 25 (124 %R)   | 23 (116 %R) (7 RPD)     | 1/27/2012     | ug/l  | 17 - 181 | 20  | 624    |
| Acrolein                    | < 50  | < 50 (%R N/A) | < 50 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 624    |
| Acetone                     | < 50  | < 50 (100 %R) | < 50 (97 %R) (3 RPD)    | 1/27/2012     | ug/l  |          |     | 624    |
| 1,1-Dichloroethene          | < 1   | 24 (122 %R)   | 23 (115 %R) (6 RPD)     | 1/27/2012     | ug/l  | 0 - 234  | 20  | 624    |
| Methylene chloride          | < 5   | 26 (129 %R)   | 25 (126 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 221  | 20  | 624    |
| Carbon disulfide            | < 5   | 22 (%R)       | 22 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Acrylonitrile               | < 50  | < 50 (%R)     | < 50 (%R) (RPD)         | 1/27/2012     | ug/l  |          |     | 624    |
| Methyl-t-butyl ether(MTBE)  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| trans-1,2-Dichloroethene    | < 2   | 25 (124 %R)   | 24 (121 %R) (2 RPD)     | 1/27/2012     | ug/l  | 54 - 156 | 20  | 624    |
| Vinyl acetate               | < 10  | 30 (%R)       | 30 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| 1,1-Dichloroethane          | < 2   | 24 (118 %R)   | 23 (113 %R) (4 RPD)     | 1/27/2012     | ug/l  | 59 - 155 | 20  | 624    |
| cis-1,2-Dichloroethene      | < 2   | 22 (%R)       | 21 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| 2-Butanone(MEK)             | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Chloroform                  | < 2   | 22 (109 %R)   | 21 (106 %R) (3 RPD)     | 1/27/2012     | ug/l  | 51 - 138 | 20  | 624    |
| 1,1,1-Trichloroethane       | < 2   | 23 (115 %R)   | 22 (110 %R) (4 RPD)     | 1/27/2012     | ug/l  | 52 - 162 | 20  | 624    |
| Carbon tetrachloride        | < 2   | 26 (132 %R)   | 26 (129 %R) (2 RPD)     | 1/27/2012     | ug/l  | 70 - 140 | 20  | 624    |
| Benzene                     | < 1   | 22 (110 %R)   | 21 (107 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 151 | 20  | 624    |
| 1,2-Dichloroethane          | < 2   | 21 (103 %R)   | 20 (99 %R) (4 RPD)      | 1/27/2012     | ug/l  | 49 - 155 | 20  | 624    |
| Trichloroethene             | < 2   | 21 (105 %R)   | 20 (101 %R) (4 RPD)     | 1/27/2012     | ug/l  | 71 - 157 | 20  | 624    |
| 1,2-Dichloropropane         | < 2   | 21 (105 %R)   | 21 (103 %R) (2 RPD)     | 1/27/2012     | ug/l  | 0 - 210  | 20  | 624    |
| Bromodichloromethane        | < 2   | 21 (104 %R)   | 20 (101 %R) (3 RPD)     | 1/27/2012     | ug/l  | 35 - 155 | 20  | 624    |
| 2-Chloroethylvinylether     | < 2   | < 2 (%R N/A)  | < 2 (%R N/A) (RPD N/A)  | 1/27/2012     | ug/l  | 0 - 305  | 20  | 624    |
| 4-Methyl-2-pentanone(MIBK)  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| cis-1,3-Dichloropropene     | < 2   | 20 (102 %R)   | 20 (102 %R) (0 RPD)     | 1/27/2012     | ug/l  | 0 - 227  | 20  | 624    |
| Toluene                     | < 1   | 22 (109 %R)   | 21 (106 %R) (3 RPD)     | 1/27/2012     | ug/l  | 47 - 150 | 20  | 624    |
| trans-1,3-Dichloropropene   | < 2   | 21 (103 %R)   | 20 (101 %R) (2 RPD)     | 1/27/2012     | ug/l  | 17 - 183 | 20  | 624    |
| 1,1,2-Trichloroethane       | < 2   | 23 (113 %R)   | 22 (109 %R) (4 RPD)     | 1/27/2012     | ug/l  | 52 - 150 | 20  | 624    |
| 2-Hexanone                  | < 10  | 20 (%R)       | 20 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Tetrachloroethene           | < 2   | 24 (120 %R)   | 23 (116 %R) (3 RPD)     | 1/27/2012     | ug/l  | 64 - 148 | 20  | 624    |
| Dibromochloromethane        | < 2   | 24 (118 %R)   | 23 (115 %R) (3 RPD)     | 1/27/2012     | ug/l  | 53 - 149 | 20  | 624    |
| Chlorobenzene               | < 2   | 22 (111 %R)   | 22 (108 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 160 | 20  | 624    |
| Ethylbenzene                | < 1   | 23 (113 %R)   | 22 (110 %R) (3 RPD)     | 1/27/2012     | ug/l  | 37 - 162 | 20  | 624    |
| mp-Xylene                   | < 1   | 47 (117 %R)   | 45 (112 %R) (4 RPD)     | 1/27/2012     | ug/l  | 70 - 130 | 20  | 624    |
| o-Xylene                    | < 1   | 23 (115 %R)   | 22 (109 %R) (5 RPD)     | 1/27/2012     | ug/l  | 70 - 130 | 20  | 624    |
| Styrene                     | < 1   | 23 (%R)       | 22 (%R) (RPD)           | 1/27/2012     | ug/l  |          |     | 624    |
| Bromoform                   | < 2   | 25 (125 %R)   | 25 (123 %R) (2 RPD)     | 1/27/2012     | ug/l  | 45 - 169 | 20  | 624    |
| 1,1,2,2-Tetrachloroethane   | < 2   | 20 (101 %R)   | 20 (100 %R) (1 RPD)     | 1/27/2012     | ug/l  | 46 - 157 | 20  | 624    |
| 1,3-Dichlorobenzene         | < 1   | 22 (110 %R)   | 21 (106 %R) (4 RPD)     | 1/27/2012     | ug/l  | 59 - 156 | 20  | 624    |
| 1,4-Dichlorobenzene         | < 1   | 22 (108 %R)   | 21 (107 %R) (1 RPD)     | 1/27/2012     | ug/l  | 18 - 190 | 20  | 624    |
| 1,2-Dichlorobenzene         | < 1   | 21 (105 %R)   | 21 (104 %R) (1 RPD)     | 1/27/2012     | ug/l  | 18 - 190 | 20  | 624    |
| 4-Bromofluorobenzene (surr) | 93 %R | 99 %R         | 102 %R                  | 1/27/2012     | % Rec | 70 - 130 |     | 624    |



# QC REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name                | Blank  | LCS    | LCSD   | Analysis Date | Units | Limits   | RPD | Method |
|-------------------------------|--------|--------|--------|---------------|-------|----------|-----|--------|
| 1,2-Dichlorobenzene-d4 (surr) | 103 %R | 99 %R  | 99 %R  | 1/27/2012     | % Rec | 70 - 130 |     | 624    |
| Toluene-d8 (surr)             | 99 %R  | 101 %R | 100 %R | 1/27/2012     | % 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#: 107170

Client: **GZA GeoEnvironmental, Inc. (NH)**  
Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Extraction/Preparation: 1/27/12  
Date of Analysis: 1/30/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1

|                             |      |
|-----------------------------|------|
| Phenol                      | < 1  |
| 2-Chlorophenol              | < 1  |
| 2,4-Dichlorophenol          | < 1  |
| 2,4,5-Trichlorophenol       | < 1  |
| 2,4,6-Trichlorophenol       | < 1  |
| Pentachlorophenol           | < 5  |
| 2-Nitrophenol               | < 1  |
| 4-Nitrophenol               | < 5  |
| 2,4-Dinitrophenol           | < 5  |
| 2-Methylphenol              | < 1  |
| 3/4-Methylphenol            | < 1  |
| 2,4-Dimethylphenol          | < 1  |
| 4-Chloro-3-methylphenol     | < 1  |
| 4,6-Dinitro-2-methylphenol  | < 5  |
| Benzoic Acid                | < 50 |
| N-Nitrosodimethylamine      | < 1  |
| n-Nitroso-di-n-propylamine  | < 1  |
| n-Nitrosodiphenylamine      | < 1  |
| bis(2-Chloroethyl)ether     | < 1  |
| bis(2-chloroisopropyl)ether | < 1  |
| bis(2-Chloroethoxy)methane  | < 1  |
| 1,3-Dichlorobenzene         | < 1  |
| 1,4-Dichlorobenzene         | < 1  |
| 1,2-Dichlorobenzene         | < 1  |
| 1,2,4-Trichlorobenzene      | < 1  |
| 2-Chloronaphthalene         | < 1  |
| 4-Chlorophenyl-phenylether  | < 1  |
| 4-Bromophenyl-phenylether   | < 1  |
| Hexachloroethane            | < 1  |
| Hexachlorobutadiene         | < 1  |
| Hexachlorocyclopentadiene   | < 5  |
| Hexachlorobenzene           | < 1  |
| 4-Chloroaniline             | < 1  |
| 2-Nitroaniline              | < 5  |
| 3-Nitroaniline              | < 1  |
| 4-Nitroaniline              | < 1  |
| Benzyl alcohol              | < 5  |
| Nitrobenzene                | < 1  |
| Isophorone                  | < 1  |
| 2,4-Dinitrotoluene          | < 1  |
| 2,6-Dinitrotoluene          | < 1  |
| Benzidine (estimated)       | < 5  |
| 3,3'-Dichlorobenzidine      | < 1  |
| Pyridine                    | < 5  |
| Azobenzene                  | < 1  |



# LABORATORY REPORT

EAI ID#: 107170

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

Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Extraction/Preparation: 1/27/12  
Date of Analysis: 1/30/12  
Analyst: JMR  
Method: 625mod  
Dilution Factor: 1  
Carbazole < 1  
Dimethylphthalate < 1  
Diethylphthalate < 1  
Di-n-butylphthalate < 5  
Butylbenzylphthalate < 1  
bis(2-Ethylhexyl)phthalate < 5  
Di-n-octylphthalate < 1  
Dibenzofuran < 1  
Naphthalene < 1  
2-Methylnaphthalene < 1  
Acenaphthylene < 1  
Acenaphthene < 1  
Fluorene < 1  
Phenanthrene < 1  
Anthracene < 1  
Fluoranthene < 1  
Pyrene < 1  
Benzo[a]anthracene < 1  
Chrysene < 1  
Benzo[b]fluoranthene < 1  
Benzo[k]fluoranthene < 1  
Benzo[a]pyrene < 1  
Indeno[1,2,3-cd]pyrene < 1  
Dibenz[a,h]anthracene < 1  
Benzo[g,h,i]perylene < 1  
2-Fluorophenol (surr) 40 %R  
Phenol-d6 (surr) 29 %R  
2,4,6-Tribromophenol (surr) 79 %R  
Nitrobenzene-D5 (surr) 81 %R  
2-Fluorobiphenyl (surr) 81 %R  
p-Terphenyl-D14 (surr) 92 %R



# QC REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)

Batch ID: 734529-39483/A012712ABN1

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name              | Blank | LCS          | LCSD                  | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|--------------|-----------------------|---------------|-------|----------|-----|--------|
| Phenol                      | < 1   | 15 (30 %R)   | 15 (30 %R) (0 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Chlorophenol              | < 1   | 30 (61 %R)   | 31 (61 %R) (0 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dichlorophenol          | < 1   | 36 (72 %R)   | 36 (73 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,5-Trichlorophenol       | < 1   | 21 (85 %R)   | 21 (84 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4,6-Trichlorophenol       | < 1   | 38 (76 %R)   | 37 (75 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| Pentachlorophenol           | < 5   | 49 (97 %R)   | 46 (93 %R) (4 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2-Nitrophenol               | < 1   | 36 (73 %R)   | 36 (72 %R) (1 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Nitrophenol               | < 5   | 16 (33 %R)   | 18 (36 %R) (9 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2,4-Dinitrophenol           | < 5   | 38 (76 %R)   | 41 (83 %R) (9 RPD)    | 1/30/2012     | ug/l  | 15 - 130 | 20  | 625mod |
| 2-Methylphenol              | < 1   | 16 (64 %R)   | 16 (65 %R) (2 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 3/4-Methylphenol            | < 1   | 14 (55 %R)   | 14 (56 %R) (2 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 2,4-Dimethylphenol          | < 1   | 34 (67 %R)   | 33 (67 %R) (0 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4-Chloro-3-methylphenol     | < 1   | 39 (77 %R)   | 40 (79 %R) (3 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| 4,6-Dinitro-2-methylphenol  | < 5   | 44 (89 %R)   | 48 (95 %R) (7 RPD)    | 1/30/2012     | ug/l  | 30 - 130 | 20  | 625mod |
| Benzoic Acid                | < 50  | < 50 (33 %R) | < 50 (35 %R) (6 RPD)  | 1/30/2012     | ug/l  | 15 - 140 | 20  | 625mod |
| N-Nitrosodimethylamine      | < 1   | 14 (55 %R)   | 13 (51 %R) (8 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitroso-di-n-propylamine  | < 1   | 19 (76 %R)   | 18 (73 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| n-Nitrosodiphenylamine      | < 1   | 25 (101 %R)  | 25 (100 %R) (1 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethyl)ether     | < 1   | 17 (67 %R)   | 17 (67 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-chloroisopropyl)ether | < 1   | 17 (70 %R)   | 17 (69 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Chloroethoxy)methane  | < 1   | 18 (72 %R)   | 17 (70 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,3-Dichlorobenzene         | < 1   | 15 (59 %R)   | 14 (54 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,4-Dichlorobenzene         | < 1   | 15 (59 %R)   | 14 (55 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2-Dichlorobenzene         | < 1   | 15 (60 %R)   | 14 (56 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 1,2,4-Trichlorobenzene      | < 1   | 16 (65 %R)   | 15 (61 %R) (6 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Chloronaphthalene         | < 1   | 18 (73 %R)   | 18 (71 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chlorophenyl-phenylether  | < 1   | 20 (79 %R)   | 20 (80 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Bromophenyl-phenylether   | < 1   | 21 (84 %R)   | 21 (84 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachloroethane            | < 1   | 13 (54 %R)   | 13 (51 %R) (6 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobutadiene         | < 1   | 15 (61 %R)   | 14 (56 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorocyclopentadiene   | < 5   | 12 (49 %R)   | 11 (45 %R) (9 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Hexachlorobenzene           | < 1   | 22 (88 %R)   | 20 (82 %R) (7 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Chloroaniline             | < 1   | 20 (82 %R)   | 20 (81 %R) (1 RPD)    | 1/30/2012     | ug/l  | 15 - 140 | 20  | 625mod |
| 2-Nitroaniline              | < 5   | 19 (77 %R)   | 20 (79 %R) (3 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 3-Nitroaniline              | < 1   | 20 (79 %R)   | 20 (82 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 4-Nitroaniline              | < 1   | 19 (74 %R)   | 22 (88 %R) (17 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzyl alcohol              | < 5   | 17 (70 %R)   | 17 (69 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Nitrobenzene                | < 1   | 18 (71 %R)   | 18 (71 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Isophorone                  | < 1   | 22 (86 %R)   | 21 (84 %R) (2 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2,4-Dinitrotoluene          | < 1   | 22 (88 %R)   | 23 (92 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2,6-Dinitrotoluene          | < 1   | 21 (82 %R)   | 21 (85 %R) (4 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzidine (estimated)       | < 5   | 19 (76 %R)   | 10 (39 %R) (64 RPD) ! | 1/30/2012     | ug/l  | 15 - 168 | 20  | 625mod |
| 3,3'-Dichlorobenzidine      | < 1   | 22 (87 %R)   | 22 (88 %R) (1 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Pyridine                    | < 5   | 14 (54 %R)   | 12 (48 %R) (12 RPD)   | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Azobenzene                  | < 1   | 21 (82 %R)   | 20 (82 %R) (0 RPD)    | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |



# QC REPORT

EAI ID#: 107170

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

Batch ID: 734529-39483/A012712ABN1

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name              | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|-----------------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Carbazole                   | < 1   | 22 (87 %R) | 22 (90 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dimethylphthalate           | < 1   | 20 (80 %R) | 20 (82 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Diethylphthalate            | < 1   | 21 (82 %R) | 21 (85 %R) (4 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-butylphthalate         | < 5   | 22 (87 %R) | 22 (89 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Butylbenzylphthalate        | < 1   | 21 (85 %R) | 22 (88 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| bis(2-Ethylhexyl)phthalate  | < 5   | 21 (86 %R) | 22 (89 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Di-n-octylphthalate         | < 1   | 21 (85 %R) | 22 (89 %R) (5 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenzofuran                | < 1   | 19 (75 %R) | 19 (74 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Naphthalene                 | < 1   | 19 (77 %R) | 18 (74 %R) (4 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Methylnaphthalene         | < 1   | 18 (71 %R) | 17 (69 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthylene              | < 1   | 19 (76 %R) | 19 (74 %R) (3 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Acenaphthene                | < 1   | 20 (81 %R) | 20 (80 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Fluorene                    | < 1   | 21 (83 %R) | 21 (83 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Phenanthrene                | < 1   | 22 (86 %R) | 22 (86 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Anthracene                  | < 1   | 21 (85 %R) | 22 (87 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Fluoranthene                | < 1   | 22 (86 %R) | 22 (88 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Pyrene                      | < 1   | 20 (82 %R) | 21 (83 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]anthracene          | < 1   | 21 (84 %R) | 22 (86 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Chrysene                    | < 1   | 22 (87 %R) | 22 (87 %R) (0 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[b]fluoranthene        | < 1   | 20 (81 %R) | 21 (83 %R) (2 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[k]fluoranthene        | < 1   | 22 (90 %R) | 22 (89 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[a]pyrene              | < 1   | 21 (83 %R) | 21 (84 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Indeno[1,2,3-cd]pyrene      | < 1   | 21 (86 %R) | 22 (87 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Dibenz[a,h]anthracene       | < 1   | 23 (91 %R) | 23 (92 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| Benzo[g,h,i]perylene        | < 1   | 22 (89 %R) | 22 (88 %R) (1 RPD) | 1/30/2012     | ug/l  | 40 - 140 | 20  | 625mod |
| 2-Fluorophenol (surr)       | 42 %R | 41 %R      | 40 %R              | 1/30/2012     | % Rec | 21 - 110 | 20  | 625mod |
| Phenol-d6 (surr)            | 29 %R | 30 %R      | 30 %R              | 1/30/2012     | % Rec | 15 - 94  | 20  | 625mod |
| 2,4,6-Tribromophenol (surr) | 76 %R | 93 %R      | 95 %R              | 1/30/2012     | % Rec | 15 - 110 | 20  | 625mod |
| Nitrobenzene-D5 (surr)      | 80 %R | 79 %R      | 78 %R              | 1/30/2012     | % Rec | 35 - 114 | 20  | 625mod |
| 2-Fluorobiphenyl (surr)     | 86 %R | 81 %R      | 77 %R              | 1/30/2012     | % Rec | 43 - 116 | 20  | 625mod |
| p-Terphenyl-D14 (surr)      | 92 %R | 97 %R      | 95 %R              | 1/30/2012     | % Rec | 33 - 130 | 20  | 625mod |

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#: 107170

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

Client Designation: Wastewater Analysis - **Weekly**

Sample ID: Treat Tank  
Effluent

Lab Sample ID: 107170.02

Matrix: aqueous

Date Sampled: 1/26/12

Date Received: 1/26/12

Units: mg/L

Date of Extraction/Prep: 1/30/12

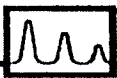
Date of Analysis: 1/30/12

Analyst: LAS

Method: 1664A

Dilution Factor: 1

Oil & Grease (HEM) < 5



# QC REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)

Batch ID: 734532-40799/A013012OG1661

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name     | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 37 (92 %R) | 36 (90 %R) (2 RPD) | 1/30/2012     | 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#: 107170

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

Client Designation: **Wastewater Analysis - *Weekly***

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02  
Matrix: aqueous  
Date Sampled: 1/26/12  
Date Received: 1/26/12  
Units: ug/l  
Date of Extraction/Prep: 1/27/12  
Date of Analysis: 1/27/12  
Analyst: JW  
Method: 608  
Dilution Factor: 1

|            |       |
|------------|-------|
| PCB-1016   | < 0.3 |
| PCB-1221   | < 0.3 |
| PCB-1232   | < 0.3 |
| PCB-1242   | < 0.3 |
| PCB-1248   | < 0.3 |
| PCB-1254   | < 0.3 |
| PCB-1260   | < 0.3 |
| TMX (surr) | 87 %R |
| DCB (surr) | 86 %R |



# QC REPORT

EAI ID#: 107170

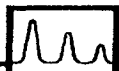
Client: **GZA GeoEnvironmental, Inc. (NH)**

Batch ID: 734529-35119/A012712E608P2

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name | Blank  | LCS            | LCSD                     | Analysis Date | Units | Limits   | RPD | Method |
|----------------|--------|----------------|--------------------------|---------------|-------|----------|-----|--------|
| PCB-1016       | < 0.3  | 2.0 (101 %R)   | 2.0 (99 %R) (2 RPD)      | 1/27/2012     | ug/l  | 50 - 114 | 20  | 608    |
| PCB-1221       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1232       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1242       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1248       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1254       | < 0.3  | < 0.3 (%R N/A) | < 0.3 (%R N/A) (RPD N/A) | 1/27/2012     | ug/l  |          |     | 608    |
| PCB-1260       | < 0.3  | 1.9 (95 %R)    | 1.9 (93 %R) (2 RPD)      | 1/27/2012     | ug/l  | 8 - 127  | 20  | 608    |
| TMX (surr)     | 93 %R  | 92 %R          | 89 %R                    | 1/27/2012     | % Rec | 30 - 150 |     | 608    |
| DCB (surr)     | 104 %R | 103 %R         | 96 %R                    | 1/27/2012     | % Rec | 30 - 150 |     | 608    |

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#: 107170

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

Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107170.02

Matrix: aqueous

Date Sampled: 1/26/12

Date Received: 1/26/12

|               |       |
|---------------|-------|
| Fluoride      | 6.2   |
| Chloride      | 9500  |
| Nitrate-N     | 68    |
| Cyanide Total | 0.01  |
| Ammonia-N     | 1.2   |
| BOD           | < 6   |
| COD           | 180   |
| Total Phenols | < 0.5 |
| pH            | 7.6   |

| Units | Analysis |       | Method   | Analyst |
|-------|----------|-------|----------|---------|
|       | Date     | Time  |          |         |
| mg/L  | 2/01/12  | 13:35 | 300.0    | KL      |
| mg/L  | 1/30/12  | 13:33 | 4500CIE  | DLS     |
| mg/L  | 1/27/12  | 9:15  | 353.2    | DLS     |
| mg/L  | 1/31/12  | 9:15  | 4500CNE  | KJR     |
| mg/L  | 1/30/12  | 15:15 | 4500NH3D | SEL     |
| mg/L  | 1/27/12  | 17:30 | 5210B    | SKC     |
| mg/L  | 2/02/12  | 16:15 | H8000    | SKC     |
| mg/L  | 1/31/12  | 9:00  | 420.1    | JCC     |
| SU    | 1/27/12  | 15:56 | 4500H+B  | SEL     |

Total Phenols: The reporting limit has been elevated due to matrix interference.

Cyanide: Cyanide was re-analyzed on 2/8/2012 per client request. The re-analysis confirmed the cyanide hit. A matrix spike/matrix spike duplicate performed on this sample had acceptable recoveries.



# QC REPORT

EAI ID#: 107170

Client: GZA GeoEnvironmental, Inc. (NH)

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name | Blank  | LCS          | LCSD                   | Units | Date of Analysis | Limits      | RPD | Method    |
|----------------|--------|--------------|------------------------|-------|------------------|-------------|-----|-----------|
| Fluoride       | < 0.1  | 2.0 (101 %R) | 2.0 (101 %R) (0 RPD)   | mg/L  | 1/31/12          | 90 - 110    | 20  | 300.0     |
| Chloride       | < 1    | 26 (102 %R)  | 25 (101 %R) (1 RPD)    | mg/L  | 1/30/12          | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N      | < 0.5  | 5.1 (103 %R) | 5.2 (103 %R) (0 RPD)   | mg/L  | 1/27/12          | 90 - 110    | 20  | 353.2     |
| Cyanide Total  | < 0.01 | 0.22 (89 %R) |                        | mg/L  | 1/31/12          | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N      | < 0.05 | 2.1 (104 %R) | 2.2 (109 %R) (5 RPD)   | mg/L  | 1/30/12          | 90 - 110    | 20  | 4500NH3DN |
| BOD            | < 6    | 330 (84 %R)  | 360 (89 %R) (6 RPD)    | mg/L  | 1/27/12          | 84 - 115    | 20  | 5210B     |
| COD            | < 10   | 100 (102 %R) | 100 (100 %R) (2 RPD)   | mg/L  | 2/2/12           | 85 - 115    | 20  | H8000     |
| Total Phenols  | < 0.05 | 0.24 (94 %R) | 0.27 (106 %R) (12 RPD) | mg/L  | 1/31/12          | 85 - 115    | 20  | 420.1     |
| pH             |        | 7.99         | 7.97                   | SU    | 1/27/12          | 7.95 - 8.07 | 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.



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

03 February 2012

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

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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                   | Lab ID     | Matrix | Date Sampled    | Date Received   |
|-----------------------------|------------|--------|-----------------|-----------------|
| C-3024 Effluent Field Blank | 1201361-01 | Water  | 26-Jan-12 09:15 | 27-Jan-12 09:42 |
| Treat Tank Effluent         | 1201361-02 | Water  | 26-Jan-12 09:20 | 27-Jan-12 09:42 |

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

Liz Siska, Project Manager

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## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 27th, 2012. The samples were received intact, on-ice with temperatures measured at 2.9 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL ISSUES

The Effluent Field Blank was greater than the PQL, however the because the associated sample was a non-detect, re-analysis was not required.

All analytes pass according to the QC parameters of EPA Method 200.8.

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

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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Liz Siska, Project Manager

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### CHAIN OF CUSTODY FORMS

1201361



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

414 Pontius Ave. N. Seattle WA 98109  
Phone: 206-622-6960  
Fax: 206-622-6870  
info@FrontierGS.com  
http://www.FrontierGS.com

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| Client: Eastern Analytical, Inc<br>Address: 1500...<br>Project Name: Marine... |                    | Contact: Jaxx...<br>Phone: 425-380-1234<br>E-mail: jaxx@eastanaly.com<br>Contract ID: 57732  |              | Report To: Same<br>Address: Same<br>Phone: 425-380-1234<br>E-mail: CustomerService@frontier.com  |                  | Invoice To: Same<br>Address: Same<br>Phone: ...<br>E-mail: CustomerService@frontier.com   |                      | Analyses Requested   |            | FGS PM LIP...<br>Date: 1/26/12<br>LAT Business (days): 20 (Std)<br>15 (0: 5 4 3 2 24 hrs.<br>(0: 30 - 10 days, custom PM<br>Saturdays apply for requested LAT)<br>Saturday Delivery: N Y LN<br>(If you place contract PM)<br>ESD: X Y L H<br>QA: U Standard <input type="checkbox"/> High |  |
|--|--------------------|--|--------------|--|------------------|---|----------------------|--|------------|---|--|
| No.  | Engraved Bottle ID | Sample ID  | # of Bottles | Matrix   | Date & Time      | Summed By   | Field Filtered (Y/N) | Field Preserved: HCl, H2O2, BPO, Other (N)   | GC, Inhib. | Comments  |  |
| 1  | 1201361            | Eastern Field Blank  | 1            | Air  | 1/26/12 10:00 AM | Jaxx  | Y                    |  |            | Jaxx Field Blank, 1500...<br>1201361, 1/26/12, 10:00 AM, 1500...<br>1201361, 1/26/12, 10:00 AM  |  |
| 2  | 1201361            | Field Blank #1201361   | 3            | Water  | 1/26/12 10:00 AM | Jaxx  | Y                    |  |            | 3 more are analyzed with...<br>1201361...<br>3 paper - special analysis...<br>with sample volume...<br>plus...  |  |
| 3  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 4  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 5  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 6  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 7  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 8  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 9  |                    |  |              |  |                  |   |                      |  |            |   |  |
| 10   |                    |  |              |  |                  |   |                      |  |            |   |  |
| 11   |                    |  |              |  |                  |   |                      |  |            |   |  |
| 12   |                    |  |              |  |                  |   |                      |  |            |   |  |
| For Laboratory Use Only  |                    | Matrix Codes:  |              | Requested by   |                  | Approved by   |                      | Received by  |            |   |  |
| COC Seal: <u>1201361</u>   |                    | FW: Fresh Water<br>WW: Waste Water<br>SW: Sea and Brackish Water<br>SS: Soil and Sediment<br>TS: Plant and Animal Tissue<br>HC: Hydrocarbon<br>TR: Trap<br>OT: Other |              | Name: <u>Jaxx</u><br>Organization: <u>Eastern Analytical</u><br>Date & Time: <u>1/26/12 10:00 AM</u><br>Tracking number: <u>1201361</u>  |                  | Name: <u>Jaxx</u><br>Organization: <u>EA</u><br>Date & Time: <u>1/26/12 10:00 AM</u>  |                      | Name: <u>Jaxx</u><br>Organization: <u>VETS</u><br>Date & Time: <u>1/26/12 10:00 AM</u> |            |   |  |
| Cooler Temp: <u>4°C</u>  |                    | Comments: <u>ID 4422</u>   |              | Sample Disposal:<br><input type="checkbox"/> Return (shipping fees may apply)<br><input type="checkbox"/> Standard Disposal - 30 Days after report<br><input type="checkbox"/> Retain for <u>2</u> 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: <u>Jaxx</u>   |            | Date: <u>1/26/12</u>  |  |

Rec'd @ FGS... ALICIA M. BATH... 1-27-12  
VTSR 4-22-12

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*Liz Siska*

Liz Siska, Project Manager

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## ANALYTICAL RESULTS

### C-3024 Effluent Field Blank

Matrix: Water

Laboratory ID: 1201361-01

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|-----------|----------|
| Aluminum   | ND     | 0.4   | 4.0   | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Antimony   | ND     | 0.005 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Arsenic    | ND     | 0.05  | 0.15  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Barium     | ND     | 0.03  | 0.20  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Beryllium  | ND     | 0.023 | 0.060 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Cadmium    | ND     | 0.004 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Chromium   | ND     | 0.009 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Copper     | ND     | 0.01  | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Iron       | ND     | 1.3   | 10.0  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Lead       | ND     | 0.004 | 0.040 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Manganese  | ND     | 0.007 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Mercury    | ND     | 0.08  | 0.50  | ng/L  | 1        | F202015 | 2B03001  | 02/02/12 | EPA 1631E | U        |
| Molybdenum | ND     | 0.006 | 0.06  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Nickel     | ND     | 0.008 | 0.10  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Selenium   | ND     | 0.19  | 0.60  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Silver     | ND     | 0.006 | 0.020 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Thallium   | ND     | 0.001 | 0.005 | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-02, U |
| Zinc       | 0.25   | 0.02  | 0.20  | µg/L  | 1        | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |

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## ANALYTICAL RESULTS

### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1201361-02

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method    | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|-----------|----------|
| Aluminum   | ND     | 8.9   | 80.0  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Antimony   | 0.758  | 0.092 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Arsenic    | 9.56   | 1.02  | 3.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Barium     | 208    | 0.54  | 4.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Beryllium  | ND     | 0.454 | 1.20  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Cadmium    | 0.587  | 0.083 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Chromium   | ND     | 0.18  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Copper     | 2.61   | 0.20  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Iron       | ND     | 26.0  | 200   | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Lead       | ND     | 0.078 | 0.800 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Manganese  | 349    | 0.15  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Mercury    | 12.2   | 0.34  | 2.02  | ng/L  | 4        | F202015 | 2B03001  | 02/02/12 | EPA 1631E |          |
| Molybdenum | 373    | 0.12  | 1.20  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Nickel     | 7.76   | 0.16  | 2.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Selenium   | 104    | 3.88  | 12.0  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   |          |
| Silver     | ND     | 0.120 | 0.400 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | U        |
| Thallium   | 5.65   | 0.022 | 0.100 | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-01    |
| Zinc       | ND     | 0.33  | 4.00  | µg/L  | 20       | F201252 | 2B02001  | 02/01/12 | FGS-054   | QB-02, U |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201316-03

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 6.99                         | 5.98                            | 1.00 | 15.6  | 24        | EPA 1631E |       |

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

**SOURCE: 1201361-02**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSDI

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes           |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------------|
| Beryllium  | ND                          | 2.0200             | 2.214                   | 110           | 75 - 125        | FGS-054 |                 |
| Aluminum   | 66.2                        | 151.50             | 213.7                   | 97.4          | 80 - 115        | FGS-054 |                 |
| Chromium   | 0.57                        | 7.0700             | 7.92                    | 104           | 85 - 115        | FGS-054 |                 |
| Manganese  | 348.7                       | 6.0600             | 353.9                   | 86.1          | 80 - 120        | FGS-054 |                 |
| Iron       | ND                          | 505.00             | 494.7                   | 98.0          | 75 - 125        | FGS-054 |                 |
| Nickel     | 7.76                        | 4.0400             | 11.66                   | 96.7          | 68 - 134        | FGS-054 |                 |
| Copper     | 2.61                        | 4.0400             | 6.22                    | 89.4          | 51 - 145        | FGS-054 |                 |
| Zinc       | ND                          | 10.100             | 9.96                    | 98.6          | 46 - 146        | FGS-054 |                 |
| Arsenic    | 9.56                        | 15.150             | 24.20                   | 96.6          | 85 - 115        | FGS-054 |                 |
| Selenium   | 104.4                       | 30.300             | 127.8                   | 77.1          | 59 - 149        | FGS-054 |                 |
| Molybdenum | 373.5                       | 2.0200             | 375.9                   | 119           | 80 - 115        | FGS-054 | QM-02           |
| Silver     | ND                          | 1.5150             | 1.289                   | 85.1          | 74 - 119        | FGS-054 |                 |
| Cadmium    | 0.587                       | 0.80800            | 1.229                   | 79.5          | 84 - 113        | FGS-054 | QM-07           |
| Antimony   | 0.758                       | 0.80800            | 1.539                   | 96.7          | 79 - 122        | FGS-054 |                 |
| Barium     | 208.4                       | 10.100             | 214.5                   | 60.3          | 80 - 120        | FGS-054 | QM-02           |
| Thallium   | 5.650                       | 0.40400            | 5.907                   | 63.6          | 64 - 137        | FGS-054 | QB-01,<br>QM-02 |
| Lead       | ND                          | 1.5150             | 1.488                   | 98.2          | 72 - 143        | FGS-054 |                 |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 2.0200             | 2.256                    | 112            | 1.88   | 75 - 125        | 20        | FGS-054 |       |
| Aluminum   | 151.50             | 213.6                    | 97.3           | 0.0484 | 80 - 115        | 20        | FGS-054 |       |
| Chromium   | 7.0700             | 7.58                     | 99.1           | 4.45   | 85 - 115        | 20        | FGS-054 |       |
| Manganese  | 6.0600             | 355.8                    | 118            | 0.544  | 80 - 120        | 20        | FGS-054 |       |
| Iron       | 505.00             | 489.5                    | 96.9           | 1.06   | 75 - 125        | 20        | FGS-054 |       |
| Nickel     | 4.0400             | 11.39                    | 89.9           | 2.39   | 68 - 134        | 20        | FGS-054 |       |
| Copper     | 4.0400             | 6.23                     | 89.5           | 0.117  | 51 - 145        | 20        | FGS-054 |       |
| Zinc       | 10.100             | 9.23                     | 91.4           | 7.53   | 46 - 146        | 20        | FGS-054 |       |
| Arsenic    | 15.150             | 25.81                    | 107            | 6.44   | 85 - 115        | 20        | FGS-054 |       |
| Selenium   | 30.300             | 130.8                    | 86.9           | 2.28   | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0200             | 377.7                    | 210            | 0.491  | 80 - 115        | 20        | FGS-054 | QM-02 |

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Liz Siska, Project Manager



### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201361-02

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------|-------|
| Silver   | 1.5150             | 1.273                    | 84.0           | 1.28  | 74 - 119        | 20        | FGS-054 |       |
| Cadmium  | 0.80800            | 1.102                    | 63.8           | 10.8  | 84 - 113        | 20        | FGS-054 | QM-07 |
| Antimony | 0.80800            | 1.618                    | 107            | 5.02  | 79 - 122        | 20        | FGS-054 |       |
| Barium   | 10.100             | 219.6                    | 110            | 2.32  | 80 - 120        | 20        | FGS-054 |       |
| Thallium | 0.40400            | 6.127                    | 118            | 3.66  | 64 - 137        | 20        | FGS-054 | QB-01 |
| Lead     | 1.5150             | 1.502                    | 99.1           | 0.946 | 72 - 143        | 20        | FGS-054 |       |

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

**SOURCE: 1201361-02**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method  | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------|-----------|
| Beryllium  | ND                          | 20.200             | 18.23                   | 90.2          | 75 - 125        | FGS-054 | AS        |
| Aluminum   | 66.2                        | 4040.0             | 3986                    | 97.0          | 80 - 115        | FGS-054 | AS        |
| Chromium   | 0.57                        | 404.00             | 411.3                   | 102           | 85 - 115        | FGS-054 | AS        |
| Manganese  | 348.7                       | 404.00             | 755.7                   | 101           | 80 - 120        | FGS-054 | AS        |
| Iron       | ND                          | 2020.0             | 2012                    | 99.6          | 75 - 125        | FGS-054 | AS        |
| Nickel     | 7.76                        | 505.00             | 488.7                   | 95.2          | 68 - 134        | FGS-054 | AS        |
| Copper     | 2.61                        | 505.00             | 459.9                   | 90.6          | 51 - 145        | FGS-054 | AS        |
| Zinc       | ND                          | 1010.0             | 870.1                   | 86.1          | 46 - 146        | FGS-054 | AS        |
| Arsenic    | 9.56                        | 404.00             | 408.2                   | 98.7          | 85 - 115        | FGS-054 | AS        |
| Selenium   | 104.4                       | 404.00             | 480.3                   | 93.0          | 59 - 149        | FGS-054 | AS        |
| Molybdenum | 373.5                       | 202.00             | 574.9                   | 99.7          | 80 - 115        | FGS-054 | AS        |
| Silver     | ND                          | 20.200             | 17.43                   | 86.3          | 74 - 119        | FGS-054 | AS        |
| Cadmium    | 0.587                       | 40.400             | 37.52                   | 91.4          | 84 - 113        | FGS-054 | AS        |
| Antimony   | 0.758                       | 20.200             | 20.06                   | 95.5          | 79 - 122        | FGS-054 | AS        |
| Barium     | 208.4                       | 808.00             | 987.1                   | 96.4          | 80 - 120        | FGS-054 | AS        |
| Thallium   | 5.650                       | 20.200             | 25.86                   | 100           | 64 - 137        | FGS-054 | AS, QB-01 |
| Lead       | ND                          | 101.00             | 97.63                   | 96.7          | 72 - 143        | FGS-054 | AS        |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-------|
| Beryllium  | 20.200             | 18.26                    | 90.4           | 0.151  | 75 - 125        | 20        | FGS-054 | AS    |
| Aluminum   | 4040.0             | 3956                     | 96.3           | 0.751  | 80 - 115        | 20        | FGS-054 | AS    |
| Chromium   | 404.00             | 408.1                    | 101            | 0.780  | 85 - 115        | 20        | FGS-054 | AS    |
| Manganese  | 404.00             | 752.0                    | 99.8           | 0.487  | 80 - 120        | 20        | FGS-054 | AS    |
| Iron       | 2020.0             | 1989                     | 98.5           | 1.13   | 75 - 125        | 20        | FGS-054 | AS    |
| Nickel     | 505.00             | 485.4                    | 94.6           | 0.681  | 68 - 134        | 20        | FGS-054 | AS    |
| Copper     | 505.00             | 459.2                    | 90.4           | 0.161  | 51 - 145        | 20        | FGS-054 | AS    |
| Zinc       | 1010.0             | 870.5                    | 86.2           | 0.0542 | 46 - 146        | 20        | FGS-054 | AS    |
| Arsenic    | 404.00             | 412.0                    | 99.6           | 0.916  | 85 - 115        | 20        | FGS-054 | AS    |
| Selenium   | 404.00             | 470.1                    | 90.5           | 2.15   | 59 - 149        | 20        | FGS-054 | AS    |
| Molybdenum | 202.00             | 574.5                    | 99.5           | 0.0697 | 80 - 115        | 20        | FGS-054 | AS    |
| Silver     | 20.200             | 17.50                    | 86.6           | 0.385  | 74 - 119        | 20        | FGS-054 | AS    |

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Liz Siska, Project Manager





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

**SOURCE: 1201361-02**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes     |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------|-----------|
| Cadmium  | 40.400             | 38.59                    | 94.1           | 2.81   | 84 - 113        | 20        | FGS-054 | AS        |
| Antimony | 20.200             | 20.14                    | 95.9           | 0.386  | 79 - 122        | 20        | FGS-054 | AS        |
| Barium   | 808.00             | 994.4                    | 97.3           | 0.729  | 80 - 120        | 20        | FGS-054 | AS        |
| Thallium | 20.200             | 25.85                    | 100            | 0.0375 | 64 - 137        | 20        | FGS-054 | AS, QB-01 |
| Lead     | 101.00             | 97.56                    | 96.6           | 0.0774 | 72 - 143        | 20        | FGS-054 | AS        |

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Liz Siska, Project Manager

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

**SOURCE: 1201316-03**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 6.99                        | 20.200             | 22.10                   | 74.8          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 20.200             | 20.97                    | 69.2           | 5.22  | 71 - 125        | 24        | EPA 1631E | QM-05 |

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414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

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

**SOURCE: 1201361-02**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 12.20                       | 40.800             | 52.32                   | 98.3          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 40.800             | 52.12                    | 97.8           | 0.379 | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**SOURCE: 1201359-01**

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 1171                        | 1530.0             | 2618                    | 94.6          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 1530.0             | 2594                     | 93.1           | 0.888 | 71 - 125        | 24        | EPA 1631E |       |

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

**RECOVERY AND RPD**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-BS/BS01

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method  | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------|-------|
| Beryllium  | 2.0000             | 1.962                    | 98.1           | 75 - 125        | FGS-054 |       |
| Aluminum   | 150.00             | 146.0                    | 97.3           | 85 - 115        | FGS-054 |       |
| Chromium   | 7.0000             | 6.47                     | 92.5           | 85 - 115        | FGS-054 |       |
| Manganese  | 6.0000             | 5.83                     | 97.1           | 85 - 115        | FGS-054 |       |
| Iron       | 500.00             | 459.4                    | 91.9           | 80 - 120        | FGS-054 |       |
| Nickel     | 4.0000             | 3.92                     | 98.0           | 68 - 134        | FGS-054 |       |
| Copper     | 4.0000             | 4.17                     | 104            | 51 - 145        | FGS-054 |       |
| Zinc       | 10.000             | 10.48                    | 105            | 46 - 146        | FGS-054 |       |
| Arsenic    | 15.000             | 14.27                    | 95.1           | 85 - 115        | FGS-054 |       |
| Selenium   | 30.000             | 28.04                    | 93.5           | 59 - 149        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.88                     | 93.8           | 85 - 115        | FGS-054 |       |
| Silver     | 1.5000             | 1.490                    | 99.3           | 74 - 119        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.825                    | 103            | 84 - 113        | FGS-054 |       |
| Antimony   | 0.80000            | 0.780                    | 97.5           | 79 - 122        | FGS-054 |       |
| Barium     | 10.000             | 9.78                     | 97.8           | 85 - 115        | FGS-054 |       |
| Thallium   | 0.40000            | 0.417                    | 104            | 64 - 134        | FGS-054 | QB-01 |
| Lead       | 1.5000             | 1.517                    | 101            | 72 - 143        | FGS-054 |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method  | Notes |
|-----------|--------------------|---------------------------|-----------------|--------|-----------------|-----------|---------|-------|
| Beryllium | 2.0000             | 1.944                     | 97.2            | 0.928  | 75 - 125        | 20        | FGS-054 |       |
| Aluminum  | 150.00             | 145.9                     | 97.2            | 0.0872 | 85 - 115        | 20        | FGS-054 |       |
| Chromium  | 7.0000             | 6.46                      | 92.2            | 0.275  | 85 - 115        | 20        | FGS-054 |       |
| Manganese | 6.0000             | 5.74                      | 95.6            | 1.55   | 85 - 115        | 20        | FGS-054 |       |
| Iron      | 500.00             | 458.2                     | 91.6            | 0.251  | 80 - 120        | 20        | FGS-054 |       |
| Nickel    | 4.0000             | 3.96                      | 99.0            | 1.01   | 68 - 134        | 20        | FGS-054 |       |
| Copper    | 4.0000             | 4.16                      | 104             | 0.0881 | 51 - 145        | 20        | FGS-054 |       |
| Zinc      | 10.000             | 10.39                     | 104             | 0.846  | 46 - 146        | 20        | FGS-054 |       |
| Arsenic   | 15.000             | 14.17                     | 94.4            | 0.731  | 85 - 115        | 20        | FGS-054 |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F201252

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F201252-BS/BSD1

LCS Source: Blank Spike Dup

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method  | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------|-------|
| Selenium   | 30.000             | 27.98                     | 93.3            | 0.184 | 59 - 149        | 20        | FGS-054 |       |
| Molybdenum | 2.0000             | 1.86                      | 92.8            | 1.11  | 85 - 115        | 20        | FGS-054 |       |
| Silver     | 1.5000             | 1.501                     | 100             | 0.752 | 74 - 119        | 20        | FGS-054 |       |
| Cadmium    | 0.80000            | 0.757                     | 94.7            | 8.56  | 84 - 113        | 20        | FGS-054 |       |
| Antimony   | 0.80000            | 0.797                     | 99.6            | 2.18  | 79 - 122        | 20        | FGS-054 |       |
| Barium     | 10.000             | 9.76                      | 97.6            | 0.247 | 85 - 115        | 20        | FGS-054 |       |
| Thallium   | 0.40000            | 0.410                     | 103             | 1.51  | 64 - 134        | 20        | FGS-054 | QB-01 |
| Lead       | 1.5000             | 1.524                     | 102             | 0.433 | 72 - 143        | 20        | FGS-054 |       |

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LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATE

RECOVERY AND RPD

Batch: F202015

Sequence: 2B03001

Preparation: BrCl Oxidation

Lab Number: F202015-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.11                    | 96.4           | 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             | 14.79                     | 94.3            | 2.16  | 80 - 120        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager



### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B02001

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found   | MRL   | Units | Batch   | Method  | Notes    |
|---------------|------------|---------|-------|-------|---------|---------|----------|
| F201252-BLK1  | Beryllium  | -0.0003 | 0.060 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Aluminum   | 0.01    | 4.0   | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Chromium   | -0.04   | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Manganese  | -0.0007 | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Iron       | -0.4    | 10.0  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Nickel     | 0.004   | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Copper     | 0.02    | 0.10  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Zinc       | 0.32    | 0.20  | µg/L  | F201252 | FGS-054 | QB-10    |
| F201252-BLK1  | Arsenic    | -0.15   | 0.15  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Selenium   | 0.14    | 0.60  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Molybdenum | 0.004   | 0.06  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Silver     | -0.001  | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Cadmium    | -0.010  | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Antimony   | -0.0003 | 0.020 | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Barium     | 0.07    | 0.20  | µg/L  | F201252 | FGS-054 | U        |
| F201252-BLK1  | Thallium   | 0.002   | 0.005 | µg/L  | F201252 | FGS-054 | QB-02, U |
| F201252-BLK1  | Lead       | 0.0003  | 0.040 | µg/L  | F201252 | FGS-054 | U        |

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Liz Siska, Project Manager





414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Ex: 206-622-6870

### PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2B03001

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|-------|------|-------|---------|-----------|----------|
| F202015-BLK1  | Mercury | 0.06  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK2  | Mercury | 0.03  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK3  | Mercury | 0.05  | 0.50 | ng/L  | F202015 | EPA 1631E | U        |
| F202015-BLK4  | Mercury | 0.06  | 0.50 | ng/L  | F202015 | EPA 1631E | QB-04, U |

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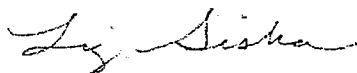
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## Notes and Definitions

- U Analyte included in the analysis, but not detected
- 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-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-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.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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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# CHAIN-OF-CUSTODY RECORD

eastern analytical, inc.  
professional/laboratory services

107170

| Sample IDs  | Date/Time       | Matrix                  | Parameters and Sample Notes  | # of containers |
|---|-----------------|-------------------------|--|-----------------|
| Effluent Field Blank  | 1/26/12<br>9:15 | aqueous<br>Grab or Comp | AqTot/SWLLMetalsSub<br>Circle preservative/s: HCL, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, MEOH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> , <u>CE</u>   | 1               |
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate |                 |                         |  |                 |
| Treat Tank Effluent   | 1/26/12<br>9:20 | aqueous<br>Grab or Comp | AqTot/SWLLMetalsSub/NH3/BOD/C/COD/CyanT/F/NO3/IOG/1664/V624/A/E625/E608PCB/TPhenols / <u>PH</u> *<br>* AT CUSTOMERS REQUEST<br>Circle preservative/s: HCL, HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , NaOH, MEOH, Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> , <u>CE</u> | 17              |
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate |                 |                         |  |                 |

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAI Project ID 3902

Project Name Wastewater Analysis - Weekly

State NH

Client (Pro Mgr) Paul Pepler

Customer GZA GeoEnvironmental, Inc. (NH)

Address 380 Harvey Road  
City Manchester NH 03103

Phone 623-3600 Fax 624-9463 (37)

Email/Address: paul.pepler@gza.com

QC deliverables  
 A  A+  B  B+  C  PC

Results Needed by: Preferred date 1/26/12

Notes about project: (i.e. Special Limits, Billing info if different...)  
Subcontract ALL metals to Frontier Global Sciences.  
Metals include Total Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Ti, Zn. Metals analyses require project-specific MS/MSD.  
624, 625, 608 results needed  
2/1/2012  
2/1/2012 PC

Reporting Options  
 HC  
 EDD PDF  
 EDD email  
 PDF prelim, NO FAX  
 e-mail Login Confirmation  
 NO FAX

Samples collected by: J.B. J.G.  
Date/Time 1/26/12 10:45

Received by: [Signature]

Relinquished by: [Signature] Date/Time: [Blank] Received by: [Blank] Date/Time: [Blank]

PO Number: 02259252  
Quote No: 45  
Temperature 45 °C  
Ice present Yes  No



**VIA EMAIL**

February 17, 2012  
File No. 04.0029307.00



Mr. Bruce Kudrick  
Superintendent, Hooksett Sewer Commission  
Town of Hooksett  
1 Egawes Drive  
Hooksett, New Hampshire 03106

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
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 Bruce:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the attached Wastewater Discharge Monitoring Report for sampling conducted on February 2, 2012, intended to satisfy the third of three initial sampling requirements as established in Special Condition 11 of PSNH's Waste Disposal Agreement No. WDA-001 (WDA). The analysis did not include total toxic organics per your discussion with Paul Pepler of GZA at the Hooksett Sewer Commission office on Thursday, February 2, 2012.

The analytical results presented in the attached **Analytical Data Report** are summarized in the attached **Table 1**.

**ANALYTICAL DISCUSSION**

Flue Gas Desulfurization (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 United States Environmental Protection Agency (EPA) web site and a link to their draft Standard Operating Procedure (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

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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 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, see:

Standard Operating Procedure: 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](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 that reads "Ronald A. Breton".

Ronald A. Breton, P.E.  
Principal

RAB:tmd

\\GZAMAN\Jobs\04\Jobs\0029300s\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Hooksett\final 4.0029307 Hooksett 3of3 LTR.021712.docx

Attachments: Wastewater Discharge Monitoring Report  
Table 1  
Analytical Data Report

**WASTEWATER DISCHARGE MONITORING REPORT**

**WASTEWATER DISCHARGE MONITORING REPORT  
HOOKSETT WASTEWATER TREATMENT PLANT**

Public Service of New Hampshire - Merrimack Station  
Waste Disposal Agreement No. WDA-001  
Issued October 1, 2011  
Expires September 30, 2012

Permitted Flow 70,000 gallons per day

**FLOW DATA**

|                        |         |                             |
|------------------------|---------|-----------------------------|
| Daily Flow Rate        | 16,038  | gallons (average)           |
| Monitoring Period Flow | 128,307 | gallons (1/27/12 - 2/03/12) |



**FACILITY INFORMATION**

Company Name Public Service Company of New Hampshire - Merrimack Station  
Company Owner Public Service Company of New Hampshire  
Facility Address 97 River Road  
Facility Contact Harold Keyes  
Telephone (603) 224-4081

**MONITORING REPORT**

Submittal Date 2/17/2012  
Monitoring Point End of treatment process  
Reporting Period First Month

**SAMPLE ANALYSIS**

Certified Analytical Laboratory Eastern Analytical Inc. (EAI) Certification Number 1012  
Authorized Representative Lorraine Olashaw  
Analytical Subcontractor Frontier Global Sciences Certification Number E87575

**SAMPLE COLLECTION**

Sampler Jeff Gagne (EAI)  
Sample Type Grab  
Sample Date 2/2/2012 Sample Time 9:00 AM  
pH 7.4

**CATEGORICAL PRETREATMENT STANDARDS**

40 CFR 423.16: Steam Electric Power Generating Category  
NOTE: There are no numerical pretreatment standards for this source

**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."

Harold Keyes  
Printed Name of Authorized Representative  
Harold Keyes  
Signature of Authorized Representative

Station Manager  
Title  
2/17/2012  
Date

**TABLE**

---

**TABLE 1 - SUMMARY ANALYTICAL DATA**  
**Treated FGD Wastewater**  
Public Service Company of New Hampshire  
Merrimack Station  
Bow, New Hampshire

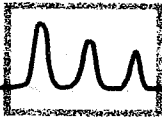
| <b>PARAMETER</b>   | <b>RESULTS<br/>(mg/L)<br/>2/2/2012<br/>EAI/Frontier</b> |
|--------------------|---|
| Aluminum           | 0.218   |
| Ammonia            | 1.1   |
| Antimony           | 0.00155   |
| Arsenic            | 0.0121  |
| Barium             | 0.243   |
| Beryllium          | < 0.00300   |
| BOD                | < 6   |
| Cadmium            | < 0.00100   |
| Chromium (T)       | < 0.00500   |
| COD                | 140   |
| Copper             | 0.00553   |
| Cyanide (T)        | < 0.01  |
| Fluoride           | 2.9   |
| Iron               | < 0.500   |
| Lead               | < 0.00200   |
| Manganese          | 0.631   |
| Mercury            | 0.000036  |
| Molybdenum         | 0.195   |
| Nitrate            | 65  |
| Nickel             | < 0.00500   |
| O&G                | < 5   |
| pH                 | 7.4   |
| Selenium           | 0.121   |
| Silver             | < 0.00100   |
| Thallium           | 0.00685   |
| Zinc               | < 0.0100  |
| Phenolic Compounds | < 0.5   |

GZA GeoEnvironmental, Inc.

11/14/2020 10:14:11 AM

**ANALYTICAL DATA REPORT**

---



# eastern analytical

*professional laboratory services*

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107330  
Client Identification: Wastewater Analysis - **Weekly**  
Date Received: 2/2/2012

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](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

2.17.12

Date

30

# of pages (excluding cover letter)



# SAMPLE CONDITIONS PAGE

EAI ID#: 107330

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

Client Designation: Wastewater Analysis - *Weekly*

Temperature upon receipt (°C): **5.2**

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)         |
|-----------|----------------------|---------------|--------------|---------------|--------------|---|
| 107330.01 | Effluent Field Blank | 2/2/12        | 2/2/12       | aqueous       |              | Adheres to Sample Acceptance Policy                           |
| 107330.02 | Treat Tank Effluent  | 2/2/12        | 2/2/12       | aqueous       |              | 624, 625 and 608 placed on hold, then cancelled at customer's |

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](http://www.eailabs.com)

Phone: (603) 228-0525



# LABORATORY REPORT

EAI ID#: 107330

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

Client Designation: Wastewater Analysis - *Weekly*

---

|                                 |                        |
|---------------------------------|------------------------|
| <b>Sample ID:</b>               | Treat Tank<br>Effluent |
| <b>Lab Sample ID:</b>           | 107330.02              |
| <b>Matrix:</b>                  | aqueous                |
| <b>Date Sampled:</b>            | 2/2/12                 |
| <b>Date Received:</b>           | 2/2/12                 |
| <b>Units:</b>                   | mg/L                   |
| <b>Date of Extraction/Prep:</b> | 2/8/12                 |
| <b>Date of Analysis:</b>        | 2/8/12                 |
| <b>Analyst:</b>                 | LAS                    |
| <b>Method:</b>                  | 1664A                  |
| <b>Dilution Factor:</b>         | 1                      |
| <b>Oil &amp; Grease (HEM)</b>   | < 5                    |



# QC REPORT

EAI ID#: 107330

Client: GZA GeoEnvironmental, Inc. (NH)

Batch ID: 734541-34922/A020812OG1661

Client Designation: Wastewater Analysis - *Weekly*

| Parameter Name     | Blank | LCS        | LCSD               | Analysis Date | Units | Limits   | RPD | Method |
|--------------------|-------|------------|--------------------|---------------|-------|----------|-----|--------|
| Oil & Grease (HEM) | < 5   | 36 (91 %R) | 36 (90 %R) (1 RPD) | 2/8/2012      | 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#: 107330

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

Client Designation: Wastewater Analysis - *Weekly*

Sample ID: Treat Tank Effluent

Lab Sample ID: 107330.02

Matrix: aqueous

Date Sampled: 2/2/12

Date Received: 2/2/12

## Analysis

|                  |        | Units | Date    | Time  | Method   | Analyst |
|------------------|--------|-------|---------|-------|----------|---------|
| Solids Suspended | 6      | mg/L  | 2/03/12 | 10:45 | 2540D    | DLS     |
| Solids Dissolved | 19000  | mg/L  | 2/03/12 | 10:45 | 2540C    | DLS     |
| Fluoride         | 2.9    | mg/L  | 2/08/12 | 15:01 | 300.0    | KL      |
| Sulfate          | 1200   | mg/L  | 2/08/12 | 14:46 | 300.0    | KL      |
| Chloride         | 9300   | mg/L  | 2/03/12 | 10:35 | 4500CIE  | DLS     |
| Nitrate-N        | 65     | mg/L  | 2/03/12 | 10:32 | 353.2    | DLS     |
| Cyanide Total    | < 0.01 | mg/L  | 2/08/12 | 9:30  | 4500CNE  | KJR     |
| Ammonia-N        | 1.1    | mg/L  | 2/09/12 | 9:00  | 4500NH3D | SEL     |
| BOD              | < 6    | mg/L  | 2/03/12 | 11:20 | 5210B    | KJR     |
| COD              | 140    | mg/L  | 2/07/12 | 16:00 | H8000    | SKC     |
| Total Phenols    | < 0.5  | mg/L  | 2/08/12 | 2:00  | 420.1    | JCC     |
| pH               | 7.4    | SU    | 2/02/12 | 16:30 | 4500H+B  | KJR     |

Total Phenols: The reporting limit has been elevated due to matrix interference.



# QC REPORT

EAI ID#: 107330

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

Client Designation: **Wastewater Analysis - Weekly**

| Parameter Name   | Blank  | LCS           | LCSD                  | Units | Date of Analysis | Limits      | RPD | Method    |
|------------------|--------|---------------|-----------------------|-------|------------------|-------------|-----|-----------|
| Solids Suspended | < 2    | 95 (95 %R)    | 94 (94 %R) (1 RPD)    | mg/L  | 2/3/12           | 90 - 110    | 20  | 2540D     |
| Solids Dissolved | < 5    | 990 (99 %R)   | NA                    | mg/L  | 2/3/12           | 85 - 115    | 20  | 2540C     |
| Fluoride         | < 0.1  | 2.0 (99 %R)   | 2.0 (99 %R) (0 RPD)   | mg/L  | 2/8/12           | 90 - 110    | 20  | 300.0     |
| Sulfate          | < 1    | 20 (100 %R)   | 20 (101 %R) (1 RPD)   | mg/L  | 2/8/12           | 90 - 110    | 20  | 300.0     |
| Chloride         | < 1    | 24 (96 %R)    | 24 (97 %R) (1 RPD)    | mg/L  | 2/3/12           | 90 - 110    | 20  | 4500CIE   |
| Nitrate-N        | < 0.5  | 4.9 (99 %R)   | 4.9 (98 %R) (1 RPD)   | mg/L  | 2/3/12           | 90 - 110    | 20  | 353.2     |
| Cyanide Total    | < 0.02 | 0.25 (100 %R) | NA                    | mg/L  | 2/8/12           | 85 - 115    | 20  | 4500CNE   |
| Ammonia-N        | < 0.05 | 2.2 (109 %R)  | 2.2 (110 %R) (1 RPD)  | mg/L  | 2/9/12           | 90 - 110    | 20  | 4500NH3DN |
| BOD              | < 6    | 420 (104 %R)  | 420 (104 %R) (0 RPD)  | mg/L  | 2/3/12           | 84 - 115    | 20  | 5210B     |
| COD              | < 10   | 100 (103 %R)  | 100 (101 %R) (2 RPD)  | mg/L  | 2/7/12           | 85 - 115    | 20  | H8000     |
| Total Phenols    | < 0.05 | 0.22 (87 %R)  | 0.22 (89 %R) (2 RPD)  | mg/L  | 2/8/12           | 85 - 115    | 20  | 420.1     |
| pH               |        | 6.05 (101 %R) | 6.07 (101 %R) (0 RPD) | SU    | 2/2/12           | 5.95 - 6.07 | 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.



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

15 February 2012

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

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



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

### ANALYTICAL REPORT FOR SAMPLES

Laboratory: Frontier Global Sciences, Inc.

SDG:

Client: Eastern Analytical, Inc

Project: Merrimack Station

| Sample ID                   | Lab ID     | Matrix | Date Sampled    | Date Received   |
|-----------------------------|------------|--------|-----------------|-----------------|
| C-3015 Effluent Field Blank | 1202063-01 | Water  | 02-Feb-12 08:47 | 03-Feb-12 09:30 |
| Treat Tank Effluent         | 1202063-02 | Water  | 02-Feb-12 09:15 | 03-Feb-12 09:30 |

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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414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

## CASE NARRATIVE

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on February 3rd, 2012. The samples were received intact, on-ice with temperatures measured at 10.6 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

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

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.

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

---

Liz Siska, Project Manager

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414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

### CHAIN OF CUSTODY FORMS



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

414 Pon 107330 39  
50  
Fax: 206-622-6870  
info@FrontierGS.com  
http://www.FrontierGS.com

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1202063

| Client: Eastern Analytical Inc<br>Address: 25 Chocoll Drive<br>CONCORD NH 03301 |                            | Contact: Jeff Goyne<br>Phone: 603 228 0525 Fax: 603 228 4571<br>E-mail: jgfg@ealabs.com   |              | Project Name: Merrimack station  |              | Contract/PO:   |                      | Report To: Same  |              | Invoice To: Same   |  | Address: same     |  | Address: same     |  | Phone: 603 228 0525 Fax: 603 228 4571 |  | Phone: Fax:              |  | E-mail: customer.service@ealabs.com |  | E-mail: customer.service@ealabs.com |  | Analyses Requested        |  | FGS PM: Lia Siska<br>Date: 2/2/2012<br>TAT (business days): 20 (std)<br>15 (0 5 4 3 2 24 hrs.<br>(For TAT < 10 days, contact PM.<br>Surcharges apply for expedited TAT).<br>Saturday delivery? <input type="checkbox"/> Y <input type="checkbox"/> N<br>(If yes, please contact PM) |  | EDD <input type="checkbox"/> Y <input type="checkbox"/> N<br>QA <input type="checkbox"/> Standard <input type="checkbox"/> High |  |
|---|----------------------------|---|--------------|--|--------------|--|----------------------|--|--------------|--|--|-------------------|--|-------------------|--|---------------------------------------|--|--------------------------|--|-------------------------------------|--|-------------------------------------|--|---------------------------|--|---|--|---|--|
| No.   | Engraved Bottle ID         | Sample ID   | # of Bottles | Matrix   | Date & Time  | Sampled By   | Field Filtered (Y/N) | Field Preserved: HNO <sub>3</sub> , HCl, BrCl, Other (%) | Total Metals | Comments   |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 1   | C-3615                     | Effluent Field blank  | 1            | AQ   | 2/1/12 08:47 | JB/GT  | N                    | -  | X            | 1) Metals Include: Al, Sb, As, Ba, Bi, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Tl, Zn<br>2) Please use celliniseal, FGD effluent<br>3) Project specific MMSR, add sample volume provided |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 2   | C-3629<br>C-3627<br>C-3628 | Treat Tank Effluent   | 3            | WW   | 2/1/12 09:15 | JB/GT  | N                    | -  | X            |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 3   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 4   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 5   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 6   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 7   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 8   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 9   |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 10  |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 11  |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| 12  |                            |   |              |  |              |  |                      |  |              |  |  |                   |  |                   |  |                                       |  |                          |  |                                     |  |                                     |  |                           |  |   |  |   |  |
| COC Seal: No  |                            | Comments: TID: 0268   |              | Matrix Codes:<br>FW: Fresh Water<br>WW: Waste Water<br>SB: Sea and Brackish Water<br>SS: Soil and Sediment<br>TS: Plant and Animal Tissue<br>HC: Hydrocarbons<br>TR: Trap<br>OT: Other |              | Relinquished By: [Signature]   |                      | Received By: [Signature]                                 |              | Name: Jim Blackwell  |  | Name: Chris Johns |  | Name: ALEXA BAHAN |  | Organization: Eastern Analytical      |  | Organization: FGI        |  | Organization: FGS                   |  | Date & Time: 2/1/12 13:00           |  | Date & Time: 2/1/12 13:00 |  | Date & Time: 2-3-12   |  |   |  |
| # of Coolers: 1 (one)   |                            | Sample Disposal:<br><input type="checkbox"/> Return (shipping fees may apply)<br><input type="checkbox"/> Standard Disposal - 30 Days after report<br><input type="checkbox"/> Retain for _____ weeks after report (storage fees may apply) |              | Tracking number: 1Z X46549 01 9628 9755 14:31  |              | 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: _____                         |  |                                     |  |                           |  |   |  |   |  |

Frontier Global Sciences, Inc.

*Liz Siska*

Liz Siska, Project Manager

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02/15/2012

### CHAIN OF CUSTODY FORMS

Sample Receipt Checklist

FGS Work Order: 1202063

Client: Eastern Analytical Date & Time Received: 2-3-12 09:30 Date Logged In: 2-3-12 14:31  
 Project: Merriam's Station Received By: Alexa Bakum  
 SDC: # of Coolers Received: 1 (one) FGS PM: LIZ SISKKA

Samples Arrived By: X Shipping Service: Courier Head (specify):  
 Tracking/Bill Number(s): UPS 1Z X46 599 01 9628 9755

| Yes | No                                  | NA | Comments   |
|-----|-------------------------------------|----|--|
|     | <input checked="" type="checkbox"/> |    | This cooler does not appear to be tampered with: |
|     | <input checked="" type="checkbox"/> |    | Cooler seals are present and intact:             |
|     | <input checked="" type="checkbox"/> |    | Cooler seals signed by:                          |

Thermal Preservation: X Loose Ice None Ambient None Other (specify):  
 Thermometer ID: 0268 Correction Factor (CF): 0.4 degrees C

| Cooler    | Temp           | Temp |
|-----------|----------------|------|
| Cooler 1: | <u>10.6</u> °C |      |
| Cooler 2: |                |      |
| Cooler 3: |                |      |
| Cooler 4: |                |      |
| Cooler 5: |                |      |

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

| Sample ID/Description | Date and Time of Sample Collection | Sampler By | Preservation Type | Requested Analyses | Requested Signatures | Internal chain of custody required |
|-----------------------|------------------------------------|------------|-------------------|--------------------|----------------------|------------------------------------|
|                       |                                    |            |                   |                    |                      |                                    |

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

Anomalies/Non-conformances: N/A

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

Frontier Global Sciences, Inc.

*Liz Siskka*

Liz Siskka, Project Manager

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## ANALYTICAL RESULTS

### C-3015 Effluent Field Blank

Matrix: Water

Laboratory ID: 1202063-01

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | ND     | 0.4   | 4.0   | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Antimony   | ND     | 0.005 | 0.020 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Arsenic    | ND     | 0.05  | 0.15  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Barium     | ND     | 0.03  | 0.20  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Beryllium  | ND     | 0.023 | 0.060 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.004 | 0.020 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.009 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Copper     | ND     | 0.01  | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Iron       | ND     | 1.3   | 10.0  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Lead       | ND     | 0.004 | 0.040 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Manganese  | 0.12   | 0.007 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Mercury    | ND     | 0.08  | 0.50  | ng/L  | 1        | F202057 | 2B06014  | 02/06/12 | EPA 1631E     | U        |
| Molybdenum | ND     | 0.006 | 0.06  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Nickel     | ND     | 0.008 | 0.10  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Selenium   | ND     | 0.19  | 0.60  | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Silver     | ND     | 0.006 | 0.020 | µg/L  | 1        | F202159 | 2B15016  | 02/15/12 | EPA 200.8 Mod | QM-12, U |
| Thallium   | ND     | 0.001 | 0.005 | µg/L  | 1        | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | QB-02, U |
| Zinc       | ND     | 0.02  | 0.20  | µg/L  | 1        | F202053 | 2B15001  | 02/14/12 | EPA 200.8 Mod | U        |

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## ANALYTICAL RESULTS

### Treat Tank Effluent

Matrix: Water

Laboratory ID: 1202063-02

| Analyte    | Result | MDL   | MRL   | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes    |
|------------|--------|-------|-------|-------|----------|---------|----------|----------|---------------|----------|
| Aluminum   | 218    | 22.2  | 200   | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Antimony   | 1.55   | 0.230 | 1.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Arsenic    | 12.1   | 2.55  | 7.50  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Barium     | 243    | 1.35  | 10.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Beryllium  | ND     | 1.14  | 3.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Cadmium    | ND     | 0.208 | 1.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Chromium   | ND     | 0.45  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Copper     | 5.53   | 0.50  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Iron       | ND     | 65.0  | 500   | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Lead       | ND     | 0.195 | 2.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Manganese  | 631    | 0.37  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Mercury    | 36.0   | 0.84  | 5.05  | ng/L  | 10       | F202057 | 2B06014  | 02/06/12 | EPA 1631E     |          |
| Molybdenum | 195    | 0.30  | 3.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Nickel     | ND     | 0.40  | 5.00  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |
| Selenium   | 121    | 9.69  | 30.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod |          |
| Silver     | ND     | 0.300 | 1.00  | µg/L  | 50       | F202159 | 2B15016  | 02/15/12 | EPA 200.8 Mod | QM-12, U |
| Thallium   | 6.85   | 0.056 | 0.250 | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | QB-01    |
| Zinc       | ND     | 0.82  | 10.0  | µg/L  | 50       | F202053 | 2B13005  | 02/12/12 | EPA 200.8 Mod | U        |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1202063-02

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 36.03                        | 36.21                           | 5.05 | 0.482 | 24        | EPA 1631E |       |

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

**SOURCE: 1202063-02**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD1

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | ND                          | 2.0200             | 2.062                   | 102           | 70 - 130        | EPA 200.8 Mod |       |
| Aluminum   | 217.7                       | 151.50             | 355.1                   | 90.7          | 70 - 130        | EPA 200.8 Mod |       |
| Chromium   | 2.05                        | 7.0700             | 9.47                    | 105           | 70 - 130        | EPA 200.8 Mod |       |
| Manganese  | 631.1                       | 6.0600             | 611.0                   | -331          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Iron       | ND                          | 505.00             | 474.3                   | 93.9          | 70 - 130        | EPA 200.8 Mod |       |
| Nickel     | 3.25                        | 4.0400             | 7.58                    | 107           | 70 - 130        | EPA 200.8 Mod |       |
| Copper     | 5.53                        | 4.0400             | 9.39                    | 95.7          | 70 - 130        | EPA 200.8 Mod |       |
| Zinc       | 0.99                        | 10.100             | 12.68                   | 116           | 70 - 130        | EPA 200.8 Mod |       |
| Arsenic    | 12.06                       | 15.150             | 24.53                   | 82.3          | 70 - 130        | EPA 200.8 Mod |       |
| Selenium   | 121.3                       | 30.300             | 145.2                   | 79.1          | 70 - 130        | EPA 200.8 Mod |       |
| Molybdenum | 195.2                       | 2.0200             | 192.5                   | -135          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Cadmium    | 0.623                       | 0.80800            | 1.437                   | 101           | 70 - 130        | EPA 200.8 Mod |       |
| Antimony   | 1.549                       | 0.80800            | 2.358                   | 100           | 70 - 130        | EPA 200.8 Mod |       |
| Barium     | 243.3                       | 10.100             | 251.4                   | 79.3          | 70 - 130        | EPA 200.8 Mod |       |
| Thallium   | 6.848                       | 0.40400            | 7.126                   | 68.9          | 70 - 130        | EPA 200.8 Mod | QB-01 |
| Lead       | ND                          | 1.5150             | 1.334                   | 88.0          | 70 - 130        | EPA 200.8 Mod |       |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium  | 2.0200             | 2.025                    | 100            | 1.80  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Aluminum   | 151.50             | 338.6                    | 79.8           | 4.77  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Chromium   | 7.0700             | 9.09                     | 99.6           | 4.12  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Manganese  | 6.0600             | 612.2                    | -311           | 0.200 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Iron       | 505.00             | 464.8                    | 92.0           | 2.03  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Nickel     | 4.0400             | 8.13                     | 121            | 7.06  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Copper     | 4.0400             | 9.35                     | 94.8           | 0.415 | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.100             | 10.13                    | 90.4           | 22.4  | 70 - 130        | 20        | EPA 200.8 Mod | QR-08 |
| Arsenic    | 15.150             | 25.77                    | 90.5           | 4.92  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.300             | 139.9                    | 61.4           | 3.76  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Molybdenum | 2.0200             | 190.9                    | -213           | 0.823 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Cadmium    | 0.80800            | 1.230                    | 75.2           | 15.5  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80800            | 2.316                    | 95.0           | 1.77  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1202063-02

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD1

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes           |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-----------------|
| Barium   | 10.100             | 250.6                    | 71.7           | 0.305 | 70 - 130        | 20        | EPA 200.8 Mod |                 |
| Thallium | 0.40400            | 6.963                    | 28.6           | 2.31  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02,<br>QB-01 |
| Lead     | 1.5150             | 1.403                    | 92.6           | 5.09  | 70 - 130        | 20        | EPA 200.8 Mod |                 |

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

**SOURCE: 1202063-02**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD3

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes     |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-----------|
| Beryllium  | ND                          | 50.500             | 42.91                   | 85.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Aluminum   | 217.7                       | 10100              | 9206                    | 89.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Chromium   | 2.05                        | 1010.0             | 1006                    | 99.4          | 70 - 130        | EPA 200.8 Mod | AS        |
| Manganese  | 631.1                       | 1010.0             | 1582                    | 94.2          | 70 - 130        | EPA 200.8 Mod | AS        |
| Iron       | ND                          | 5050.0             | 4849                    | 96.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Nickel     | 3.25                        | 1262.5             | 1190                    | 94.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Copper     | 5.53                        | 1262.5             | 1149                    | 90.6          | 70 - 130        | EPA 200.8 Mod | AS        |
| Zinc       | 0.99                        | 2525.0             | 2401                    | 95.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Arsenic    | 12.06                       | 1010.0             | 1050                    | 103           | 70 - 130        | EPA 200.8 Mod | AS        |
| Selenium   | 121.3                       | 1010.0             | 1168                    | 104           | 70 - 130        | EPA 200.8 Mod | AS        |
| Molybdenum | 195.2                       | 505.00             | 685.1                   | 97.0          | 70 - 130        | EPA 200.8 Mod | AS        |
| Cadmium    | 0.623                       | 101.00             | 96.95                   | 95.4          | 70 - 130        | EPA 200.8 Mod | AS        |
| Antimony   | 1.549                       | 50.500             | 50.84                   | 97.6          | 70 - 130        | EPA 200.8 Mod | AS        |
| Barium     | 243.3                       | 2020.0             | 2379                    | 106           | 70 - 130        | EPA 200.8 Mod | AS        |
| Thallium   | 6.848                       | 50.500             | 53.06                   | 91.5          | 70 - 130        | EPA 200.8 Mod | AS, QB-01 |
| Lead       | ND                          | 252.50             | 220.5                   | 87.3          | 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 |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 50.500             | 43.37                    | 85.9           | 1.08   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Aluminum   | 10100              | 9221                     | 89.1           | 0.164  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Chromium   | 1010.0             | 990.2                    | 97.8           | 1.59   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Manganese  | 1010.0             | 1562                     | 92.2           | 1.27   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Iron       | 5050.0             | 4775                     | 94.6           | 1.53   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Nickel     | 1262.5             | 1197                     | 94.6           | 0.613  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Copper     | 1262.5             | 1129                     | 89.0           | 1.79   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Zinc       | 2525.0             | 2399                     | 95.0           | 0.0456 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Arsenic    | 1010.0             | 1013                     | 99.2           | 3.57   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Selenium   | 1010.0             | 1151                     | 102            | 1.49   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Molybdenum | 505.00             | 684.8                    | 97.0           | 0.0426 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cadmium    | 101.00             | 100.4                    | 98.7           | 3.45   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Antimony   | 50.500             | 51.11                    | 98.1           | 0.531  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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## MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1202063-02

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-MS/MSD3

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes     |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-----------|
| Barium   | 2020.0             | 2377                     | 106            | 0.106 | 70 - 130        | 20        | EPA 200.8 Mod | AS        |
| Thallium | 50.500             | 53.45                    | 92.3           | 0.720 | 70 - 130        | 20        | EPA 200.8 Mod | AS, QB-01 |
| Lead     | 252.50             | 219.8                    | 87.0           | 0.315 | 70 - 130        | 20        | EPA 200.8 Mod | AS        |

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

**SOURCE: 1202063-02**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 36.03                       | 102.00             | 140.9                   | 103           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|--------|-----------------|-----------|-----------|-------|
| Mercury | 102.00             | 141.0                    | 103            | 0.0816 | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1202035-02RE1**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 38.97                       | 102.00             | 144.0                   | 103           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 102.00             | 144.5                    | 103            | 0.394 | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1202063-02RE2**

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 1.5150             | 1.891                   | 125           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5150             | 2.021                    | 133            | 6.64  | 70 - 130        | 20        | EPA 200.8 Mod | QM-07 |

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

**SOURCE: 1202063-02RE2**

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-MS/MSD2

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Silver  | ND                          | 50.500             | 45.54                   | 90.2          | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 50.500             | 46.21                    | 91.5           | 1.46  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**RECOVERY AND RPD**

Batch: F202053

Sequence: 2BI3005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Beryllium  | 2.0000             | 1.891                    | 94.5           | 85 - 115        | EPA 200.8 Mod |       |
| Aluminum   | 150.00             | 143.0                    | 95.3           | 85 - 115        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.44                     | 92.0           | 85 - 115        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 5.77                     | 96.2           | 85 - 115        | EPA 200.8 Mod |       |
| Iron       | 500.00             | 454.7                    | 90.9           | 85 - 115        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.02                     | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.18                     | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.25                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.25                    | 95.0           | 85 - 115        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 29.36                    | 97.9           | 85 - 115        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.82                     | 91.0           | 85 - 115        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.828                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.800                    | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.99                     | 99.9           | 85 - 115        | EPA 200.8 Mod |       |
| Thallium   | 0.40000            | 0.420                    | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.552                    | 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 |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium | 2.0000             | 1.863                     | 93.1            | 1.50  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Aluminum  | 150.00             | 137.5                     | 91.7            | 3.91  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Chromium  | 7.0000             | 6.29                      | 89.9            | 2.39  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Manganese | 6.0000             | 5.58                      | 93.0            | 3.37  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Iron      | 500.00             | 435.9                     | 87.2            | 4.22  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Nickel    | 4.0000             | 3.71                      | 92.9            | 7.79  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Copper    | 4.0000             | 4.03                      | 101             | 3.75  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Zinc      | 10.000             | 9.89                      | 98.9            | 3.59  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Arsenic   | 15.000             | 13.45                     | 89.7            | 5.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Selenium  | 30.000             | 29.20                     | 97.3            | 0.548 | 85 - 115        | 20        | EPA 200.8 Mod |       |

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 02/15/2012

Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F202053

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202053-BS/BSD1

LCS Source: Blank Spike Dup

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Molybdenum | 2.0000             | 1.77                      | 88.3            | 3.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.794                     | 99.2            | 4.16  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.784                     | 98.0            | 2.05  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.82                      | 98.2            | 1.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Thallium   | 0.40000            | 0.407                     | 102             | 2.98  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.535                     | 102             | 1.06  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager

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414 Pontius Ave North  
 Seattle, WA 98109  
 Ph: 206-622-6960  
 Fx: 206-622-6870

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

**RECOVERY AND RPD**

Batch: F202057

Sequence: 2B06014

Preparation: BrCl Oxidation

Lab Number: F202057-BS/BSD1

LCS Source: LCS

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.77                    | 101            | 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             | 16.05                     | 102             | 1.76  | 80 - 120        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F202159

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F202159-BS/BSD1

LCS Source: Blank Spike

| Analyte | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Silver  | 1.5000             | 2.156                    | 144            | 85 - 115        | EPA 200.8 Mod | QM-12 |

| Analyte | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|---------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Silver  | 1.5000             | 2.141                     | 143             | 0.706 | 85 - 115        | 20        | EPA 200.8 Mod | QM-12 |

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Liz Siska, Project Manager



414 Pontius Ave North  
Seattle, WA 98109  
Ph: 206-622-6960  
Ex: 206-622-6870

### PREPARATION BLANKS

Instrument: Hg-16

Sequence: 2B06014

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|-------|------|-------|---------|-----------|----------|
| F202057-BLK1  | Mercury | 0.04  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK2  | Mercury | 0.04  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK3  | Mercury | 0.05  | 0.50 | ng/L  | F202057 | EPA 1631E | U        |
| F202057-BLK4  | Mercury | 0.10  | 0.50 | ng/L  | F202057 | EPA 1631E | QB-04, U |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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## PREPARATION BLANKS

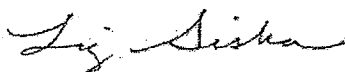
Instrument: ICPMS-6

Sequence: 2B13005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|------------|--------|-------|-------|---------|---------------|-------|
| F202053-BLK1  | Beryllium  | 0.005  | 0.060 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Aluminum   | -0.04  | 4.0   | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Chromium   | -0.02  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Manganese  | -0.002 | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Iron       | -0.3   | 10.0  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Nickel     | -0.03  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Copper     | 0.008  | 0.10  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Zinc       | 0.10   | 0.20  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Arsenic    | -0.07  | 0.15  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Selenium   | -0.02  | 0.60  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Molybdenum | 0.01   | 0.06  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Cadmium    | 0.005  | 0.020 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Antimony   | 0.019  | 0.020 | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Barium     | 0.005  | 0.20  | µg/L  | F202053 | EPA 200.8 Moc | U     |
| F202053-BLK1  | Thallium   | 0.028  | 0.005 | µg/L  | F202053 | EPA 200.8 Moc | QB-10 |
| F202053-BLK1  | Lead       | 0.004  | 0.040 | µg/L  | F202053 | EPA 200.8 Moc | U     |

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Liz Siska, Project Manager

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Seattle, WA 98109  
Ph: 206-622-6960  
Fx: 206-622-6870

### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2B15016

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|---------|--------|-------|-------|---------|---------------|-------|
| F202159-BLK1  | Silver  | 0.0006 | 0.020 | µg/L  | F202159 | EPA 200.8 Moc | U     |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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-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-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.
- QB-01 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the blank concentration(s) are less than 10% of the sample result.
- 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.

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

Liz Siska, Project Manager

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eastern analytical, inc.  
Professional laboratory services

# CHAIN-OF-CUSTODY RECORD

107330

GZANH

30

Date/Time  
Composites need start  
and stop dates/times

Matrix

Parameters and Sample Notes

# of containers

|                      |          |                         |                    |  |   |
|----------------------|----------|-------------------------|--------------------|--|---|
| Effluent Field Blank | 2/2/2012 | aqueous<br>Grab or Comp | AqTo/SWLLMetalsSub |  | 1 |
|----------------------|----------|-------------------------|--------------------|--|---|

|   |          |                         |  |  |    |
|---|----------|-------------------------|--|--|----|
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate   |          |                         |  |  |    |
| Treat Tank Effluent   | 2/2/2012 | aqueous<br>Grab or Comp | AqTo/SWLLMetalsSub/BOD/COD/CyanT/F/NO3/OG1664/SO4/TDS/SS/V624A/E625/TPhenols/E600PGB/NH3/Cl/ph |  | 18 |
| <input checked="" type="checkbox"/> Sampler confirms ID and parameters are accurate   |          |                         |  |  |    |
| Circle preservative/s: <u>HCl HNO<sub>3</sub> H<sub>2</sub>SO<sub>4</sub> NaOH MeOH Na<sub>2</sub>S<sub>2</sub>O<sub>8</sub> <del>PCB</del></u> |          |                         |  |  |    |
| Dissolved Sample Field Filtered <input type="checkbox"/>  |          |                         |  |  |    |
| Dissolved Sample Field Filtered <input type="checkbox"/>  |          |                         |  |  |    |

Please ensure this auto COC is accurate, adheres to permit or sampling requirements for this sampling event, and modify as necessary.

EAI Project ID 3902  
 Project Name Wastewater Analysis - Weekly  
 State NH  
 Client (Pro Mgr) Paul Pepler  
 Customer GZA GeoEnvironmental, Inc. (NH)  
 Address 380 Harvey Road  
 City Manchester NH 03103  
 Phone 623-3600 Fax 624-9463 (37)  
 Email/Address: paul.pepler@gza.com

Results Needed by: Preferred date \_\_\_\_\_  
 Notes about project: (i.e. Special Limits, Billing info if different...)  
 Subcontract ALL metals to Frontier Global Sciences.  
 Metals include Total  
 Al, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Ti, Zn. Metals analyses require project-specific MS/MSD.  
 Please hold 684/625/608 analyses per GZA.

Reporting Options  
 HC  
 EDD PDF  
 EDD email  
 PDF prelim, NO FAX  
 e-mail Login Confirmation  
 NO FAX  
 PONumber: vertical  
 Quote No: 1039426  
 Temperature: 5.2 °C  
 Ice present Yes  No   
 Sample collected by: JR GT  
 Date/Time: 2/2/12 13:00  
 Relinquished by: [Signature]  
 Date/Time: \_\_\_\_\_  
 Received by: [Signature]  
 Date/Time: \_\_\_\_\_

QC deliverables  
 A  A+  B  B+  C  PC



**VIA EMAIL**

April 6, 2012  
File No. 04.0029307.00



Mr. Bruce Kudrick  
Superintendent, Hooksett Sewer Commission  
Town of Hooksett  
1 Egawes Drive  
Hooksett, New Hampshire 03106

Re: Wastewater Discharge Monitoring Report  
Treated Wastewater  
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 Bruce:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Wastewater Discharge Monitoring Report** and **Analytical Data Report** for sampling conducted on March 2, 2012.

The analysis on samples collected on March 2, 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 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.

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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, see:

Standard Operating Procedure: 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](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 FDG 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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

A handwritten signature in black ink that reads 'Michael P. North'.

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

RAB:tmd

P:\04Jobs\00293008\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Hooksett\Monthly\final 04.0029307 Hooksett March RPT 040612.docx

Attachments: Wastewater Discharge Monitoring Report  
Analytical Data Report

**WASTEWATER DISCHARGE MONITORING REPORT**

**WASTEWATER DISCHARGE MONITORING REPORT  
HOOKSETT WASTEWATER TREATMENT PLANT**

Public Service of New Hampshire - Merrimack Station  
Waste Disposal Agreement No. WDA-001  
Issued October 1, 2011  
Expires September 30, 2012

Permitted Flow 70,000 gallons per day

**FLOW DATA**

|                        |                |  |
|------------------------|----------------|--|
| Daily Flow Rate        | <u>12,808</u>  | <u>gallons (average of 11 actual discharge days)</u> |
| Monitoring Period Flow | <u>140,890</u> | <u>gallons (3/01/12 - 3/31/12)</u>                   |



**FACILITY INFORMATION**

Company Name Public Service Company of New Hampshire - Merrimack Station  
Company Owner Public Service Company of New Hampshire  
Facility Address 97 River Road  
Facility Contact Harold Keyes  
Telephone (603) 224-4081

**MONITORING REPORT**

Submittal Date 4/6/2012  
Monitoring Point End of treatment process  
Reporting Period First Month

**SAMPLE ANALYSIS**

Certified Analytical Laboratory Eastern Analytical Inc. (EAI) Certification Number 1012  
Authorized Representative Lorraine Olashaw  
Analytical Subcontractor Frontier Global Sciences Certification Number E87575

**SAMPLE COLLECTION**

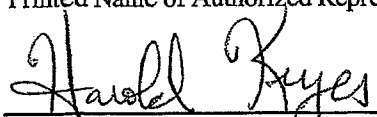
Sampler Jim Blackwell, Gregg Thompson, EAI  
Sample Type Grab  
Sample Date 3/2/2012 Sample Time 11:00 AM  
pH 7.1

**CATEGORICAL PRETREATMENT STANDARDS**

40 CFR 423.16: Steam Electric Power Generating Category  
NOTE: There are no numerical pretreatment standards for this source

**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."

Harold Keyes  
Printed Name of Authorized Representative  
  
Signature of Authorized Representative

Station Manager  
Title  
4/6/2012  
Date

## **ANALYTICAL DATA REPORT**

---



# 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 Received | Date Sampled | Sample Matrix | % Dry Weight | Exceptions/Comments (other than thermal preservation) |
|-----------|---|---------------|--------------|---------------|--------------|---|
| 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

**eastern analytical, inc.**

www.eailabs.com

Phone: (603) 228-0525



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

| Analysis |         |       |         |         |
|----------|---------|-------|---------|---------|
| Units    | Date    | Time  | Method  | Analyst |
| 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

| Analysis |         |       |        |         |
|----------|---------|-------|--------|---------|
| Units    | Date    | Time  | Method | Analyst |
| 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



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   |
|-----------------------------|------------|--------|-----------------|-----------------|
| 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

*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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1203055 Revised Report  
03/27/2012



## 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.

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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03/27/2012





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

### CHAIN OF CUSTODY FORMS



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

414 Pontius Ave. N. Seattle WA 98109  
 Phone: 206-622-6960  
 Fax: 206-622-6870  
 info@FrontierGS.com  
 http://www.FrontierGS.com

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| Client: <u>Eastern Analytical Inc.</u>  |                          | Contact: <u>Jeff Siska</u>  |              | Analyses Requested<br>FGS PM: <u>Liz Siska</u><br>Date: <u>3/2/2012</u><br>TAT (business days): <u>20</u> (std)<br><u>15</u> (10) 5 4 3 2 24 hrs.<br>(For TAT < 10 days, contact PM.<br>Surcharges apply for expedited TAT)<br>Saturday delivery? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N<br>(if yes, please contact PM)<br>EDD: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N<br>QA <input type="checkbox"/> Standard <input type="checkbox"/> High<br>Comments<br><u>Metals include Se, Hg, As, Fe, Cd, Cr, Cu, Ni, Mn, Ag, Zn</u><br><u>2005 metal</u><br><u>EGP WW</u><br><br><u>108078</u> |                |   |                      |   |              |
|---|--------------------------|---|--------------|---|----------------|---|----------------------|---|--------------|
| Address: <u>25 Cheney Drive Concord NH 03301</u>  |                          | Phone: <u>228-4515</u> Fax: <u>228-4591</u>   |              |   |                |   |                      |   |              |
| Project Name: <u>Merrimack Station</u>  |                          | E-mail: <u>jsiska@eastlabs.com</u>  |              |   |                |   |                      |   |              |
| Report To: <u>Same</u>  |                          | Contract/PO:  |              |   |                |   |                      |   |              |
| Address:  |                          | Invoice To: <u>Same PO 27842</u>  |              |   |                |   |                      |   |              |
| Phone: Fax:   |                          | Address:  |              |   |                |   |                      |   |              |
| E-mail: <u>customerservice@eastlabs.com</u>   |                          | Phone: Fax:   |              |   |                |   |                      |   |              |
| E-mail: <u>customerservice@eastlabs.com</u>   |                          | E-mail: <u>customerservice@eastlabs.com</u>   |              |   |                |   |                      |   |              |
| No.   | Engraved Bottle ID       | Sample ID   | # of Bottles | Matrix  | Date & Time    | Sampled By  | Field Filtered (Y/N) | Field Preserved: HNO <sub>3</sub> , HCl, BCl, Other (%) | Total Metals |
| 1   | B-3621                   | Effluent field blank  | 1            | AQ  | 1/2/2012 11:00 | JS/AS   | -                    | -   |              |
| 2   |                          |   |              |   |                |   |                      |   |              |
| 3   | B-3625 B-3727 B-3723     | Final Effluent  | 3            | WW  | 2/2/2012 11:00 | JS/AS   | -                    | -   |              |
| 4   |                          |   |              |   |                |   |                      |   |              |
| 5   |                          |   |              |   |                |   |                      |   |              |
| 6   |                          |   |              |   |                |   |                      |   |              |
| 7   |                          |   |              |   |                |   |                      |   |              |
| 8   |                          |   |              |   |                |   |                      |   |              |
| 9   |                          |   |              |   |                |   |                      |   |              |
| 10  |                          |   |              |   |                |   |                      |   |              |
| 11  |                          |   |              |   |                |   |                      |   |              |
| 12  |                          |   |              |   |                |   |                      |   |              |
| For Laboratory Use Only   |                          | Matrix Codes:   |              | Renowned By:  |                | Received By:  |                      | Received By:  |              |
| COC Seal: <u>N/A</u>  | Comments: <u>710 350</u> | FW: Fresh Water<br>WW: Waste Water<br>SB: Sea and Brackish Water<br>SS: Soil and Sediment<br>TS: Plant and Animal Tissue<br>HC: Hydrocarbons<br>TR: Trap<br>OT: Other |              | Name: <u>Jim Blawieck</u>   |                | Name: <u>Deary Zink</u>   |                      | Name:   |              |
| Cooler Temp: <u>6.2°C</u>   |                          |   |              | Organization: <u>Eastern Analytical Inc</u>   |                | Organization: <u>EPA</u>  |                      | Organization:   |              |
| Carrier: <u>UPS</u>   |                          |   |              | Date & Time: <u>3/2/2012 13:50</u>  |                | Date & Time: <u>3/2/2012 13:50</u>  |                      | Date & Time:  |              |
| VTSR: <u>0851</u>   |                          |   |              | Tracking number: <u>1Z K40599 1S 9152 8312</u>  |                |   |                      |   |              |
| # of Coolers:   |                          |   |              |   |                |   |                      |   |              |
| Sample Disposal:<br><input type="checkbox"/> Return (shipping fees may apply)<br><input type="checkbox"/> Standard Disposal - 30 Days after report<br><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.<br>Customer Approval: <u>Liz Siska</u> Date: <u>3/2/12</u> |                      |   |              |

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*Liz Siska*

Liz Siska, Project Manager

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### CHAIN OF CUSTODY FORMS

FGS Work Order: 1203059 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: \_\_\_\_\_ FGS PM: Liz  
 Samples Arrived By: UPS Shipping Service Courier \_\_\_\_\_ Hand \_\_\_\_\_ Other (specify) \_\_\_\_\_  
 Tracking/Airbill Number(s): 1Z x46 597 B 952 8312

| Cooler Information                             | Yes                                 | No                                  | NA                                  | Comments |
|--|-------------------------------------|-------------------------------------|-------------------------------------|----------|
| The coolers do not appear to be tampered with: | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Custody seals are present and intact:          |                                     | <input checked="" type="checkbox"/> |                                     |          |
| Custody seals signed by:                       |                                     |                                     | <input checked="" 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 (°C)        | Cooler     | Temp (°C)        | Cooler     | Temp (°C)        |
|-----------|------------------|------------|------------------|------------|------------------|
| Cooler 1: | <u>13.2</u>      | Cooler 6:  | <del>_____</del> | Cooler 11: | <del>_____</del> |
| Cooler 2: | <del>_____</del> | Cooler 7:  | <del>_____</del> | Cooler 12: | <del>_____</del> |
| Cooler 3: | <del>_____</del> | Cooler 8:  | <del>_____</del> | Cooler 13: | <del>_____</del> |
| Cooler 4: | <del>_____</del> | Cooler 9:  | <del>_____</del> | Cooler 14: | <del>_____</del> |
| Cooler 5: | <del>_____</del> | Cooler 10: | <del>_____</del> | Cooler 15: | <del>_____</del> |

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"/> |                                     |                                     |          |
| Date and Time of Sample Collection: | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Sampled By:                         | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Preservation Type:                  |                                     |                                     | <input checked="" type="checkbox"/> |          |
| Requested Analyses:                 | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Required Signatures:                | <input checked="" type="checkbox"/> |                                     |                                     |          |
| Internal chain of custody required: |                                     | <input checked="" type="checkbox"/> |                                     |          |

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

Anomalies/Non-conformances:

\_\_\_\_\_  
 \_\_\_\_\_

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

Discussion/Resolution:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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*Liz Siska*

Liz Siska, Project Manager

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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<br>ng/L | Duplicate Concentration<br>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,<br>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/BSDI

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 |       |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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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Liz Siska, Project Manager

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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     |

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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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

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Liz Siska, Project Manager

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**BOLD FIELDS REQUIRED. PLEASE CIRCLE REQUESTED ANALYSIS.**

| SAMPLE I.D.   | SAMPLING DATE/TIME<br><small>*IF COMPOSITE, INDICATE BOTH START &amp; FINISH DATE/TIME</small> | MATRIX (SEE BELOW) | GRAB/*COMPOSITE | VOC  |                     |  |       | SVOC  |               | TCP | METALS |                     | INORGANICS |                    |                               | MICRO | OTHER | NOTES<br># of CONTAINERS<br>MEQH VAL. # |                           |  |
|---|--|--------------------|-----------------|--|---------------------|--|-------|-------|---------------|-----|--------|---------------------|------------|--------------------|-------------------------------|-------|-------|---|---------------------------|--|
|   |  |                    |                 | 524.2<br>524.2 BTEX<br>8260B<br>I, 4 DIOXANE | 624<br>VTICS<br>EDB | 8021B<br>BTEX<br>8015B GRO<br>MEGRO<br>8270D<br>625<br>ABN A<br>TPH800<br>LI<br>L2 | HALOS | MAVPH | SVTICS<br>PAH |     | MAEPH  | PCB 608<br>PCB 8082 | TPH 1664   | ABN METALS<br>HERB | DISSOLVED METALS (LIST BELOW) |       |       |   | TOTAL METALS (LIST BELOW) | Spec. Con.<br>F SO <sub>4</sub><br>NO <sub>2</sub> NO <sub>3</sub> |
| <b>Effluent Field Blank</b><br>8-3621   | 3/2/2012 11:00   | AG                 | G               |  |                     |  |       |       |               |     |        |                     |            |                    |                               |       |       |   |                           |  |
| <b>Final Effluent</b><br>8-3625<br>8-3722   | 3/2/2012 11:00   | MG                 | G               | X  |                     |  |       |       | X             |     |        | X                   | X          | X                  |                               | X     | X     | X                                       | 14                        | 1  |
| <b>MATRIX:</b> A-AIR; S-SOIL; GW-GROUND WATER; SW-SURFACE WATER; DW-DRINKING WATER; WW-WASTE WATER<br><b>PRESERVATIVE:</b> H-HCl; N-HNO <sub>3</sub> ; S-H <sub>2</sub> SO <sub>4</sub> ; Na-NaOH; K-MEON |  |                    |                 |  |                     |  |       |       |               |     |        |                     |            |                    |                               |       |       |   |                           |  |

**PROJECT MANAGER:** Paul Pehler  
**COMPANY:** GZA Geoscientists  
**ADDRESS:** 380 Harvey Rd  
**CITY:** Manchester **STATE:** NH **ZIP:** 03103  
**PHONE:** 232-8712 **EXT.:**  
**FAX:** 604-9463  
**E-MAIL:** Paul.Pehler@gza.com  
**SITE NAME:** Wastewater Analysis  
**PROJECT #:**  
**STATE:** NH MA ME VT OTHER:  
**REGULATORY PROGRAM:** NPDES; RGP POTW Stormwater OR GWP, Oil Field, Brownfield OR Other:  
**QUOTE #:** **PO #:**

**DATE NEEDED:**  
**QA/QC REPORTING LEVEL:** A B C  
**PRESUMPTIVE CERTAINTY:**  
**REPORTING OPTIONS:** PRELIMS: YES OR NO IF YES: FAX OR PDF  
**ELECTRONIC OPTIONS:** NO FAX E-MAIL PDF EQUIS  
**REINQUISHED BY:** DATE: TIME: RECEIVED BY:  
**RELINQUISHED BY:** DATE: TIME: RECEIVED BY:

SAMPLED In Black well Gregg Thompson  
 3/2/2012 13:50 by Mike Madala  
 RELINQUISHED BY: DATE: TIME: RECEIVED BY:

**METALS:** 8 RCR 13 PP 15, Mn, Pb, Cu, Se, Hg, As, Fe, Cd, Cr, Cu, Ni,  
**OTHER METALS:** Mo, Ag, Zn  
**DISCOURAGED METALS FIELD FILTERED?** YES NO  
**NOTES:** (E: SPECIAL DETECTION LIMITS, BILLING INFO, IF DIFFERENT)  
 Subcontract Metals to FCS.  
 Provide project specific MSD for metals.  
 \* AT Customers Request, Add Lead to this Report.  
**SITE HISTORY:** Pa-21912  
**SUSPECTED CONTAMINATION:** Pa-21912  
**FIELD READINGS:**



**VIA EMAIL**

April 27, 2012  
File No. 04.0029307.00



Mr. Bruce Kudrick  
Superintendent, Hooksett Sewer Commission  
Town of Hooksett  
1 Egawes Drive  
Hooksett, New Hampshire 03106

Re: Analytical Data Report  
Treated Wastewater  
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 Bruce:

On behalf of Public Service of New Hampshire (PSNH), GZA GeoEnvironmental, Inc. is pleased to submit the attached **Analytical Data Report** for sampling conducted on January 5, 2012, previously submitted on January 16, 2012. In anticipation of extremely low metals concentrations, the previous analysis was performed by Environmental Protection Agency (EPA) Method 1638 which was specifically developed by EPA to enable metals detection by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS) at extremely low concentrations in ambient water when used in conjunction with sampling Method 1669: Sampling Ambient Water for Determination of Trace Metals at EPA Water Quality Criteria Levels.

Total metals were reanalyzed using Method 200.8MOD within the sample hold time, in accordance with Waste Disposal Agreement No. WDA-001, requiring that any sampling, preservation, handling, and analytical methods conform to 40 CFR 136. This method is specified in the United States EPA draft Standard Operating Procedure (SOP) for trace metals analysis of flue gas desulfurization (FGD) wastewater. The SOP is discussed 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 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 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 SOP. For further information, see:

Standard Operating Procedure: 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](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 FDG 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 that reads 'Ronald A. Breton'.

Ronald A. Breton, P.E.  
Principal

A handwritten signature in black ink that reads 'Michael P. North'.

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

RAB/MPN:tmd

\\GZAMANN\Jobs\04\Jobs\0029300\04.0029307.00\Work\SAMPLING AND REPORTING\REPORTS\Hooks\set\final 04.0029307.00 Hook 010512 rerun 042712.docx

Attachment: Analytical Data Report

**ANALYTICAL DATA REPORT**



# eastern analytical

*professional laboratory services*

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



Subject: Laboratory Report

Eastern Analytical, Inc. ID: 107555  
Client Identification: Merrimack Station  
Date Received: 1/5/2012

Dear Mr. Pepler :

Enclosed please find the report of analysis for the above identified project.  
As discussed, analyses were subcontracted and are listed as follows:

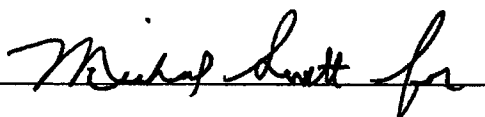
Analysis: Subcontract - Metals Method 200.8  
(Al, Sb, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Mn, Mo, Na, Ni, Ag, Tl, Zn, As, Se & Hg)

Subcontractor Lab: Frontier Global Sciences, Inc

A complete copy of the report is attached. This report may not be reproduced except in full,  
without the written approval of the laboratory.

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

Sincerely,

  
Lorraine Olashaw, Lab Director

4/25/12  
Date

29  
# of pages (excluding cover letter)

**REVISED**  
Pg 4/25/12



# SAMPLE CONDITIONS PAGE

EAI ID#: 107555

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

Client Designation: **Merrimack Station**

**Temperature upon receipt (°C): 4.7**

**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) |
|-----------|--------------------------|---------------|--------------|---------------|--------------|---|
| 107555.01 | Treat Tank Eff Composite | 1/5/12        | 1/5/12       | aqueous       |              | Adheres to Sample Acceptance Policy                   |
| 107555.02 | Treat Tank Eff Grab      | 1/5/12        | 1/5/12       | 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*



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

25 April 2012

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

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



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

| Sample ID                | Lab ID     | Matrix | Date Sampled    | Date Received   |
|--------------------------|------------|--------|-----------------|-----------------|
| Treat Tank Eff Composite | 1201073-01 | Water  | 05-Jan-12 10:00 | 06-Jan-12 09:50 |
| Treat Tank Eff Grab      | 1201073-02 | Water  | 05-Jan-12 08:00 | 06-Jan-12 09:50 |

Frontier Global Sciences, Inc.

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Liz Siska, Project Manager

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04/25/2012



## CASE NARRATIVE

Revised Report 4/25/12:

Per client request Boron was removed from report.

Revised Report 3/28/12:

Per client request samples were prepared and analyzed for total metals in accordance with EPA 200.8 (modified).

### SAMPLE RECEIPT

Samples were received at Frontier Global Sciences (FGS) on January 6th, 2012. The samples were received intact, on-ice with temperatures measured at 3.4 degrees Celsius.

### SAMPLE PREPARATION AND ANALYSIS

Samples were prepared and analyzed for total metals in accordance with FGS-054/EPA 1638.

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

### ANALYTICAL AND QUALITY CONTROL ISSUES

There were no analytical difficulties experienced with analysis of these samples with the exceptions flagged in the report.

Frontier Global Sciences, Inc.

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

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Liz Siska, Project Manager

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### CHAIN OF CUSTODY FORMS

1201073

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

414 Fourth Ave. N. Seattle WA 98109  
 Phone: 206-622-6968  
 Fax: 206-622-6970  
 Email: info@frontiersci.com  
 http://www.frontiersci.com



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1201073

|   |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
|---|--------------------|---------------------------------|--|------------------------------|---------------------------------|---------------------------------------|---|---|---|--|
| Client: <u>Alloya Barum</u>             |                    | Contract: <u>1201073</u>        |  | Project Name: <u>1201073</u> |                                 | Report Requested: <u>As Requested</u> |   | FCS PPL Lead Date: <u>04/25/12</u>  |   |  |
| Address: <u>1201073</u>                 |                    | City: <u>Seattle</u>            |  | State: <u>WA</u>             |                                 | Country: <u>USA</u>                   |   | TAT (business days): <u>20</u> (Std)  |   |  |
| Project Name: <u>1201073</u>            |                    | Contract ID: <u>1201073</u>     |  | Sample ID: <u>1201073</u>    |                                 | TAT (business days): <u>24</u> hrs.   |   | SAT (business days): <u>24</u> hrs.   |   |  |
| Report To: <u>Alloya Barum</u>          |                    | Invoice To: <u>Alloya Barum</u> |  | Contact: <u>Alloya Barum</u> |                                 | TAT (business days): <u>24</u> hrs.   |   | SAT (business days): <u>24</u> hrs.   |   |  |
| Address: <u>1201073</u>                 |                    | Address: <u>1201073</u>         |  | City: <u>Seattle</u>         |                                 | State: <u>WA</u>                      |   | Country: <u>USA</u>   |   |  |
| Phone: <u>1201073</u>                   |                    | Phone: <u>1201073</u>           |  | Fax: <u>1201073</u>          |                                 | Fax: <u>1201073</u>                   |   | Fax: <u>1201073</u>   |   |  |
| E-mail: <u>1201073</u>                  |                    | E-mail: <u>1201073</u>          |  | E-mail: <u>1201073</u>       |                                 | E-mail: <u>1201073</u>                |   | E-mail: <u>1201073</u>  |   |  |
| No.                                     | Engraved Bottle ID | Sample ID                       | # of Bottles   | Notes                        | Date & Time                     | Sampled By                            | Field Parameters: <u>PH, DO, EC, TSS, NH4, NO2, NO3, H2S, CO2</u> | Lab. Methods: <u>GC/MS, ICP-MS, HPLC, TOC, BOD, COD, TSS, NH4, NO2, NO3, H2S, CO2</u> | Standard Methods: <u>1631, 1631A, 1631B, 1631C, 1631D, 1631E, 1631F, 1631G, 1631H, 1631I, 1631J, 1631K, 1631L, 1631M, 1631N, 1631O, 1631P, 1631Q, 1631R, 1631S, 1631T, 1631U, 1631V, 1631W, 1631X, 1631Y, 1631Z</u> |  |
| 1                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 2                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 3                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 4                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 5                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 6                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 7                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 8                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 9                                       |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 10                                      |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 11                                      |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 12                                      |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| 13                                      |                    |                                 |  |                              |                                 |                                       |   |   |   |  |
| For Laboratory Use Only                 |                    |                                 | FCS Code:  |                              | Received By:                    |                                       | Received By:  |   | Received By:  |  |
| BGC Seal ID: <u>1201073</u>             |                    |                                 | Comments: <u>1201073</u>   |                              | Name: <u>Alloya Barum</u>       |                                       | Name: <u>Alloya Barum</u>   |   | Name: <u>Alloya Barum</u>   |  |
| Cooler Temp: <u>1201073</u>             |                    |                                 | Date & Time: <u>1201073</u>  |                              | Date & Time: <u>1201073</u>     |                                       | Date & Time: <u>1201073</u>                                       |   | Date & Time: <u>1201073</u>   |  |
| Organism: <u>1201073</u>                |                    |                                 | Organism: <u>1201073</u>   |                              | Organism: <u>1201073</u>        |                                       | Organism: <u>1201073</u>  |   | Organism: <u>1201073</u>  |  |
| # of Coolers: <u>1201073</u>            |                    |                                 | Tracking Number: <u>1201073</u>  |                              | Tracking Number: <u>1201073</u> |                                       | Tracking Number: <u>1201073</u>                                   |   | Tracking Number: <u>1201073</u>   |  |
| Client's Signature: <u>Alloya Barum</u> |                    |                                 | By signing, you declare that you agree with FCS' terms and conditions, and that you authorize FCS to perform the specified analyses. |                              | Signature: <u>Alloya Barum</u>  |                                       | Signature: <u>Alloya Barum</u>                                    |   | Signature: <u>Alloya Barum</u>  |  |

Received by: Alloya Barum, FG-5, 1-6-12, 11:07

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*Liz Siska*

Liz Siska, Project Manager



## ANALYTICAL RESULTS

### Treat Tank Eff Composite

Matrix: Water

Laboratory ID: 1201073-01

| Analyte    | Result  | MDL   | MRL    | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes |
|------------|---------|-------|--------|-------|----------|---------|----------|----------|---------------|-------|
| Aluminum   | ND      | 8.9   | 80.0   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Antimony   | 0.408   | 0.092 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Barium     | 240     | 0.54  | 4.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Beryllium  | ND      | 0.454 | 1.20   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Cadmium    | ND      | 0.083 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Calcium    | 5010000 | 16200 | 200000 | µg/L  | 5000     | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Chromium   | ND      | 0.18  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Copper     | ND      | 0.20  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Iron       | ND      | 26.0  | 200    | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Lead       | ND      | 0.078 | 0.800  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Manganese  | 280     | 0.15  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Molybdenum | 134     | 0.12  | 1.20   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Nickel     | 9.79    | 0.16  | 2.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Silver     | ND      | 0.120 | 0.400  | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |
| Sodium     | 259000  | 23    | 400    | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |       |
| Thallium   | 5.56    | 0.250 | 1.00   | µg/L  | 100      | F203314 | 2C25005  | 03/25/12 | EPA 200.8 Mod |       |
| Zinc       | ND      | 0.33  | 4.00   | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod | U     |

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## ANALYTICAL RESULTS

### Treat Tank Eff Grab

Matrix: Water

Laboratory ID: 1201073-02

| Analyte  | Result | MDL  | MRL  | Units | Dilution | Batch   | Sequence | Analyzed | Method        | Notes   |
|----------|--------|------|------|-------|----------|---------|----------|----------|---------------|---------|
| Arsenic  | 8.51   | 1.02 | 3.00 | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |         |
| Mercury  | 10.5   | 0.34 | 2.02 | ng/L  | 4        | F201063 | 2A09010  | 01/09/12 | EPA 1631E     | FB-1631 |
| Selenium | 68.9   | 3.88 | 12.0 | µg/L  | 20       | F203271 | 2C22005  | 03/22/12 | EPA 200.8 Mod |         |

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### MATRIX DUPLICATES/TRIPPLICATES

SOURCE: 1201073-02

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-DUP1

| Analyte | Sample Concentration<br>ng/L | Duplicate Concentration<br>ng/L | MRL  | % RPD | RPD Limit | Method    | Notes |
|---------|------------------------------|---------------------------------|------|-------|-----------|-----------|-------|
| Mercury | 10.48                        | 10.54                           | 2.02 | 0.617 | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD1

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 10.48                       | 20.400             | 31.36                   | 102           | 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             | 27.08                    | 81.4           | 14.7  | 71 - 125        | 24        | EPA 1631E |       |

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Liz Siska, Project Manager



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

**SOURCE: 1112278-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD2

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 7.61                        | 20.400             | 27.86                   | 99.2          | 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             | 28.37                    | 102            | 1.82  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201029-01**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD3

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.34                        | 10.200             | 15.58                   | 100           | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.07                    | 85.6           | 10.2  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201030-02**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-MS/MSD4

| Analyte | Sample Concentration (ng/L) | Spike Added (ng/L) | MS Concentration (ng/L) | MS % Recovery | Recovery Limits | Method    | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|-----------|-------|
| Mercury | 5.54                        | 10.200             | 14.82                   | 91.0          | 71 - 125        | EPA 1631E |       |

| Analyte | Spike Added (ng/L) | MSD Concentration (ng/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|-----------|-------|
| Mercury | 10.200             | 14.61                    | 89.0           | 1.40  | 71 - 125        | 24        | EPA 1631E |       |

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

**SOURCE: 1201073-01RE3**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD1

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Calcium | 5013000                     | 1515.0             | 4802000                 | -13900        | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Calcium | 1515.0             | 4943000                  | -4600          | 2.89  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |

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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD2

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | 0.507                       | 2.0200             | 2.442                   | 95.8          | 70 - 130        | EPA 200.8 Mod |       |
| Sodium     | 258800                      | 505.00             | 257700                  | -213          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Aluminum   | 52.9                        | 151.50             | 202.3                   | 98.6          | 70 - 130        | EPA 200.8 Mod |       |
| Chromium   | 0.57                        | 7.0700             | 8.04                    | 106           | 70 - 130        | EPA 200.8 Mod |       |
| Manganese  | 280.5                       | 6.0600             | 283.4                   | 47.6          | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Iron       | ND                          | 505.00             | 520.0                   | 103           | 70 - 130        | EPA 200.8 Mod |       |
| Nickel     | 9.79                        | 4.0400             | 14.11                   | 107           | 70 - 130        | EPA 200.8 Mod |       |
| Copper     | 0.55                        | 4.0400             | 4.34                    | 93.9          | 70 - 130        | EPA 200.8 Mod |       |
| Zinc       | 0.40                        | 10.100             | 8.42                    | 79.4          | 70 - 130        | EPA 200.8 Mod |       |
| Arsenic    | 10.30                       | 15.150             | 24.18                   | 91.6          | 70 - 130        | EPA 200.8 Mod |       |
| Selenium   | 63.40                       | 30.300             | 89.73                   | 86.9          | 70 - 130        | EPA 200.8 Mod |       |
| Molybdenum | 133.8                       | 2.0200             | 136.7                   | 142           | 70 - 130        | EPA 200.8 Mod | QM-02 |
| Silver     | ND                          | 1.5150             | 1.388                   | 91.6          | 70 - 130        | EPA 200.8 Mod |       |
| Cadmium    | 0.332                       | 0.80800            | 1.105                   | 95.6          | 70 - 130        | EPA 200.8 Mod |       |
| Antimony   | 0.408                       | 0.80800            | 1.259                   | 105           | 70 - 130        | EPA 200.8 Mod |       |
| Barium     | 239.7                       | 10.100             | 249.5                   | 96.8          | 70 - 130        | EPA 200.8 Mod |       |
| Lead       | ND                          | 1.5150             | 1.542                   | 102           | 70 - 130        | EPA 200.8 Mod |       |

| Analyte    | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 2.0200             | 2.561                    | 102            | 4.74   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Sodium     | 505.00             | 257100                   | -336           | 0.243  | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |
| Aluminum   | 151.50             | 203.4                    | 99.3           | 0.564  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Chromium   | 7.0700             | 7.73                     | 101            | 3.85   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Manganese  | 6.0600             | 285.2                    | 76.9           | 0.625  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Iron       | 505.00             | 518.7                    | 103            | 0.242  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Nickel     | 4.0400             | 13.81                    | 99.5           | 2.13   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Copper     | 4.0400             | 4.19                     | 90.2           | 3.47   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.100             | 9.16                     | 86.8           | 8.49   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Arsenic    | 15.150             | 22.25                    | 78.9           | 8.31   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.300             | 94.00                    | 101            | 4.64   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Molybdenum | 2.0200             | 136.6                    | 137            | 0.0771 | 70 - 130        | 20        | EPA 200.8 Mod | QM-02 |

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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD2

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Silver   | 1.5150             | 1.387                    | 91.5           | 0.0874 | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Cadmium  | 0.80800            | 1.061                    | 90.2           | 4.03   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Antimony | 0.80800            | 1.274                    | 107            | 1.21   | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Barium   | 10.100             | 251.4                    | 116            | 0.781  | 70 - 130        | 20        | EPA 200.8 Mod |       |
| Lead     | 1.5150             | 1.534                    | 101            | 0.525  | 70 - 130        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**SOURCE: 1201073-01RE3**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD3

| Analyte | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|---------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Calcium | 5013000                     | 10100000           | 15120000                | 100           | 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 |
|---------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Calcium | 10100000           | 16140000                 | 110            | 6.53  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**SOURCE: 1201073-01RE4**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD4

| Analyte    | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|------------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Beryllium  | 0.507                       | 20.200             | 20.41                   | 98.5          | 70 - 130        | EPA 200.8 Mod | AS    |
| Sodium     | 258800                      | 40400              | 292900                  | 84.5          | 70 - 130        | EPA 200.8 Mod | AS    |
| Aluminum   | 52.9                        | 4040.0             | 3956                    | 96.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Chromium   | 0.57                        | 404.00             | 430.1                   | 106           | 70 - 130        | EPA 200.8 Mod | AS    |
| Manganese  | 280.5                       | 404.00             | 704.2                   | 105           | 70 - 130        | EPA 200.8 Mod | AS    |
| Iron       | ND                          | 2020.0             | 2121                    | 105           | 70 - 130        | EPA 200.8 Mod | AS    |
| Nickel     | 9.79                        | 505.00             | 511.2                   | 99.3          | 70 - 130        | EPA 200.8 Mod | AS    |
| Copper     | 0.55                        | 505.00             | 475.4                   | 94.0          | 70 - 130        | EPA 200.8 Mod | AS    |
| Zinc       | 0.40                        | 1010.0             | 907.4                   | 89.8          | 70 - 130        | EPA 200.8 Mod | AS    |
| Arsenic    | 10.30                       | 404.00             | 431.7                   | 104           | 70 - 130        | EPA 200.8 Mod | AS    |
| Selenium   | 63.40                       | 404.00             | 468.8                   | 100           | 70 - 130        | EPA 200.8 Mod | AS    |
| Molybdenum | 133.8                       | 202.00             | 338.1                   | 101           | 70 - 130        | EPA 200.8 Mod | AS    |
| Silver     | ND                          | 20.200             | 18.50                   | 91.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Cadmium    | 0.332                       | 40.400             | 39.37                   | 96.6          | 70 - 130        | EPA 200.8 Mod | AS    |
| Antimony   | 0.408                       | 20.200             | 20.91                   | 102           | 70 - 130        | EPA 200.8 Mod | AS    |
| Barium     | 239.7                       | 808.00             | 1056                    | 101           | 70 - 130        | EPA 200.8 Mod | AS    |
| Lead       | ND                          | 101.00             | 99.32                   | 98.3          | 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 |
|------------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Beryllium  | 20.200             | 20.07                    | 96.8           | 1.71   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Sodium     | 40400              | 292600                   | 83.7           | 0.114  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Aluminum   | 4040.0             | 3954                     | 96.6           | 0.0362 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Chromium   | 404.00             | 428.7                    | 106            | 0.337  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Manganese  | 404.00             | 694.4                    | 102            | 1.40   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Iron       | 2020.0             | 2077                     | 103            | 2.11   | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Nickel     | 505.00             | 512.6                    | 99.6           | 0.276  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Copper     | 505.00             | 470.7                    | 93.1           | 0.997  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Zinc       | 1010.0             | 905.9                    | 89.6           | 0.166  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Arsenic    | 404.00             | 429.9                    | 104            | 0.419  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Selenium   | 404.00             | 468.2                    | 100            | 0.141  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Molybdenum | 202.00             | 336.5                    | 100            | 0.473  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager



### MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY AND RPD

SOURCE: 1201073-01RE4

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-MS/MSD4

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Silver   | 20.200             | 18.95                    | 93.8           | 2.42  | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Cadmium  | 40.400             | 39.33                    | 96.5           | 0.104 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Antimony | 20.200             | 21.07                    | 102            | 0.736 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Barium   | 808.00             | 1058                     | 101            | 0.205 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |
| Lead     | 101.00             | 98.77                    | 97.8           | 0.549 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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

**SOURCE: 1201073-01RE6**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-MS/MSD2

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Thallium | 5.563                       | 0.40400            | 5.875                   | 77.3          | 70 - 130        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | MSD Concentration (µg/L) | MSD % Recovery | % RPD  | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|--------------------------|----------------|--------|-----------------|-----------|---------------|-------|
| Thallium | 0.40400            | 5.880                    | 78.5           | 0.0859 | 70 - 130        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**SOURCE: 1201073-01RE6**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-MS/MSD4

| Analyte  | Sample Concentration (µg/L) | Spike Added (µg/L) | MS Concentration (µg/L) | MS % Recovery | Recovery Limits | Method        | Notes |
|----------|-----------------------------|--------------------|-------------------------|---------------|-----------------|---------------|-------|
| Thallium | 5.563                       | 101.00             | 103.3                   | 96.8          | 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 |
|----------|--------------------|--------------------------|----------------|-------|-----------------|-----------|---------------|-------|
| Thallium | 101.00             | 103.7                    | 97.1           | 0.341 | 70 - 130        | 20        | EPA 200.8 Mod | AS    |

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Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F201063

Sequence: 2A09010

Preparation: BrCl Oxidation

Lab Number: F201063-BS/BSD1

LCS Source: Nist 1641d

| Analyte | Spike Added (ng/L) | LCS Concentration (ng/L) | LCS % Recovery | Recovery Limits | Method    | Notes |
|---------|--------------------|--------------------------|----------------|-----------------|-----------|-------|
| Mercury | 15.679             | 15.50                    | 98.8           | 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             | 15.95                     | 102             | 2.89  | 80 - 120        | 24        | EPA 1631E |       |

Frontier Global Sciences, Inc:

Liz Siska, Project Manager

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

**RECOVERY AND RPD**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-BS/BS1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|------------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Beryllium  | 2.0000             | 1.930                    | 96.5           | 85 - 115        | EPA 200.8 Mod |       |
| Sodium     | 500.00             | 499                      | 99.8           | 85 - 115        | EPA 200.8 Mod |       |
| Aluminum   | 150.00             | 146.0                    | 97.3           | 85 - 115        | EPA 200.8 Mod |       |
| Calcium    | 1500.0             | 1528                     | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Chromium   | 7.0000             | 6.57                     | 93.9           | 85 - 115        | EPA 200.8 Mod |       |
| Manganese  | 6.0000             | 5.86                     | 97.6           | 85 - 115        | EPA 200.8 Mod |       |
| Iron       | 500.00             | 475.3                    | 95.1           | 85 - 115        | EPA 200.8 Mod |       |
| Nickel     | 4.0000             | 4.01                     | 100            | 85 - 115        | EPA 200.8 Mod |       |
| Copper     | 4.0000             | 4.18                     | 105            | 85 - 115        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.33                    | 103            | 85 - 115        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.37                    | 95.8           | 85 - 115        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 29.66                    | 98.9           | 85 - 115        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.81                     | 90.5           | 85 - 115        | EPA 200.8 Mod |       |
| Silver     | 1.5000             | 1.517                    | 101            | 85 - 115        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.781                    | 97.6           | 85 - 115        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.815                    | 102            | 85 - 115        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.69                     | 96.9           | 85 - 115        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.597                    | 106            | 85 - 115        | EPA 200.8 Mod |       |

| Analyte   | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|-----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Beryllium | 2.0000             | 1.949                     | 97.4            | 0.955 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Sodium    | 500.00             | 500                       | 100             | 0.216 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Aluminum  | 150.00             | 148.5                     | 99.0            | 1.71  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Calcium   | 1500.0             | 1544                      | 103             | 1.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Chromium  | 7.0000             | 6.67                      | 95.3            | 1.48  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Manganese | 6.0000             | 5.96                      | 99.4            | 1.75  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Iron      | 500.00             | 485.2                     | 97.0            | 2.06  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Nickel    | 4.0000             | 4.02                      | 101             | 0.246 | 85 - 115        | 20        | EPA 200.8 Mod |       |

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Liz Siska, Project Manager



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

**RECOVERY AND RPD**

Batch: F203271

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203271-BS/BSD1

LCS Source: Blank Spike

| Analyte    | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|------------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Copper     | 4.0000             | 4.28                      | 107             | 2.24  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Zinc       | 10.000             | 10.39                     | 104             | 0.570 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Arsenic    | 15.000             | 14.52                     | 96.8            | 0.977 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Selenium   | 30.000             | 30.15                     | 101             | 1.66  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Molybdenum | 2.0000             | 1.82                      | 91.0            | 0.564 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Silver     | 1.5000             | 1.502                     | 100             | 1.03  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Cadmium    | 0.80000            | 0.828                     | 103             | 5.85  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Antimony   | 0.80000            | 0.808                     | 101             | 0.848 | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Barium     | 10.000             | 9.86                      | 98.6            | 1.77  | 85 - 115        | 20        | EPA 200.8 Mod |       |
| Lead       | 1.5000             | 1.620                     | 108             | 1.42  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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

**RECOVERY AND RPD**

Batch: F203314

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

Lab Number: F203314-BS/BSD1

LCS Source: Blank Spike

| Analyte  | Spike Added (µg/L) | LCS Concentration (µg/L) | LCS % Recovery | Recovery Limits | Method        | Notes |
|----------|--------------------|--------------------------|----------------|-----------------|---------------|-------|
| Thallium | 0.40000            | 0.396                    | 98.9           | 85 - 115        | EPA 200.8 Mod |       |

| Analyte  | Spike Added (µg/L) | LCSD Concentration (µg/L) | LCSD % Recovery | % RPD | Recovery Limits | RPD Limit | Method        | Notes |
|----------|--------------------|---------------------------|-----------------|-------|-----------------|-----------|---------------|-------|
| Thallium | 0.40000            | 0.391                     | 97.8            | 1.12  | 85 - 115        | 20        | EPA 200.8 Mod |       |

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### PREPARATION BLANKS

Instrument: Hg-17

Sequence: 2A09010

Preparation: BrCl Oxidation

| Lab Sample ID | Analyte | Found  | MRL  | Units | Batch   | Method    | Notes    |
|---------------|---------|--------|------|-------|---------|-----------|----------|
| F201063-BLK1  | Mercury | -0.009 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK2  | Mercury | -0.006 | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK3  | Mercury | -0.02  | 0.50 | ng/L  | F201063 | EPA 1631E | U        |
| F201063-BLK4  | Mercury | 0.03   | 0.50 | ng/L  | F201063 | EPA 1631E | U, QB-04 |
| F201063-BLK5  | Mercury | 0.11   | 0.52 | ng/L  | F201063 | EPA 1631E | U, QB-06 |

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### PREPARATION BLANKS

Instrument: ICPMS-6

Sequence: 2C22005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte    | Found   | MRL   | Units | Batch   | Method        | Notes |
|---------------|------------|---------|-------|-------|---------|---------------|-------|
| F203271-BLK1  | Beryllium  | 0.00008 | 0.060 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Sodium     | 2       | 20    | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Aluminum   | -0.04   | 4.0   | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Calcium    | 1       | 40    | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Chromium   | -0.02   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Manganese  | 0.01    | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Iron       | -0.02   | 10.0  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Nickel     | 0.004   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Copper     | 0.003   | 0.10  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Zinc       | 0.007   | 0.20  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Arsenic    | -0.06   | 0.15  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Selenium   | -0.02   | 0.60  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Molybdenum | 0.01    | 0.06  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Silver     | -0.0005 | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Cadmium    | 0.004   | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Antimony   | 0.002   | 0.020 | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Barium     | 0.01    | 0.20  | µg/L  | F203271 | EPA 200.8 Moc | U     |
| F203271-BLK1  | Lead       | 0.010   | 0.040 | µg/L  | F203271 | EPA 200.8 Moc | U     |

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Liz Siska, Project Manager

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

### PREPARATION BLANKS

Instrument: ICPMS-3

Sequence: 2C25005

Preparation: Closed Vessel Nitric Oven Digestion

| Lab Sample ID | Analyte  | Found  | MRL   | Units | Batch   | Method        | Notes |
|---------------|----------|--------|-------|-------|---------|---------------|-------|
| F203314-BLK1  | Thallium | 0.0007 | 0.010 | µg/L  | F203314 | EPA 200.8 Moc | U     |

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Liz Siska, Project Manager

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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-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.
- 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

Frontier Global Sciences, Inc.

Liz Siska, Project Manager

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- 1) Please provide the following information with regard to the offsite disposal of FGD WWTS effluent from Merrimack Station:**
  - (c) Please also provide copies of any notices or notifications that PSNH may have filed with either EPA or the New Hampshire Department of Environmental Services (NH DES) concerning the offsite disposal of FGD WWTS effluent.**

1(c) PSNH is providing both the Indirect Discharge Request Applications and the approvals from the State received by PSNH for (1) the Winnepesaukee River Basin Program/Franklin Wastewater Treatment Plant and (2) the municipalities of Allenstown, Concord, Hooksett, and Manchester. In addition, although not specifically requested, PSNH is providing the applications to various POTWs, several of which include MSDS, and process schematics, which are in turn responsive to Question 3. In addition, PSNH has included the NHDES Fact Sheet (the Antidegradation Analysis of the Merrimack River in the vicinity of Merrimack Station) submitted to EPA by NHDES on October 4, 2010, which demonstrates the State's full knowledge and oversight of the FGD WWTS process.





**Public Service  
of New Hampshire**

The Northeast Utilities System

May 11, 2011

Mr. George Carlson, P.E.  
Supervisor, Industrial Pretreatment Program  
N.H. Department of Environmental Services  
Water Division  
29 Hazen Drive, P.O. Box 95  
Concord, New Hampshire 03301-0095

Re: NHDES Industrial Wastewater Indirect Discharge Request Application  
Public Service of New Hampshire (PSNH)

Dear Mr. Carlson:

Based on your recent meeting with Allan Palmer (PSNH) and Ron Breton (GZA GeoEnvironmental, Inc. [GZA]), our consulting engineer, PSNH is requesting that four separate municipalities (Allentown, Concord, Hooksett, and Manchester) consider our request to accept treated wastewater from our wet flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the State and local approvals and issuance of permits, it is our intention to transport treated wastewater by tanker truck from our power station in Bow to discharge points as designated by the individual municipalities.

As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are including post-treatment systems that can be used to reduce the volume of the treated wastestream from roughly 100,000 gallons per day (gpd) to as small a volume as 5,000 gpd. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with each treatment system. While our goal is to gain approval to discharge all the wastewater we generate at all four municipal facilities, we recognize that there may be restrictions at certain facilities and that only a portion of the total discharge may be accepted. This scenario has been considered in our overall wastewater management strategy.

This application has been provided to the Town of Hooksett and we have also prepared and submitted local permit applications directly to the wastewater treatment facilities of Allentown, Concord, and Manchester. Please find attached GZA GeoEnvironmental Check No. 220959 in the amount of \$1,000.00 to cover the cost of design review.

During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We trust that this submittal adequately addresses your informational needs. Should you have any questions, please contact Ron Breton at 232-8744 or me at 224-4081.

Sincerely,

Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

Attachment(s)

IDR-11-016

PSNH Energy Park  
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, NH 03105-0330  
(603) 669-4000  
[www.psnh.com](http://www.psnh.com)

The Northeast Utilities System

RECEIVED  
MAY 12 2011  
DES-WEB



NH DES WATER DIVISION  
 29 Hazen Drive - PO Box 95  
 CONCORD, NEW HAMPSHIRE 03302-0095  
 (603)271-3908 FAX (603)271-4128

IDR 11-016



**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION**

**PART I. MUNICIPAL**

The Town/City of Manchester, Hooksett, Concord, and Allenstown proposes:

To discharge to its publicly owned treatment works the industrial flow from:

Applicant PSNH  
 (Name of Indirect Discharger)

New Discharge or Modified Discharge

RECEIVED  
 MAY 12 2011  
 DES-WEB

Flow: Average Process Wastewater Volume (gallons/day):

|                           |         |
|---------------------------|---------|
| Previous Permitted Total: | 0       |
| This Request:             | 100,000 |
| TOTAL:                    | 100,000 |

**CERTIFICATION:**

"This proposal meets with the approval of all local authorities having jurisdiction over the request."

Name \_\_\_\_\_ Title \_\_\_\_\_  
 (Print or Type)

Signature: \_\_\_\_\_ Date \_\_\_\_\_  
 (Authorized Municipal Official)

Notes:

- ✧ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ✧ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ✧ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit

\* This value is the average daily process flow requested by the Applicant on Page 2



**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION**

**PART II. APPLICANT**

**(a) DISCHARGER NAME & ADDRESS**

|                  |   |
|------------------|---|
| Name:            | PSNH                                    |
| Street Address:  | 97 River Road, Bow, New Hampshire 03304 |
| Mailing Address: |   |

**(b) RESPONSIBLE OFFICIAL**

|                 |                 |
|-----------------|-----------------|
| Official - Name | Harold Keyes    |
| Position:       | Station Manager |
| Phone #:        | 603-224-4081    |
| Contact - Name: | Allan Palmer    |
| Position:       | Senior Engineer |
| Phone #:        | (603) 634-2439  |

**(c) INDUSTRY TYPE**

|                           |                        |                 |      |
|---------------------------|------------------------|-----------------|------|
| Product(s) / Description: | Electricity Generation |                 |      |
| NAICS Code # (s):         | 221112                 | SIC Code # (s): | 4911 |

**(d) SIU or CATEGORICAL STANDARDS     Yes     No**

|  |             |          |
|--|-------------|----------|
| CIU-Category(s) Name:                    | 40CFR Part: | Subpart: |
| Steam Electric Power Generating Category | 423.16      |          |
| SIU Description:                         |             |          |

**(e) FLOW INFORMATION:**

|                               |                            |                 |              |
|-------------------------------|----------------------------|-----------------|--------------|
| This IDR- Ave. Process (gpd): | # of Connections to sewer: | # of Employees: | # of Shifts: |
| ** 100,000                    | N/A                        | 115             | 2 per day    |

| FLOW SUMMARY              | Source   | Average (gpd) | Maximum (gpd) | Time/Duration |
|---------------------------|----------|---------------|---------------|---------------|
| Previous                  | Sanitary | 0             | 0             |               |
|                           | Process  | 0             | 0             |               |
|                           | TOTAL    | 0             | 0             |               |
| <u>Change - This IDR:</u> | Sanitary | 0             | 0             |               |
|                           | Process  | * 100,000     | 100,000       | Batch         |
|                           | TOTAL    | 100,000       | 100,000       | Batch         |
| TOTAL :                   | Sanitary | 0             | 0             | 0             |
|                           | Process  | 100,000       | 100,000       | Batch         |
|                           | TOTAL    | 100,000       | 100,000       | Batch         |

\* This value to match the value of "This Request" on Page 1

\* No pretreatment standards listed for this particular process wastestream.

NOTE: The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year and generate up to 100,000 gpd on a continuous basis. However, volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system. The wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION**

(g) ENGINEER FOR TREATMENT SYSTEM PLANS & SPECS [§ 1,000 Review Fee]

|           |                            |
|-----------|----------------------------|
| Engineer: | Ronald A. Breton, P.E.     |
| Company:  | GZA GeoEnvironmental, Inc. |
| NH P.E. # | 5956                       |

**ATTACHMENTS Check List**

|   | Attached                            | Remarks/Explanation             |
|---|-------------------------------------|---------------------------------|
| (f) TREATMENT PROCESS SCHEMATIC               | <input checked="" type="checkbox"/> | See Figure 2                    |
| (g) PLANS, SPECS, O&M PROCEDURES              | <input checked="" type="checkbox"/> | See Attachment 1                |
| (h) PRODUCTION PROCESS DIAGRAM                | <input checked="" type="checkbox"/> | See Drawing Number 3977-3-001-B |
| (i) WASTE STREAM POLLUTANTS LIST              | <input checked="" type="checkbox"/> | See Table 1                     |
| (j) TOXICITY/TREATABILITY INFO.               | <input checked="" type="checkbox"/> | See Attachment 2                |
| (k) LOCATION MAP                              | <input checked="" type="checkbox"/> | See Figure 1                    |
| (l) CHEMICAL LIST                             | <input checked="" type="checkbox"/> | See Table 2                     |
| (m) SAMPLING LOCATION                         | <input checked="" type="checkbox"/> | See Figure 2                    |
| (n) H <sub>2</sub> O REDUCTION / P2 NARRATIVE | <input checked="" type="checkbox"/> | See Attachment 3                |
| (o) ENVIRONMENTAL PERMITS LIST                | <input checked="" type="checkbox"/> | See Attachment 4                |

**CERTIFICATION : (b)**

"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."

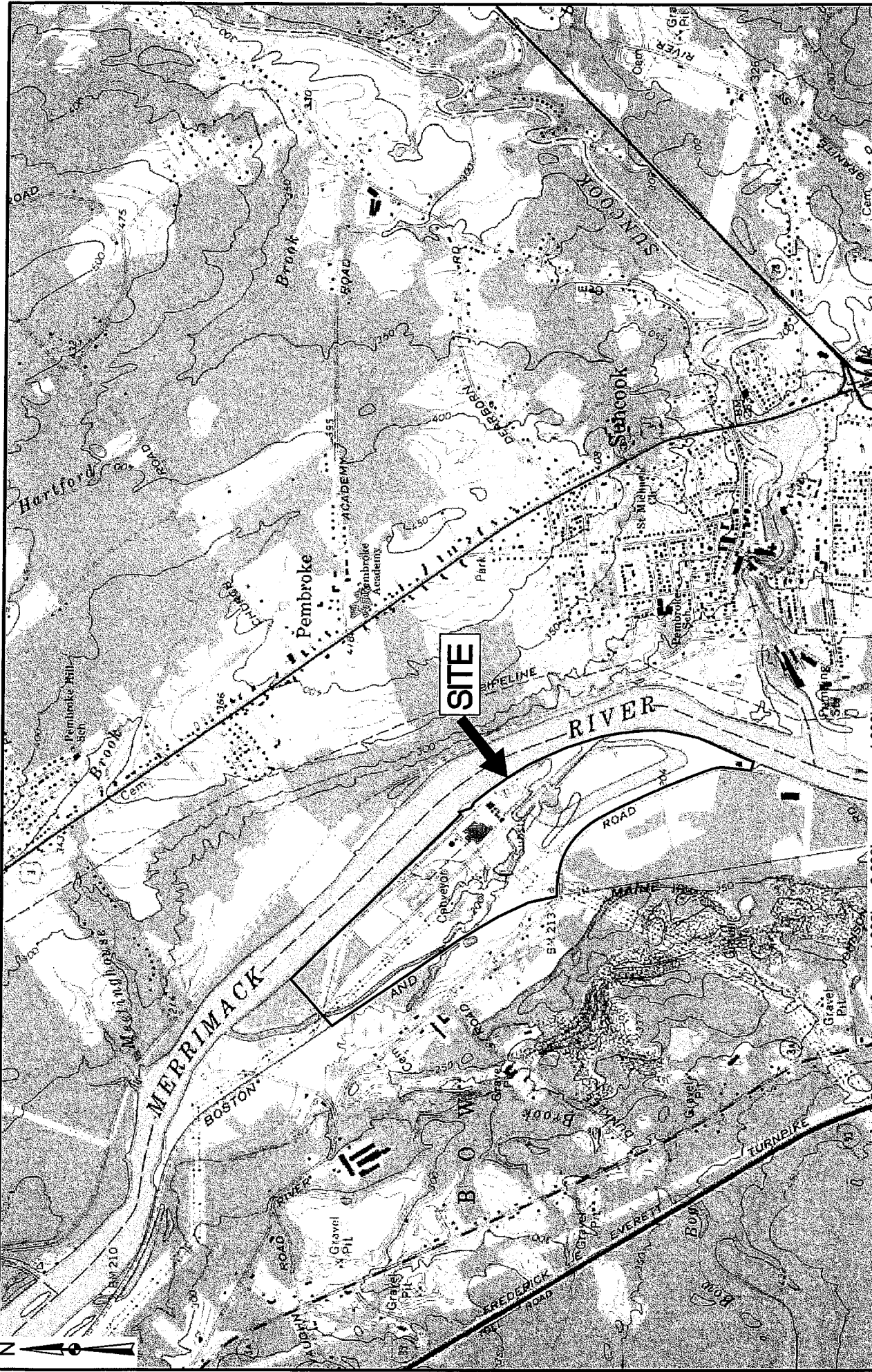
Name Harold Keyes Title Station Manager  
(Print or Type)

Signature: *Harold Keyes* Date 5/11/2011  
(Indirect Discharger Official)

**Notes:**

- ◆ Please attach additional pages as needed.
- ◆ Information not designated with shading is requested but optional.

**CONFIDENTIAL**



|  |  |  |  |  |  |
|--|--|--|--|--|--|
| NO.  |  | ISSUE/DESCRIPTION  |  | DATE   |  |
| 1  |  | LOCUS PLAN   |  | MARCH 2011   |  |
| PROJECT NO.  |  | PROJECT NO.  |  | PROJECT NO.  |  |
| 04-0029307.00  |  | 04-0029307.00  |  | 04-0029307.00  |  |
| DRAWN BY:  |  | DRAWN BY:  |  | DRAWN BY:  |  |
| JPN  |  | JPN  |  | JPN  |  |
| CHECKED BY:  |  | CHECKED BY:  |  | CHECKED BY:  |  |
| RAG  |  | RAG  |  | RAG  |  |
| SCALE: 1" = 2,000'   |  | SCALE: 1" = 2,000'   |  | SCALE: 1" = 2,000'   |  |
| INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION |  | INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION |  | INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION |  |
| 97 RIVER ROAD  |  | 97 RIVER ROAD  |  | 97 RIVER ROAD  |  |
| MERRIMACK STATION  |  | MERRIMACK STATION  |  | MERRIMACK STATION  |  |
| BOW, NEW HAMPSHIRE   |  | BOW, NEW HAMPSHIRE   |  | BOW, NEW HAMPSHIRE   |  |
| PREPARED BY:   |  | PREPARED BY:   |  | PREPARED BY:   |  |
| GZA GeoEnvironmental, Inc.                                   |  | GZA GeoEnvironmental, Inc.                                   |  | GZA GeoEnvironmental, Inc.                                   |  |
| Engineers and Scientists                                     |  | Engineers and Scientists                                     |  | Engineers and Scientists                                     |  |
| 380 HARVEY ROAD  |  | 380 HARVEY ROAD  |  | 380 HARVEY ROAD  |  |
| MANCHESTER, NEW HAMPSHIRE 03103                              |  | MANCHESTER, NEW HAMPSHIRE 03103                              |  | MANCHESTER, NEW HAMPSHIRE 03103                              |  |
| (603) 252-3300   |  | (603) 252-3300   |  | (603) 252-3300   |  |
| PUBLIC SERVICE OF NEW HAMPSHIRE                              |  | PUBLIC SERVICE OF NEW HAMPSHIRE                              |  | PUBLIC SERVICE OF NEW HAMPSHIRE                              |  |

**TABLES**

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**TABLE 1  
REPRESENTATIVE WASTEWATER CHARACTERISTICS**

PSNH

FLOW: 4,000 - 100,000 gpd

| METAL             | MASS LOADING<br>(lb/day) |
|-------------------|--------------------------|
| Aluminum          | 0.83                     |
| Antimony          | 0.40                     |
| Arsenic           | 0.02                     |
| Barium            | 4.01                     |
| Beryllium         | 0.08                     |
| Cadmium           | 0.04                     |
| Chromium          | 0.13                     |
| Copper            | 0.04                     |
| Iron              | 0.17                     |
| Lead              | 0.08                     |
| Manganese         | 0.83                     |
| Mercury           | 0.000012                 |
| Nickel            | 0.83                     |
| Silver            | 0.04                     |
| Zinc              | 0.04                     |
| Selenium          | 2.50                     |
| Thallium          | 0.48                     |
| <i>Molybdenum</i> | <i>No Data</i>           |
| <i>Cyanide</i>    | <i>BDL</i>               |
| <i>Phenols</i>    | <i>BDL</i>               |

| POLLUTANT      | CONCENTRATION<br>(mg/L) |
|----------------|-------------------------|
| Nitrogen       | <i>No Data</i>          |
| Fluoride       | 118                     |
| <i>BOD</i>     | <i>BDL</i>              |
| <i>COD</i>     | <i>No Data</i>          |
| <i>TTO</i>     | <i>BDL</i>              |
| <i>O&amp;G</i> | <i>BDL</i>              |
| TEMPERATURE    | < 104° F                |

**NOTE:**

1. lb/day means pounds per day, gpd means gallons per day, BDL means below detection limit.
2. Please note, steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably less than the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case waste water characteristics. All mass loadings are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.

*Mass*  $\frac{0.83}{8.34 \times 34.0 \text{ ms}}$  - *1003 mg/L*  
*3 mg/L*

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**TABLE 2  
CHEMICAL INVENTORY**

PSNH Merrimack Station  
Bow, New Hampshire

| REFERENCE # | RAW MATERIALS           | AMOUNT USED PER YEAR |
|-------------|-------------------------|----------------------|
| 1           | Ferric chloride         | 7614 lbs             |
| 2           | Hydrochloric acid (32%) | 282,800 lbs          |
| 3           | Sodium Hydroxide (50%)  | 683,282 lbs          |
| 4           | Antifoam 1430           | 7,008 lbs            |
| 5           | Antiscalant             | 2,628 lbs            |
| 6           | Organosulfide           | 1522 lbs             |
| 7           | Polymer                 | 761 lbs              |
| 8           | TMT 15                  | 219 tons             |
| 9           | Limestone               | 152,000 tons         |

Note:

1. Values have been estimated by PSNH's treatment system design team.
2. It is not expected that significant amounts of chemicals will discharge to the sewer.

**ATTACHMENT 1**

**PLANS, SPECS, O&M PROCEDURES**

CONFIDENTIAL

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

PLANS, SPECS, O&M PROCEDURES

ATTACHMENT 1

PROPRIETARY

*George Carle*  
NHDES



INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**PLANS, SPECS, O&M PROCEDURES**

**ATTACHMENT 1**

The proposed WWTS represents a modification to the facility which will minimize the impact on air quality and water. The conceptual design and treatment chemistry were developed by PSNH's current treatment design team. Engineering design review and permitting services were provided by GZA. **FIGURE 1** depicts the WWTS process flow and unit process details for the proposed treatment system.

**Wastewater Treatment System Description**

**Provided by Treatment System Design Team in Philosophy/Sequence of Operation Revision 2, August 2, 2010**

The FGD purge stream is unsuitable for reuse by other power plant facilities, and therefore must be treated separately and discharged. The characteristics of this wastewater stream require extensive treatment. A dedicated FGD wastewater treatment system offered for this application consists of two major sub-systems:

- Physical-Chemical Treatment; and
- Sludge Handling/Dewatering System.

The FGD purge stream is initially directed to the two 50 percent (%) equalization tanks (each has 50% of the total specified storage capacity) to partially attenuate any chemical or hydraulic fluctuations resulting from the FGD operations. In addition, the equalization tanks can receive flow from the treated wastewater effluent pumps and filtrate sump pumps, which consists of filtrate from the filter presses, backwash reject, building trench drains and tank overflow.

At a fairly constant rate, flow from the two 50% equalization tanks shall be pumped to the two 100% capacity reaction tanks (No. 1A and 1B). The wastewater will cascade by gravity through two 100% capacity reaction tanks (No. 2A and 2B), on to the two 100% capacity solids contact clarifiers (No. A and B), then to the two 100% capacity gravity filters and on to the two 50% capacity treated wastewater effluent tanks.

Reaction tanks No. 1A and 1B are chemical conditioning tanks where pH adjustment/gypsum "desaturation" is conducted. In the pH adjustment/gypsum "desaturation" phase, hydrated lime is added to elevate the pH to between 8.5 and 9.2 to provide "desaturation" of gypsum from the wastewater which has a tendency to be supersaturated when received from the FGD process. If not brought to equilibrium, this supersaturation can result in gypsum scale formation in the downstream wastewater treatment plant equipment. In order to achieve the "desupersaturation" operation in a controlled fashion via a crystal growth mechanism, sludge is recycled from the downstream solids contact clarifier to provide seed crystals for gypsum nucleation. The desired solids concentration within the reaction tanks is 3% – 5% by weight. The pH is also elevated to aid in the precipitation of soluble metals as insoluble hydroxides and oxyhydroxides. This operating pH range has been selected to achieve optimal metals reduction while minimizing the formation of magnesium hydroxide which can occur at higher pH.

In addition, an organosulfide reagent is added to reaction tanks No. 1A and 1B to form organosulfide heavy metal complexes which have very low solubility products, thus resulting in maximum heavy metal removal. Of particular importance for this project is the removal of mercury.

In reaction tanks No. 2A and 2B, ferric chloride is added to form a dense floc and enhance the settling characteristics of the precipitate. Additionally, the hydrolyzed form of this coagulant provides precipitation sites for co-precipitation of other metals. Polymer shall be injected into the clarifier influent line in order to form a denser floc which in turn will enhance the settling characteristics.

Two 100% capacity solids contact clarifiers will be provided for clarifying the chemically conditioned waste stream.

Overflow from the solids contact clarifiers will flow by gravity to a standpipe. HCl is dosed into the wastewater to reduce the pH to approximately 6.5 to 7.0 SU. An in-line static mixer with a HCl injection port shall be provided ahead of the standpipe to enhance the chemical blending with the clarified effluent.

The pH adjusted clarifier effluent shall flow by gravity to the two 100% capacity continuous backwash gravity filters for further suspended solids reduction.

The filtered effluent from the continuous backwash gravity filters will flow by gravity to the two 50% treated wastewater effluent storage tanks and shall be subsequently conveyed to the point of discharge by the treated wastewater discharge pumps. During low flow conditions and/or if the treated wastewater is found to be out of compliance, the discharge pumps shall be used to recycle flow back to the equalization tanks for reprocessing.

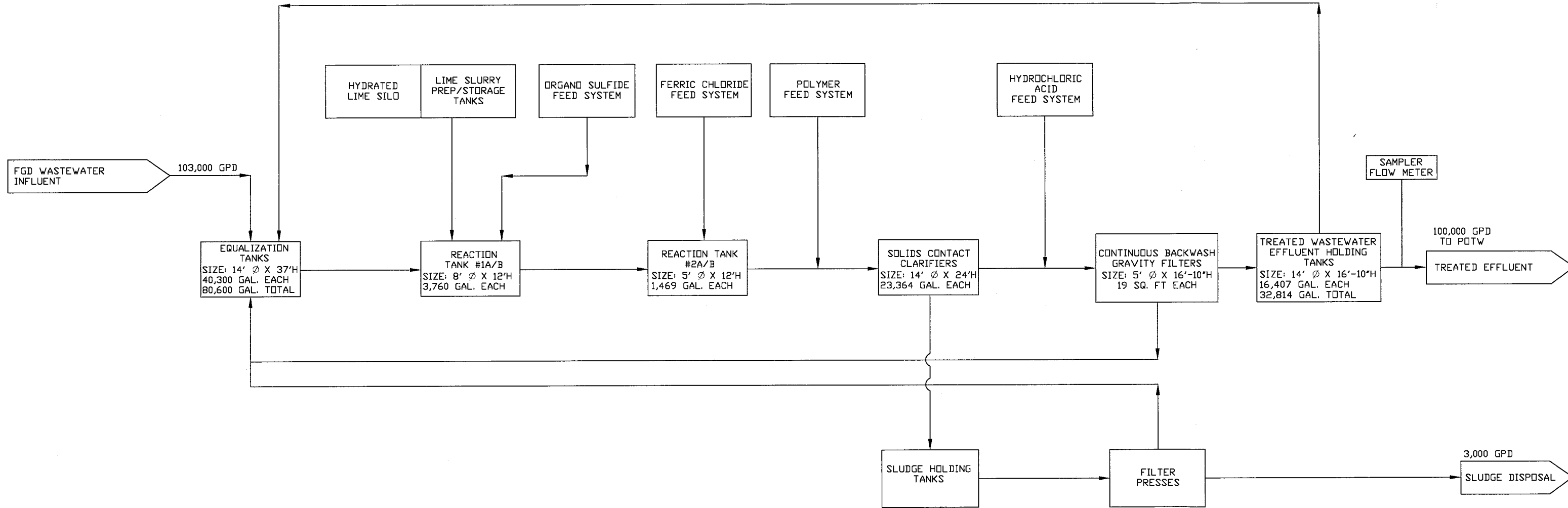
Two volume reduction steps can be utilized to concentrate the waste stream as necessary. A Falling Film Evaporator will reduce the volume by up to 85% (1-10/65), from 100,000 gallons per day (gpd) to approximately 15,400 gpd. The volume of wastewater is reduced, concentrations of contaminants increase but the mass remains unchanged. Effluent from the Evaporator can be directed to a Crystallizer to reduce the volume by up to an additional 70% (1-3/10), from 15,400 gpd to approximately 4,600 gpd. It should be noted that the concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.

Sludge from the solids contact clarifier is pumped via the sludge recycle/transfer pumps to the two 50% capacity sludge holding tanks. In addition, sludge is recycled to reaction tanks No. 1A and 1B. Dewatering is achieved by two 100% capacity recessed plate and frame filter presses. Filtrate from the dewatering operation, as well as any drain water from filter press drip trays, floor drains and floor trenches, is directed to the filtrate sump and pumped to the equalization tanks for subsequent treatment.

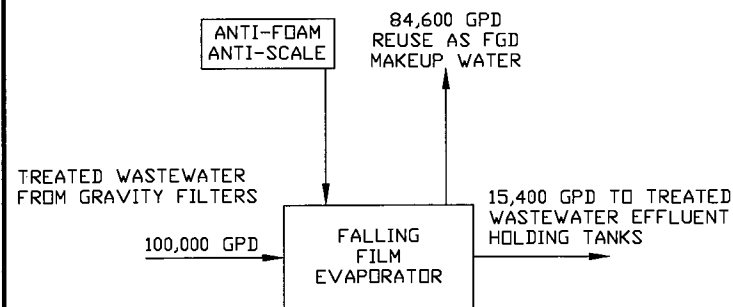
Overflows are routed to a floor trench collection system which discharges to the filtrate sump. Flows to the filtrate sump are recycled back to the equalization tank.

- NOTE:
1. THE WASTEWATER SYSTEM OPERATES TWO TREATMENT TRAINS IN PARALLEL.
  2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

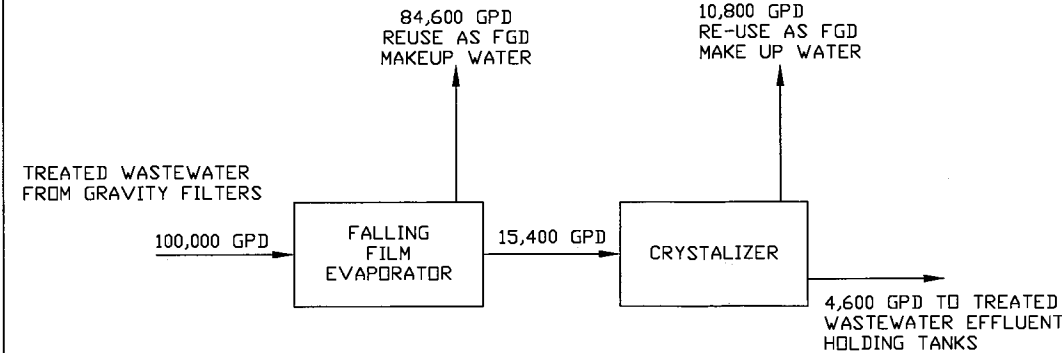
OPTION 1



OPTION 2



OPTION 3



UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE  
REQUEST APPLICATION  
PSNH  
BOW, NEW HAMPSHIRE

WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

|   |                            |   |                 |
|---|----------------------------|---|-----------------|
| PREPARED BY:<br><b>GZA</b> GeoEnvironmental, Inc.<br>Engineers and Scientists<br>380 HARVEY ROAD<br>MANCHESTER, NEW HAMPSHIRE 03103<br>(603) 623-3600 |                            | PREPARED FOR:<br>PUBLIC SERVICE OF<br>NEW HAMPSHIRE |                 |
| PROJ MGR: RAB   | DESIGNED BY: PTP           | REVIEWED BY: KDB                                    | CHECKED BY: PTP |
| DATE: MAY 2011  | PROJECT NO.: 04.0029307.00 | SCALE: N.T.S.                                       | REVISION NO.    |
| FIGURE<br>2   |                            |   | SHEET NO.       |

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**ATTACHMENT 2**

**TOXICITY AND TREATABILITY INFORMATION**

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INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**TOXICITY AND TREATABILITY INFORMATION**

**ATTACHMENT 2**

Federal standards applicable to all industrial wastewater discharges include a prohibition against discharges that cause or contribute to pass-through or interference. These limitations are related to the biodegradability of wastewater pollutants and toxicity to wastewater treatment system activated sludge microorganisms. Based on a review of the estimated wastewater treatment system effluent water quality and the MSDSs of materials used in the process, there is no evidence to suggest that the treated wastewater will adversely impact the performance of Municipality's POTW.

**ATTACHMENT 3**

**WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE**

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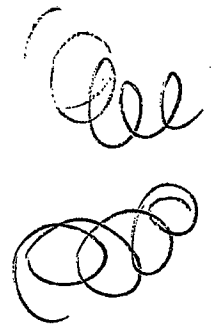
INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE

ATTACHMENT 3

PSNH will continue to evaluate opportunities for implementing conservation/pollution prevention measures. The project currently proposed was designed for the purpose of pollution prevention. Makeup water for the scrubber is recycled wastewater from an on-site pond where nearly 1 million gallons are recycled daily. Treated wastewater from the proposed treatment system will be recycled and used as makeup water for the scrubber. PSNH will continue to evaluate options for on-site reuse of this treated waste stream.





**ATTACHMENT 4**

**ENVIRONMENTAL PERMITS LIST**

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INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

ENVIRONMENTAL PERMITS LIST

ATTACHMENT 4

- TP-008: Flue Gas Desulfurization Unit
- FP-T-0054: Electric Generating Unit #1
- TP-B-0462: Electric Generating Unit #2
- TP-B-0490: Emergency Boiler
- PO-B-1788: Emergency Generator #1
- PO-BP-2416: Primary Coal Crusher
- PO-BP-2417: Secondary Coal Crusher
- PO-B-0034: Combustion Turbine #1
- PO-B-0035: Combustion Turbine #2
- TV-AR-01: Title V Operating Permit
- TV-AR-0055: Proposed Title V Operating Permit
- TP-0068: Emergency Cooling Water Pump Engine
- DPHS-SW-85-012: Solid Waste Facility
- GWP-19840065-B-004: Ground Water Permit
- 11-026610: Permit to Operate Public Water System
- DES-HW-LP-06-22: Hazardous Waste Limited Permit
- NH0001465: National Pollutant Discharge Elimination System



NHDES WATER DIVISION  
 29 Hazen Drive PO Box 95  
 CONCORD, NEW HAMPSHIRE 03302-0095  
 (603)271-3908 FAX (603)271-4128



**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION**

**PART I. MUNICIPAL**

The Town/City of Allenstown proposes:

To discharge to its publicly owned treatment works the industrial flow from:

Applicant PSNH  
 (Name of Indirect Discharger)

New Discharge or Modified Discharge

Flow: Average Process Wastewater Volume (gallons/day):

|                           |         |
|---------------------------|---------|
| Previous Permitted Total: | 0       |
| This Request:             | 100,000 |
| TOTAL:                    | 100,000 |

**CERTIFICATION:**

"This proposal meets with the approval of all local authorities having jurisdiction over the request."

Name Dana Clement Title Superintendent  
 (Print or Type)

Signature: [Signature] Date 2/25/11  
 (Authorized Municipal Official)

**Notes:**

- ❖ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ❖ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ❖ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit.
- \* This value is the average daily process flow requested by the Applicant on Page 2.

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The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



Thomas S. Burack, Commissioner

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPROVAL**

**APPLICANT**

Indirect Discharger **PSNH**  
 Address **97 River Rd., Bow, NH**  
 Authorized Signature **Harold Keyes** **Station Manager**  
 Engineer **Ronald Breton, GZA GeoEnvironmental**

**MUNICIPALITY**

Municipality/POTW **Allenstown WWTF**  
 Approval Signature **Dana L Clement** **Superintendent**  
 Date of IDR **July 25, 2011**

**APPROVAL**

PERMIT/REQUEST NUMBER **IDR 11-016 A**  
 FLOW **100000** gallons/day DATE: **August 12, 2011**

The Department of Environmental Services has reviewed and hereby approves the request as follows: Approval of the discharge to the applicant's wastewater facilities is based on review of the supporting information submitted and is subject to the conditions indicated below and the standard Conditions of Approval on the second page.

**CONDITIONS:**

Approval is for acceptance of highly treated wastewater from the wet flue gas desulfurization system. The wastewater will be hauled by tanker truck to the WWTF.

*George F. Carlson, Jr.*  
 George F. Carlson, Jr., P.E.

Telephone (603) 271-2052

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST

**CONDITIONS OF APPROVAL**

The department's approval of this discharge request is subject to the following conditions:

- (1) The indirect discharger shall fully comply with the applicable sewer use ordinance;
- (2) The indirect discharger shall fully comply with all federal, state and local pretreatment standards and requirements;
- (3) Using additional water to dilute effluent or introducing uncontaminated water to the effluent shall not be allowed as a substitute for any pretreatment necessary to maintain compliance;
- (4) The indirect discharger shall not make changes in the type of production, amount of flow, or pollutant characteristics, or any increase in pollutant concentration, without prior approval by the department through the submission of a new industrial wastewater discharge request;
- (5) The approval shall be based on and apply only to the subject discharge request and all associated plans and supporting information as submitted and shall be signed by the indirect discharger's authorized representative; and
- (6) The approval shall become void if the discharge approved does not begin within one year from the date of approval.

Upon receipt of notification from the department that the discharge request is approved, the municipality shall issue a discharge permit to the indirect discharger.

If there are any question or comments concerning this approval, please contact the Industrial Pretreatment Section Supervisor, at the Water Division, telephone 271-2052.



The State of New Hampshire  
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPROVAL**

**APPLICANT**

Indirect Discharger: **PSNH**  
Address: **97 River Rd., Bow, NH**  
Authorized Signature: **Harold Keyes** Station Manager  
Engineer: **Ronald Breton, GZA GeoEnvironmental**

**MUNICIPALITY**

Municipality/POTW: **Hooksett Wastewater Treatment Plant**  
Approval Signature: **Sidney Baines** Chairman  
Date of IDR: **August 16, 2011**

**APPROVAL**

PERMIT/REQUEST NUMBER: **IDR 11-016 H**  
FLOW: **100000** gallons/day      DATE: **August 19, 2011**

The Department of Environmental Services has reviewed and hereby approves the request as follows: Approval of the discharge to the applicant's wastewater facilities is based on review of the supporting information submitted and is subject to the conditions indicated below and the standard Conditions of Approval on the second page.

**CONDITIONS:**

Approval is for acceptance of highly treated wastewater from the wet flue gas desulfurization system. The wastewater will be hauled by tanker truck to the POTW.

George F. Carlson, Jr., P.E.

Telephone (603) 271-2052

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST

CONDITIONS OF APPROVAL

The department's approval of this discharge request is subject to the following conditions:

- (1) The indirect discharger shall fully comply with the applicable sewer use ordinance;
- (2) The indirect discharger shall fully comply with all federal, state and local pretreatment standards and requirements;
- (3) Using additional water to dilute effluent or introducing uncontaminated water to the effluent shall not be allowed as a substitute for any pretreatment necessary to maintain compliance;
- (4) The indirect discharger shall not make changes in the type of production, amount of flow, or pollutant characteristics, or any increase in pollutant concentration, without prior approval by the department through the submission of a new industrial wastewater discharge request;
- (5) The approval shall be based on and apply only to the subject discharge request and all associated plans and supporting information as submitted and shall be signed by the indirect discharger's authorized representative; and
- (6) The approval shall become void if the discharge approved does not begin within one year from the date of approval.

Upon receipt of notification from the department that the discharge request is approved, the municipality shall issue a discharge permit to the indirect discharger.

If there are any question or comments concerning this approval, please contact the Industrial Pretreatment Section Supervisor, at the Water Division, telephone 271-2052.



NH DES WATER DIVISION  
 29 Hazen Drive - PO Box 95  
 CONCORD, NEW HAMPSHIRE 03302-0095  
 (603)271-3908 FAX (603)271-4128



INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION

RECEIVED

AUG 18 2011

DES-WEB  
 proposes

**PART I. MUNICIPAL**

The Town/City of Hooksett

To discharge to its publicly owned treatment works the industrial flow from:

Applicant PSNH  
 (Name of Indirect Discharger)

New Discharge or Modified Discharge

*No check*  
*mm*  
*PD. by TSC. jk*

Flow: Average Process Wastewater Volume (gallons/day):

|                           |         |
|---------------------------|---------|
| Previous Permitted Total: | 0       |
| This Request:             | 100,000 |
| TOTAL:                    | 100,000 |

**CERTIFICATION:**

"This proposal meets with the approval of all local authorities having jurisdiction over the request."

Name SIDNEY BAINES Title CHAIRMAN  
 (Print or Type)

Signature: *Sidney Baines* Date 8-16-11  
 (Authorized Municipal Official)

Notes:

- ✧ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ✧ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ✧ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit

\* This value is the average daily process flow requested by the Applicant on Page 2

*CONFIDENTIAL*







The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



Thomas S. Burack, Commissioner

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPROVAL**

**APPLICANT**

Indirect Discharger **PSNH**  
 Address **97 River Rd., Bow, NH**  
 Authorized Signature **Harold Keyes** **Station Manager**  
 Engineer **Ronald Breton, GZA GeoEnvironmental**

**MUNICIPALITY**

Municipality/POTW **Concord Wastewater Treatment Facility**  
 Approval Signature **Thomas Neforas** **Laboratory Manager**  
 Date of IDR **August 25, 2011**

**APPROVAL**

PERMIT/REQUEST NUMBER **IDR 11-016 C**  
 FLOW **25000** gallons/day DATE: **August 29, 2011**

The Department of Environmental Services has reviewed and hereby approves the request as follows: Approval of the discharge to the applicant's wastewater facilities is based on review of the supporting information submitted and is subject to the conditions indicated below and the standard Conditions of Approval on the second page.

**CONDITIONS:**

Approval is for acceptance of highly treated wastewater from the wet flue gas desulfurization system. The wastewater will be hauled by tanker truck to the WWTF.

George F. Carlson, Jr., P.E.

Telephone (603) 271-2052

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST

CONDITIONS OF APPROVAL

The department's approval of this discharge request is subject to the following conditions:

- (1) The indirect discharger shall fully comply with the applicable sewer use ordinance;
- (2) The indirect discharger shall fully comply with all federal, state and local pretreatment standards and requirements;
- (3) Using additional water to dilute effluent or introducing uncontaminated water to the effluent shall not be allowed as a substitute for any pretreatment necessary to maintain compliance;
- (4) The indirect discharger shall not make changes in the type of production, amount of flow, or pollutant characteristics, or any increase in pollutant concentration, without prior approval by the department through the submission of a new industrial wastewater discharge request;
- (5) The approval shall be based on and apply only to the subject discharge request and all associated plans and supporting information as submitted and shall be signed by the indirect discharger's authorized representative; and
- (6) The approval shall become void if the discharge approved does not begin within one year from the date of approval.

Upon receipt of notification from the department that the discharge request is approved, the municipality shall issue a discharge permit to the indirect discharger.

If there are any question or comments concerning this approval, please contact the Industrial Pretreatment Section Supervisor, at the Water Division, telephone 271-2052.



**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION**

**PART I. MUNICIPAL**

The Town/City of CITY OF CONCORD

To discharge to its publicly owned treatment works the industrial flow from:

Applicant PS NH MERRIMACK STATION  
 (Name of Indirect Discharger)

RECEIVED  
 proposes:  
 AUG 26 2011

DES-WEB

New Discharge ~ or Modified Discharge ~

Flow: Average Process Wastewater Volume (gallons/day):

|                           |                 |
|---------------------------|-----------------|
| Previous Permitted Total: | <u>0</u>        |
| This Request:             | * <u>25,000</u> |
| TOTAL:                    | <u>25,000</u>   |

**CERTIFICATION:**

"This proposal meets with the approval of all local authorities having jurisdiction over the request."

Name THOMAS NEFORAS  
 (Print or Type)

Title LABORATORY MANAGER

Signature: [Signature]  
 (Authorized Municipal Official)

Date 8-25-2011

Notes:

- ✧ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ✧ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ✧ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit

\* This value is the average daily process flow requested by the Applicant on Page 2



Kevin A. Sheppard, P.E.  
Public Works Director

Timothy J. Clougherty  
Deputy Public Works Director

Frederick J. McNeill, P.E.  
Chief Engineer



Commission  
Raymond Hebert  
Harold Sullivan  
Robert R. Rivard  
Rick Rothwell  
Bill Skouteris

**CITY OF MANCHESTER**  
*Highway Department*  
*Environmental Protection Division*

**Trucked Waste      Special Agreement      No. SA 3001-10-11**

In accordance with the provisions of the City of Manchester's Special Agreement Provisions:

Office/Home  
PSNH  
780 North Commercial St.  
Manchester, NH 03101

Work Site  
PSNH – Merrimack Station  
97 River Street  
Bow, NH 03304

is authorized to discharge wastewater from the above stated facility (the "Facility"). This discharge consists of:

Description      Gallons/Day  
Treated Blowdown from Flue Gas Desulfurization (FGD) System      24,750 gallons per day

Compliance with this Special Agreement does not relieve the owner of its obligation to comply with any other applicable pretreatment requirements under local, State, or Federal laws, including such requirements that may become effective during the term of this Agreement.

Noncompliance with any term or condition of this Agreement including the provisions of Page 2 and 3 shall constitute a violation of the City's Sewer Use Ordinance ("Sewer Use Ordinance") and shall be subject to the penalty provisions of Article V, Section 52.999 and may include suspension of discharge privilege with 24 hours notice.

This Special Agreement shall become **Effective on:** December 1, 2011  
This Special Agreement shall **Expire on:** November 30, 2012

|                             |                                  |         |
|-----------------------------|----------------------------------|---------|
|                             | Chief Engineer – EPD             | 2/9/12  |
| Special Agreement Issued By | Title                            | Date    |
|                             | Public Works Director - Highways | 2-13-12 |
| Authorization by (City)     | Title                            | Date    |

**Acknowledgement:** The undersigned acknowledges receipt of this Special Agreement and acknowledges that this discharge is subject to the requirements of the Sewer Use Ordinance Article V.

PSNH           2/9/2012  
Company Name      Authorized Representative      Date



### Standard Conditions

This agreement is subject to the following standard conditions.

**Acceptance of discharge** – The FGD blowdown must first be turned away in part, or in total, by the Towns of Hooksett, Allenstown and the City of Concord before discharge is accepted at EPD’s Manchester WWTP.

**Responsible contact** – PSNH must designate one main responsible contact (Shift Supervisor 224-4081 x4141) and provide their 24- hour phone number along with an alternate person (Paul Raichle 225-5571) and their 24- hour contact information who can act on behalf of PSNH in emergency situations.

**Tanker delivery** - PSNH must use dedicated tankers or tankers that have been rinsed internally and certified “industrial clean” by the tanker truck owner so no other discharge is inadvertently disposed of at Manchester’s WWTP.

**Delivery hours** – The hours of delivery shall be from Monday through Friday from 6:00 AM until 4:00 PM and on weekends and holidays from 7:00 AM until 2:00 PM. Hours outside these times may be agreed to in writing by both parties and amended to this agreement.

**Changes in discharge** - Any substantial change in the type of production, amount of flow or pollutant characteristics, or any increase in pollutant concentration, must receive prior review and approval by the City of Manchester and the State of NH if applicable. The projected wastewater characteristics were presented in the Industrial Wastewater Discharge Permit application submitted to the City of Manchester in May 2011.

**Spills, potentially harmful dischargers** - Immediate notification is required for any discharge which spills at the offloading facility that would cause a problem for the Wastewater Treatment Plant’s Stormwater Permit or other environmental concerns. This includes but is not limited to an accidental discharge of substances prohibited by the Sewer Use Ordinance or any slug loads or spills that may enter the public, right-of-way, receiving water, or combined sewers. Notification information as follows:

- \* During normal business hours (7:00 A.M. to 4:00 P.M.) notify:
 

|                                 |          |
|---------------------------------|----------|
| Chief Sanitary Engineer         | 624-6341 |
| Wastewater Plant Superintendent | 624-6526 |
| Industrial Pretreatment Office  | 624-6513 |
- \* At all other times notify:
 

|                            |          |
|----------------------------|----------|
| Wastewater Treatment Plant | 624-6421 |
|----------------------------|----------|

The notification shall include location of discharge, date and time thereof, type of waste, including concentration and estimated volumes, and any and all corrective actions taken. The owner will make notification in accordance with the requirements of this section and does not relieve its obligation of other reporting requirements as may arise under local, State, or Federal laws.

**Agreement continuance** - If the owner desires to continue to discharge after the expiration of this Agreement, it shall reapply on the application forms then in use at least thirty (30) calendar days before this Agreement expires. Under no circumstances shall the owner continue to discharge after the expiration of this Agreement, except as authorized pursuant to a new agreement with, or an extension of this Agreement by, the City.

**Access by the City** - The owner shall allow authorized EPD personnel unrestricted access for the purposes of inspection, investigation, and sampling of wastewater discharges from the PSNH Work Site when requested.

**Sampling & analytical requirements** - Any sampling, preservation, handling, and analytical testing methods must conform to the requirements as set out in 40 CFR Part 136.

**Charges and rates** – The rate is based upon mass loading. The daily allowable loading for aluminum is 0.21 lbs and for selenium it is 0.6025 lbs. As aluminum and selenium are the main concerns in the FGD concentration the rate is based on loading for both aluminum at \$3,213.25 per pound, or the rate for selenium at \$1,066.80 per pound. The total fee will be based on the highest of the aluminum or selenium loading, but not on both. This is not a fee based on per 1,000 gallon discharge, but rather on the mass loading of aluminum and selenium.





**Other requirements** - The conditions listed in this Agreement are not all inclusive. The City shall be notified if questions arise regarding the owner's responsibilities under this Agreement or obligations under the Sewer Use Ordinance. The City reserves the right to make revisions to this Agreement in order to implement the requirements of the Sewer Use Ordinance.

### Special Conditions

1. Treated FGD blowdown shall not be discharged into the plant's influent wastestream during a rain event (i.e., defined as 0.5 inches of rain in a 24-hour period), but such Treated FGD Blowdown must instead be unloaded to the on-site holding tank (20,000-gallon holding tank at the City's Wastewater Treatment Plant).
2. No daily limit is placed upon the volume of effluent that may be received from the PSNH work site; however, no more than 24,750 gallons are approved to be discharged to the Manchester WWTP Facility per day.
3. Designated disposal site shall be located at EPD 300 Winston Street (20,000 gpd holding tank), or other location as approved by the EPD.
4. Fee is outlined in Charges and rates above.
5. Treated FGD blowdown must be metered and pretreated onsite before hauling to the POTW. If the testing deems that the discharge does not meet compliance limits then suspension of discharge may occur with 24 hours prior notice.
6. Manchester will take random samples of aluminum and selenium in either a weekly composite or use discreet sampling from up to two tanker truck loads to establish the mass loading of aluminum and selenium for the purpose of determining billing at owner's cost. Any other compliance sampling may be carried out up to once per month at owner's cost. Any additional sampling above the aforementioned must have prior approval of PSNH if sampling is at the cost of PSNH.
7. Mass daily allocation for aluminum is 0.21 lbs and for selenium is 0.6025 lbs. Allowance is made for a daily maximum of 20% additional discharge to a maximum aluminum loading of 0.252 lb, and a maximum selenium load of 0.723 lbs.
8. All other parameters must meet and not exceed Manchester's local limits concentrations or mass loading limitations.
9. Service is guaranteed during the duration of this agreement if wastewater is in compliance with the requirements of this Agreement, compliance is maintained, the wastewater can not be accepted by Allenstown, Hooksett or Concord due to regulatory restrictions, and Manchester's WWTP is in compliance with WQ criteria for aluminum and selenium.







**Public Service  
of New Hampshire**

The Northeast Utilities System

Merrimack Generating Station

Public Service Company of New Hampshire  
97 River Road  
Bow, NH 03304  
(603) 224-4081  
Fax (603) 634-2334

The Northeast Utilities System

August 23, 2011

Ms. Nancy Lesieur  
Industrial Pretreatment Coordinator  
Franklin Wastewater Treatment Plant  
Water Division  
New Hampshire Department of Environmental Services  
528 River Street  
Franklin, New Hampshire 03235

Re: Industrial Wastewater Indirect Discharge Request Application  
Public Service of New Hampshire (PSNH)  
Bow, New Hampshire

Dear Ms. Lesieur:

In accordance with the discussion on Friday, August 12, 2011, between Steven Doloff and Ronald Breton (GZA GeoEnvironmental, Inc. [GZA]), our consulting engineer, PSNH is requesting that the Franklin Wastewater Treatment Plant consider our request to accept treated wastewater from our flue gas desulfurization system that is scheduled to become operational on or around October 1, 2011. With the issuance of a permit and/or contract by New Hampshire Department of Environmental Services (NHDES) outlining the terms of service and financial compensation, it is our intention to transport treated wastewater by tanker truck to the Franklin treatment facility seven days per week, over 24 hours each day.

As presented in our attached application (along with the \$75 application review fee), we are installing a technologically advanced wastewater treatment system. In addition, we are including post-treatment systems that can be used to reduce the volume of the treated waste stream from 70,000 gallons per day (gpd) to as small a volume as 5,000 gpd. These post-treatment systems are anticipated to be operational by January 1, 2012. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all the wastewater we generate, we recognize that there may be restrictions at your facility and that only a portion of the total discharge could be accepted. This scenario has been considered in our overall wastewater management strategy.

Please note that we have previously submitted an Indirect Discharge Request application along with the required \$1,000 design review fee to George Carlson, P.E., NHDES. Therefore, Mr. Carlson is familiar with this specific indirect discharge request, and we encourage you to contact him with your inquiries.

During the course of performing your evaluation, GZA and PSNH will be available to provide additional information and technical support.

We trust that this submittal adequately address your informational needs. Should you have any questions, please contact Mr. Breton at 603-232-8744 or myself at 603-224-4081, extension 4130.

Sincerely,

Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

Attachment(s)

cc: George Carlson, P.E. - NHDES



NHDES WATER DIVISION  
 FRANKLIN WASTEWATER TREATMENT PLANT  
 528 RIVER STREET; PO BOX 68  
 FRANKLIN, NH 03235  
 (603) 934-2809 FAX (603) 934-4831



**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION  
 (Winnepesaukee River Basin Program)**

The Town/City of Franklin proposes:

To connect to its existing sewage collection system the industrial flow from:

PSNH

(Project/Company Name or Description)

**NOTE:** The wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

New Discharge or **Modified Discharge**

of pretreated (untreated) industrial waste to the municipal sewage collection system.

Flow: Average Process Wastewater Volume (gallons/day) :

|                           |               |
|---------------------------|---------------|
| Previous Permitted Total: | 0             |
| This Request:             | *70,000       |
| <b>TOTAL:</b>             | <b>70,000</b> |

The municipal sewage collection system has no history of surcharge and there is no record of objections from persons presently connected to the system. This proposal meets with the approval of the Planning Board, the Engineering Department and all other local authorities.

Name: \_\_\_\_\_  
 (Print or Type)

Title: \_\_\_\_\_  
 (Municipal Official)

Signature: \_\_\_\_\_

Date \_\_\_\_\_

Name: \_\_\_\_\_  
 (Print or Type)

Title: \_\_\_\_\_  
 (WRBP Official)

Signature: \_\_\_\_\_

Date \_\_\_\_\_

**Notes:**

- ❖ By signing this discharge permit request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ❖ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ❖ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limits.

\* This value is the average daily process flow requested by the Applicant on Page 3

## INSTRUCTIONS

### INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION

NHDES approval is required for any new or increases in industrial waste being discharged to POTW having a wastewater treatment plant located in New Hampshire. Approval is also required for any proposed changes in the pollutant concentration or characteristics of an industrial waste that could cause interference with or have an adverse effect on the POTW.

The following fees are required with an IDR application: \$1,000 when plans and specifications are submitted relative to the construction or installation of waste pretreatment devices or \$50 when plans and specifications are not required made payable to "State of New Hampshire –DES" and a \$75 WRBP IDR application review fee made payable to the "State of NH – Treasurer."

The following information shall accompany any Indirect Discharge Request Application (blue form) submitted for review:

- (1) Name, street address and mailing address of industry.
- (2) Name, position and telephone number of responsible individual at the industry, i.e., plant manager, president or vice president of company, who certifies the accuracy and completeness of the information submitted in the application.
- (3) The type of industry using the North American Industrial Classification System (NAICS) code if available.
- (4) Whether the industry is subject to national categorical standards, and if so, which;
- (5) The estimated average, minimum, maximum and total daily flow for domestic discharges and each process discharge and the time and duration of those discharges.
- (6) A schematic of the proposed treatment process.
- (7) If applicable plans, specifications, and operation and maintenance procedures for new or modified treatment facilities at the industrial facility which impact the POTW, stamped by a chemical, civil, sanitary, or environmental engineer registered in New Hampshire.
- (8) Schematics or drawings, a major components list, and operation and maintenance procedures for existing treatment works designed to discharge directly to receiving waters which will be utilized for pretreating the wastewater and redirecting the discharge to a POTW, reviewed and certified as suitable for the proposed use by a chemical, civil, sanitary, or environmental engineer registered in New Hampshire.
- (9) A schematic diagram showing the production process, including the origin of each waste stream.
- (10) Analyses of the waste stream(s) to be discharged, which shall include test results or anticipated quantities of pollutants expected to be present, including those regulated by national categorical standards or local sewer use ordinances.
- (11) Information on the toxicity and treatability of the particular pollutants proposed to be discharged, as available from manufacturer's testing, safety and data publications.
- (12) A map showing the location within the municipality of the industrial facility with respect to the POTW.
- (13) A listing of all chemicals used in the industrial facility which will be discharged, such as production chemicals, degreasers, and cleaning solvents.
- (14) A description and location diagram of all sampling locations at the industrial facility.
- (15) A brief narrative describing those measures taken or planned to reduce water usage and implement pollution prevention techniques, if any, such as: flow restrictors, countercurrent rinses, recycling of non-contact cooling water, chemical substitutions, and pollutant source reduction.
- (16) A list of all environmental permits held by or for the facility.

**Please contact us if you have any questions.**

**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION PG 1 of 2**

**(1) INDUSTRY NAME & ADDRESS**

|                  |   |
|------------------|---|
| Name:            | PSNH                                    |
| Street Address:  | 97 River Road, Bow, New Hampshire 03304 |
| Mailing Address: |   |

**(2) RESPONSIBLE INDUSTRY OFFICIAL / CONTACT**

|                 |                           |
|-----------------|---------------------------|
| Official – Name | Harold Keyes              |
| Title:          | Station Manager           |
| Phone #:        | 603-224-4081, ext. 4130   |
| Contact Name:   | Allan Palmer              |
| Title:          | Senior Engineer           |
| Phone #:        | (603) 634-2439, ext. 2439 |

**(3) INDUSTRY TYPE**

|                 |                        |               |      |
|-----------------|------------------------|---------------|------|
| Product(s):     | Electricity Generation |               |      |
| NAICS Code #(s) | 221112                 | SIC Code #(s) | 4911 |

**(4) SIU or CATEGORICAL STANDARDS APPLICABLE**  Yes  No

|  |                    |          |
|--|--------------------|----------|
| CIU-Category(s) Name:                    | 40CFR Part:        | Subpart: |
| Steam Electric Power Generating Category | 423 <sup>(1)</sup> |          |
| SIU – Description                        |                    |          |
| Local Permit Class/ Number               |                    |          |

*(1) Facility is subject to 40 CFR 423 but the treated FGD wastestream is not regulated by pretreatment standards*

**(5) FLOW INFORMATION: TOTAL**

| This DPR- Ave. Process (gpd) | # of Discharges to sewer: | # of Employees:      | # of Shifts:         |
|------------------------------|---------------------------|----------------------|----------------------|
| 70,000                       | N/A                       | 115                  | 2 per day            |
| <b>FLOW SUMMARY</b>          | <b>Source</b>             | <b>Average (gpd)</b> | <b>Maximum (gpd)</b> |
| <b>Previous</b>              | Sanitary                  | 0                    | 0                    |
|                              | Process                   | 0                    | 0                    |
|                              | <b>TOTAL</b>              | 0                    | 0                    |
| <b>Change – this IDR:</b>    | Sanitary                  | 0                    | 0                    |
|                              | Process                   | * 70,000             | 70,000               |
|                              | <b>TOTAL</b>              | 70,000               | 70,000               |
| <b>TOTAL :</b>               | Sanitary                  | 0                    | 0                    |
|                              | Process                   | 70,000               | 70,000               |
|                              | <b>TOTAL</b>              | 70,000               | 70,000               |

\* This value to match the value of "This Request" on Page 1



**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION PG 2 of 2**

**(7/8) TREATMENT SYSTEM PLANS & SPECS [ \$ 1,000 Review Fee ]**

|           |                            |
|-----------|----------------------------|
| Engineer: | Ronald A. Breton, P.E.     |
| Company:  | GZA GeoEnvironmental, Inc. |
| P.E. #    | 5956                       |

**ATTACHMENTS**

|  | Attached                            | Not Applicable | Remarks/Explanation             |
|--|-------------------------------------|----------------|---------------------------------|
| (6) TREATMENT PROCESS SCHEMATIC                                  | <input checked="" type="checkbox"/> |                | See Figure 2                    |
| (9) PRODUCTION PROCESS DIAGRAM                                   | <input checked="" type="checkbox"/> |                | See Drawing Number 3977-3-001-B |
| (10) WASTE STREAM ANALYSES                                       | <input checked="" type="checkbox"/> |                | See Table 1                     |
| (11) TOXICITY/TREATABILITY INFO.                                 | <input checked="" type="checkbox"/> |                | See Attachment 1                |
| (12) LOCATION MAP  | <input checked="" type="checkbox"/> |                | See Figure 1                    |
| (13) CHEMICAL LIST   | <input checked="" type="checkbox"/> |                | See Table 2                     |
| (14) SAMPLING LOCATION   | <input checked="" type="checkbox"/> |                | See Figure 2                    |
| (15) H <sub>2</sub> O REDUCTION. / P2 NARRATIVE                  | <input checked="" type="checkbox"/> |                | See Attachment 2                |
| (16) ENVIRONMENTAL PERMITS LIST                                  | <input checked="" type="checkbox"/> |                | See Attachment 3                |
| (7) PLANS, SPECIFICATIONS, OPERATIONS AND MAINTENANCE PROCEDURES | <input checked="" type="checkbox"/> |                | See Attachment 4                |

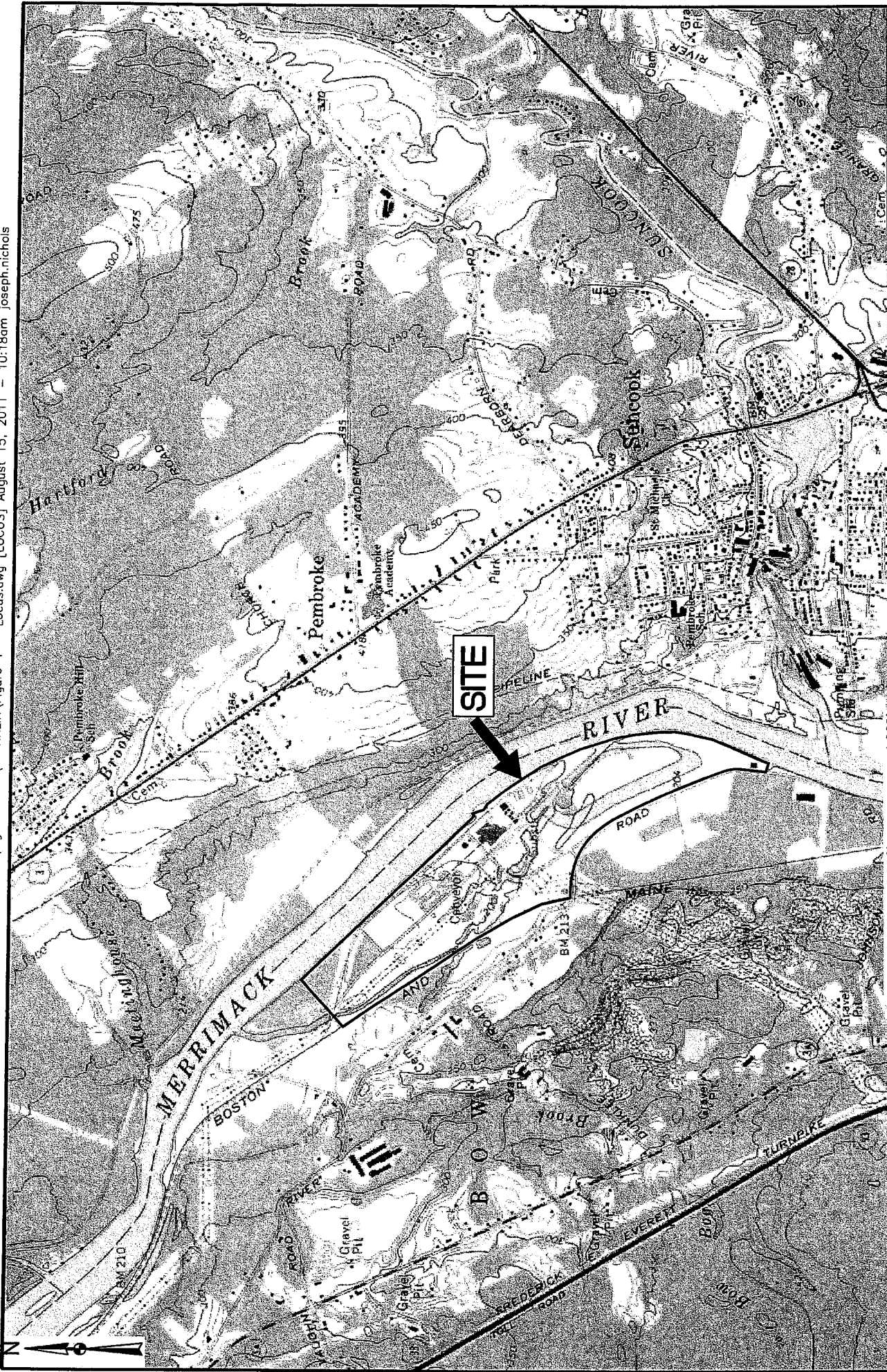
CERTIFICATION : (2)

"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."

Signature Ronald A. Breton 8/22/2011  
 (Responsible Industry Official)

- Note:
- ♣ Attach additional pages as needed.
  - ♣ Feel free to call if you have any questions.
  - ♣ ( ) Numbers refer to requirement of IDR Instructions ( Page 2).
  - ♣ Information not designated with shading is requested but optional.

## **FIGURES**

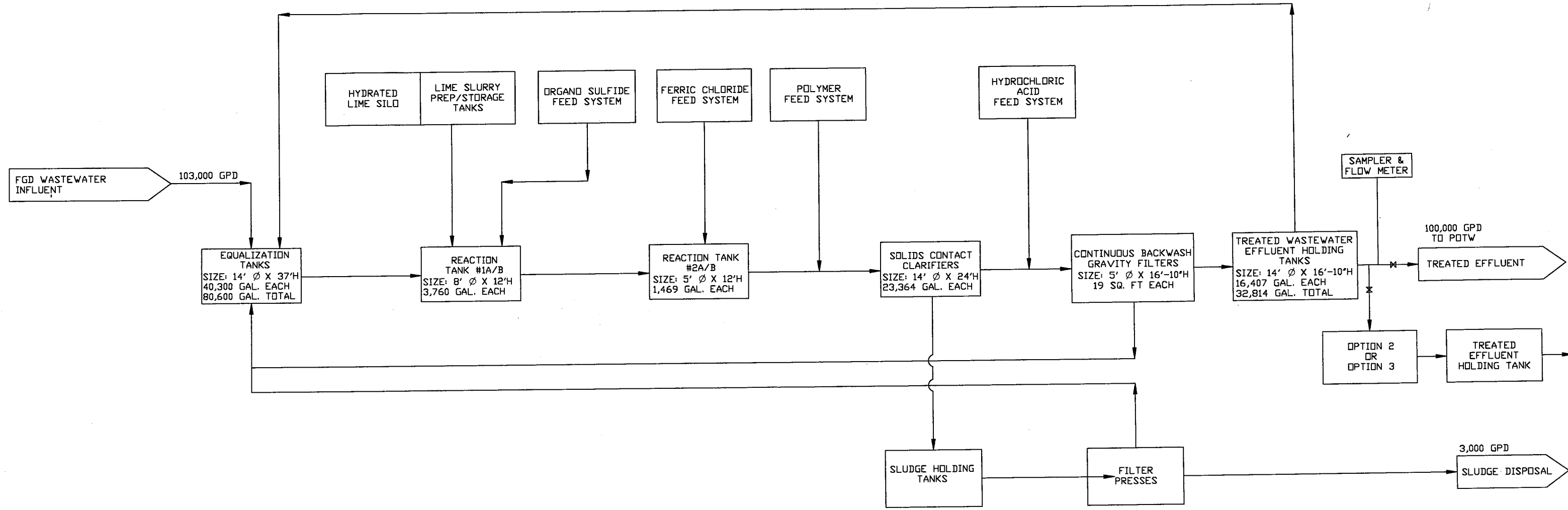


|  |                   |     |               |              |
|--|-------------------|-----|---------------|--------------|
| NO.  | ISSUE/DESCRIPTION |     | DATE          | FIGURE       |
|  | PROJ. WGR:        | RAS | AUGUST 2011   | 1            |
| INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION   |                   |     | PROJECT NO.   | REVISION NO. |
| 97 RIVER ROAD  |                   |     | 04.0029307.00 |              |
| MERRIMACK STATION  |                   |     | DESIGNED BY:  |              |
| BOW, NEW HAMPSHIRE   |                   |     | REVIEWED BY:  |              |
| <p>PREPARED BY: <b>GZA GeoEnvironmental, Inc.</b><br/> <b>Engineers and Scientists</b><br/>         100 WINDY HILL ROAD<br/>         MANCHESTER, NEW HAMPSHIRE 03103<br/>         (603) 623-3400</p> |                   |     | DRAWN BY:     |              |
| <p>PREPARED FOR:<br/> <b>PUBLIC SERVICE OF NEW HAMPSHIRE</b></p>   |                   |     | CHECKED BY:   |              |
| <p>SCALE IN FEET</p> <p>0 1,000' 2,000' 4,000'</p>   |                   |     | SCALE:        | 1" = 2,000'  |

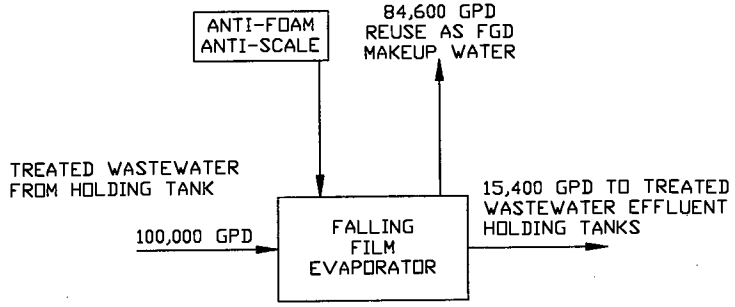
**NOTE:**

1. THE WASTEWATER SYSTEM CAN OPERATE TWO TREATMENT TRAINS IN PARALLEL.
2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

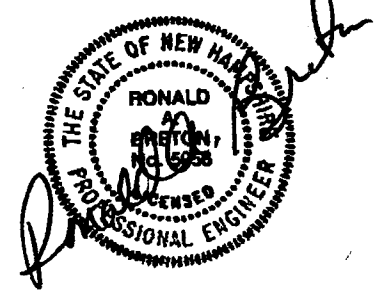
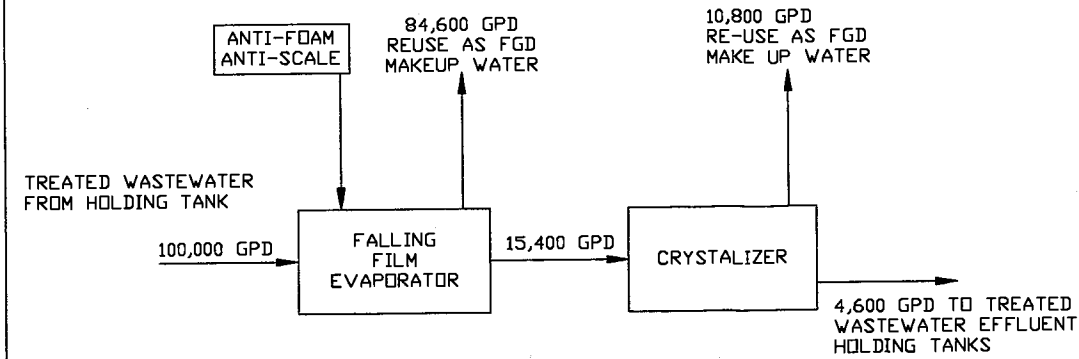
**OPTION 1**



**OPTION 2**



**OPTION 3**



INDUSTRIAL WASTEWATER INDIRECT DISCHARGE  
 REQUEST APPLICATION  
 PSNH  
 BOW, NEW HAMPSHIRE

WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

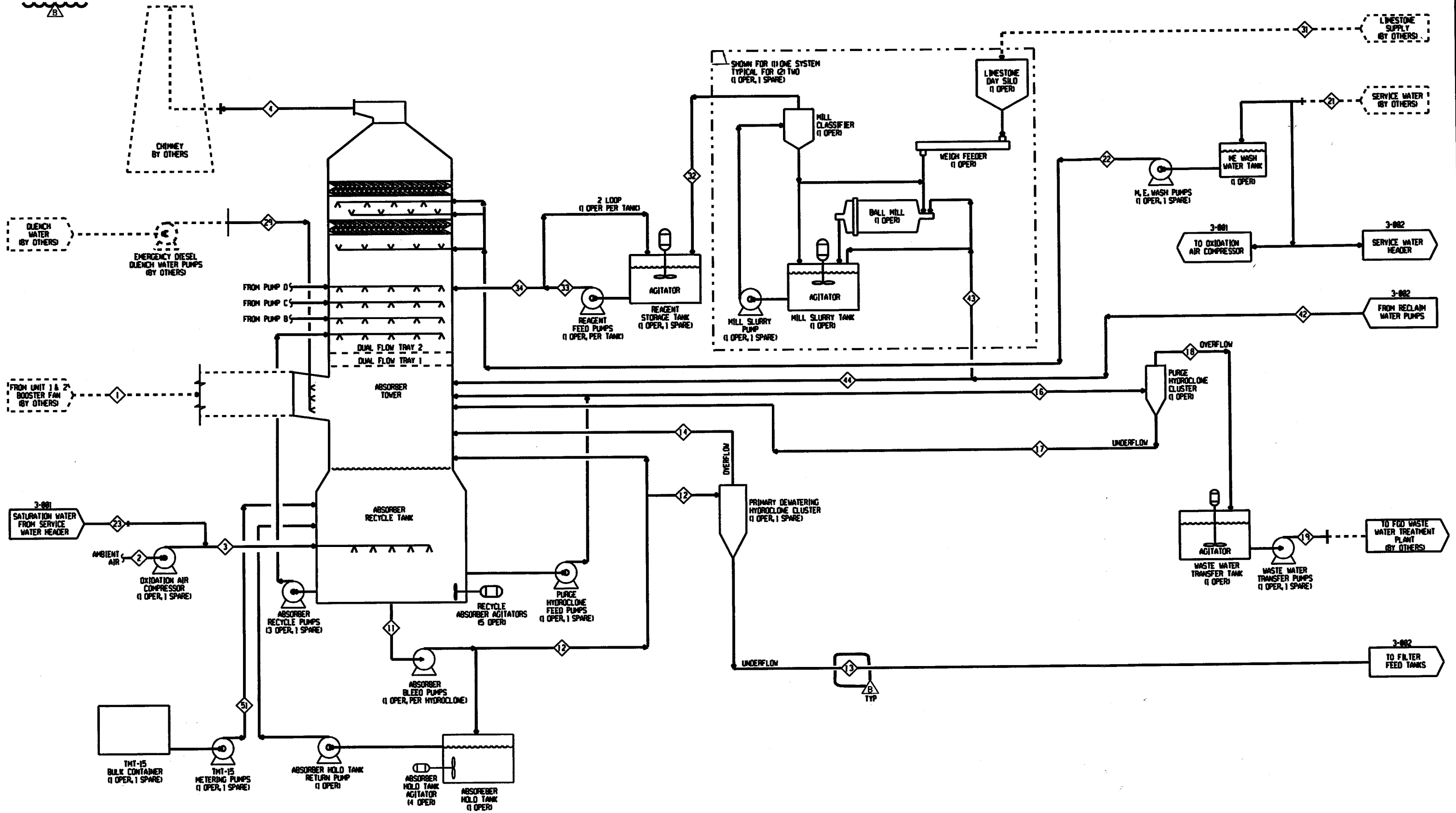
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOTECHNICAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

|              |             |  |               |               |                                    |
|--------------|-------------|--|---------------|---------------|------------------------------------|
| PREPARED BY: |             | GZA GeoEnvironmental, Inc.<br>Engineers and Scientists<br>380 HARVEY ROAD<br>MANCHESTER, NEW HAMPSHIRE 03103<br>(603) 623-3600 |               | PREPARED FOR: | PUBLIC SERVICE OF<br>NEW HAMPSHIRE |
| PROJ MGR:    | RAB         | DESIGNED BY:   | PTP           | CHECKED BY:   | PTP                                |
| DATE:        | AUGUST 2011 | PROJECT NO.:   | 04.0029307.00 | SCALE:        | N.T.S.                             |
|              |             | REVISION NO.:  |               |               |                                    |

FIGURE 2  
SHEET NO.

2011 - GZA GeoEnvironmental, Inc. GZA-PS-NH-0029307.00 (Figure 2) Wastewater Treatment System Flow Diagram.dwg [Rev: 11/17/11] August 16, 2011 - 10:21am jason.kubacki

3977-3-001



Information: 6.5. cad.drafting\6.5.2 voc drawings\9773001.DGN

**PRELIMINARY**

|  |  |   |
|--|--|---|
| PUBLIC SERVICE OF NEW HAMPSHIRE<br>MERRIMACK STATION UNITS 1&2<br>BOW, NEW HAMPSHIRE |  | SIEMENS Power Generation, Inc<br>Environmental Systems & Services |
| PROCESS FLOW DIAGRAM   |  | 3977-3-001  |
|  |  | B   |



| NO. | REVISION          | DATE     | NO. | REVISION | DATE |
|-----|-------------------|----------|-----|----------|------|
| B   | GENERAL REVISIONS | 01-29-88 |     |          |      |
| B   | FOR APPROVAL      | 01-12-88 |     |          |      |

NOTE  
FABRICATION, MANUFACTURING, OR DETAILING  
MAY PROCEED ONLY WHEN DRAWING IS ISSUED  
OR AUTHORIZED FOR SUCH PURPOSES.

This print and all information therein is the property of SPGL. It is confidential and proprietary and must not be used, made public, or copied unless authorized in writing by SPGL. It is transmitted to you with the explicit understanding that it is subject to return upon request.

|           |      |
|-----------|------|
| DRG. BY   | DATE |
| CHKD. BY  | DATE |
| APP'D. BY | DATE |
| SCALE     |      |
| EXEMPTED  |      |
| BY        | DATE |

## **TABLES**

**TABLE 1  
REPRESENTATIVE WASTEWATER CHARACTERISTICS**

PSNH Merrimack Station  
Bow, New Hampshire

| POLLUTANT               | WASTE STREAM CONCENTRATION (mg/L) | LOADING AT 70,000 GPD (lb/day) |
|-------------------------|-----------------------------------|--------------------------------|
| Aluminum                | 1                                 | 0.58                           |
| Antimony                | 0.48                              | 0.28                           |
| Arsenic                 | 0.02                              | 0.012                          |
| Barium                  | 4.8                               | 2.80                           |
| Beryllium               | 0.1                               | 0.058                          |
| Cadmium                 | 0.05                              | 0.029                          |
| Chromium                | 0.15                              | 0.088                          |
| Copper                  | 0.05                              | 0.029                          |
| Iron                    | 0.2                               | 0.12                           |
| Lead                    | 0.1                               | 0.058                          |
| Manganese               | 1                                 | 0.58                           |
| Mercury                 | 0.000014                          | 0.0000082                      |
| Nickel                  | 1                                 | 0.58                           |
| Silver                  | 0.05                              | 0.029                          |
| Zinc                    | 0.05                              | 0.029                          |
| Selenium                | 3                                 | 1.75                           |
| Thallium                | 0.57                              | 0.33                           |
| Cyanide                 | < 0.020                           | < 0.012                        |
| Phenols                 | < 0.050                           | < 0.029                        |
| Ammonia                 | < 50                              | < 29                           |
| Nitrate                 | < 50                              | < 29                           |
| Fluoride                | 118                               | 68.9                           |
| Calcium                 | 4,651                             | 2,717                          |
| Magnesium               | 927                               | 541                            |
| Sodium                  | 200                               | 117                            |
| Sulfate                 | 1,117                             | 652                            |
| Chloride                | 10,000                            | 5,841                          |
| Silica                  | 200                               | 117                            |
| Alkalinity <sup>5</sup> | 100-300                           | 175                            |
| TSS                     | < 30                              | < 18                           |
| BOD                     | < 10                              | < 6                            |
| TTO                     | < 0.01                            | < 0.006                        |
| O&G                     | < 5.0                             | < 2.92                         |
| pH                      | 6 - 8 SU                          | N/A                            |
| Temperature             | 140° F                            | N/A                            |

NOTES:

1. SU means standard units, mg/L means milligrams per liter, < means anticipated below detection limit
2. Please note, steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably less than the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case wastewater characteristics. All mass loadings are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.
5. Mass loading for alkalinity was based on 300 mg/L.

**TABLE 2**  
**CHEMICAL INVENTORY**

PSNH Merrimack Station  
Bow, New Hampshire

| REFERENCE # | RAW MATERIALS           | AMOUNT USED PER YEAR |
|-------------|-------------------------|----------------------|
| 1           | Ferric chloride         | 7614 lbs             |
| 2           | Hydrochloric acid (32%) | 282,800 lbs          |
| 3           | Sodium Hydroxide (50%)  | 683,282 lbs          |
| 4           | Antifoam 1430           | 7,008 lbs            |
| 5           | Antiscalant             | 2,628 lbs            |
| 6           | Polymer                 | 761 lbs              |
| 7           | TMT 15 (Organosulfide)  | 219 tons             |
| 8           | Limestone <sup>3</sup>  | 152,000 tons         |

Note:

1. Values have been estimated by PSNH's treatment system design team.
2. It is not expected that significant amounts of chemicals will discharge to the sewer.
3. Flue gas absorber vessel feedstock



**ATTACHMENT 1**

**TOXICITY AND TREATABILITY INFORMATION**

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE (IDR) APPLICATION  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE**

**PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE**

**TOXICITY AND TREATABILITY INFORMATION**

**ATTACHMENT 1**

Federal standards applicable to all industrial wastewater discharges include a prohibition against discharges that cause or contribute to pass-through or interference. These limitations are related to the biodegradability of wastewater pollutants and toxicity to wastewater treatment system activated sludge microorganisms. Based on a review of the estimated wastewater treatment system effluent water quality and the MSDSs of materials used in the process, there is no evidence to suggest that the treated wastewater will adversely impact the performance of State's POTW.

**ATTACHMENT 2**

**WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE**

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE (IDR) APPLICATION  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE**

**PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE**

**WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE**

**ATTACHMENT 2**

PSNH will continue to evaluate opportunities for implementing conservation/pollution prevention measures. The project currently proposed was designed for the purpose of pollution prevention. Makeup water for the scrubber is recycled wastewater from an on-site pond where nearly 1 million gallons are recycled daily. Treated wastewater from the proposed treatment system will be recycled and used as makeup water for the scrubber. PSNH will continue to evaluate options for on-site reuse of this treated waste stream.

**ATTACHMENT 3**

**ENVIRONMENTAL PERMITS LIST**

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE (IDR) APPLICATION  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**ENVIRONMENTAL PERMITS LIST**

**ATTACHMENT 3**

- TP-008: Flue Gas Desulfurization Unit
- FP-T-0054: Electric Generating Unit #1
- TP-B-0462: Electric Generating Unit #2
- TP-B-0490: Emergency Boiler
- PO-B-1788: Emergency Generator #1
- PO-BP-2416: Primary Coal Crusher
- PO-BP-2417: Secondary Coal Crusher
- PO-B-0034: Combustion Turbine #1
- PO-B-0035: Combustion Turbine #2
- TV-AR-01: Acid Rain Permit
- TV-AR-0055: Proposed Title V Operating Permit
- TP-0068: Emergency Cooling Water Pump Engine
- DPHS-SW-85-012: Solid Waste Facility
- GWP-19840065-B-004: Ground Water Permit
- 11-026610: Permit to Operate Public Water System
- DES-HW-LP-06-22: Hazardous Waste Limited Permit
- NH0001465: National Pollutant Discharge Elimination System
- NHR05C069: MSGP-2008

**ATTACHMENT 4**

**PLANS, SPECIFICATIONS, OPERATION AND MAINTENANCE PROCEDURES**

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE (IDR) APPLICATION  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**PLANS, SPECIFICATIONS, OPERATION AND MAINTENANCE PROCEDURES**

**ATTACHMENT 4**

The proposed WWTS represents a modification to the facility which will minimize the impact on air and water quality. The conceptual design and treatment chemistry were developed by PSNH's current treatment design team. Engineering design review and permitting services were provided by GZA. **FIGURE 2** depicts the WWTS process flow and unit process details for the proposed treatment system.

**Wastewater Treatment System Description**

**Provided by Treatment System Design Team in Philosophy/Sequence of Operation Revision 2, August 2, 2010**

The FGD purge stream is unsuitable for reuse by other power plant facilities, and therefore must be treated separately and discharged. The characteristics of this wastewater stream require extensive treatment. A dedicated FGD wastewater treatment system offered for this application consists of two major sub-systems:

- Physical-Chemical Treatment; and
- Sludge Handling/Dewatering System.

The FGD purge stream is initially directed to the two 50 percent (%) equalization tanks (each has 50% of the total specified storage capacity) to partially attenuate any chemical or hydraulic fluctuations resulting from the FGD operations. In addition, the equalization tanks can receive flow from the treated wastewater effluent pumps and filtrate sump pumps, which consists of filtrate from the filter presses, backwash reject, building trench drains and tank overflow.

At a fairly constant rate, flow from the two 50% equalization tanks shall be pumped to the two 100% capacity reaction tanks (No. 1A and 1B). The wastewater will cascade by gravity through two 100% capacity reaction tanks (No. 2A and 2B), on to the two 100% capacity solids contact clarifiers (No. A and B), then to the two 100% capacity gravity filters and on to the two 50% capacity treated wastewater effluent tanks.

Reaction tanks No. 1A and 1B are chemical conditioning tanks where pH adjustment/gypsum "desaturation" is conducted. In the pH adjustment/gypsum "desaturation" phase, hydrated lime is added to elevate the pH to between 8.5 and 9.2 to provide "desaturation" of gypsum from the wastewater which has a tendency to be supersaturated when received from the FGD process. If not brought to equilibrium, this supersaturation can result in gypsum scale formation in the downstream wastewater treatment plant equipment. In order to achieve the "desupersaturation" operation in a controlled fashion via a crystal growth mechanism, sludge is recycled from the downstream solids contact clarifier to provide seed crystals for gypsum nucleation. The desired solids concentration within the reaction tanks is 3% – 5% by weight. The pH is also elevated to aid in the precipitation of soluble metals as insoluble hydroxides and oxyhydroxides. This operating pH range has been selected to achieve optimal metals reduction while minimizing the formation of magnesium hydroxide which can occur at higher pH.



In addition, an organosulfide reagent is added to reaction tanks No. 1A and 1B to form organosulfide heavy metal complexes which have very low solubility products, thus resulting in maximum heavy metal removal. Of particular importance for this project is the removal of mercury.

In reaction tanks No. 2A and 2B, ferric chloride is added to form a dense floc and enhance the settling characteristics of the precipitate. Additionally, the hydrolyzed form of this coagulant provides precipitation sites for co-precipitation of other metals. Polymer shall be injected into the clarifier influent line in order to form a denser floc which in turn will enhance the settling characteristics.

Two 100% capacity solids contact clarifiers will be provided for clarifying the chemically conditioned waste stream.

Overflow from the solids contact clarifiers will flow by gravity to a standpipe. HCl is dosed into the wastewater to reduce the pH to approximately 6.5 to 7.0 SU. An in-line static mixer with a HCl injection port shall be provided ahead of the standpipe to enhance the chemical blending with the clarified effluent.

The pH adjusted clarifier effluent shall flow by gravity to the two 100% capacity continuous backwash gravity filters for further suspended solids reduction.

The filtered effluent from the continuous backwash gravity filters will flow by gravity to the two 50% treated wastewater effluent storage tanks and shall be subsequently conveyed to the point of discharge by the treated wastewater discharge pumps. During low flow conditions and/or if the treated wastewater is found to be out of compliance, the discharge pumps shall be used to recycle flow back to the equalization tanks for reprocessing.

Two volume reduction steps can be utilized to concentrate the waste stream as necessary. A Falling Film Evaporator will reduce the volume by up to 84% (1-8/49), from 70,000 gallons per day (gpd) to approximately 11,500 gpd. The volume of wastewater is reduced, concentrations of contaminants increase but the mass remains unchanged. Effluent from the Evaporator can be directed to a Crystallizer to reduce the volume by up to an additional 63% (1-3/8), from 11,500 gpd to approximately 4,300 gpd. It should be noted that the concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.

Sludge from the solids contact clarifier is pumped via the sludge recycle/transfer pumps to the two 50% capacity sludge holding tanks. In addition, sludge is recycled to reaction tanks No. 1A and 1B. Dewatering is achieved by two 100% capacity recessed plate and frame filter presses. Filtrate from the dewatering operation, as well as any drain water from filter press drip trays, floor drains and floor trenches, is directed to the filtrate sump and pumped to the equalization tanks for subsequent treatment.

Overflows are routed to a floor trench collection system which discharges to the filtrate sump. Flows to the filtrate sump are recycled back to the equalization tank.



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**



*Winnepesaukee River Basin Program*

*Wastewater Treatment Plant*

*P.O. Box 68 - Franklin, NH- 03235*

*603-934-4032*

9/28/11

Mr. Harold Keyes  
Station Manager  
PSNH  
97 River Road  
Bow, NH 03304

Re: Status of PSNH Industrial Wastewater Indirect Discharge Request  
*Special Agreement – PSNH and WRBP Wastewater Treatment Plant*

Dear Mr. Keyes:

Please be advised that the Winnepesaukee River Basin Program (WRBP) has reviewed your Industrial Wastewater Discharge Request received on August 24<sup>th</sup>, 2011. Based upon document review and discussions with Mr. Ron Breton, GZA Inc, Mr. George Carlson, NHDES, and the WRBP staff we would like to inform you that approval has been granted for indirect discharge from your facility. This letter serves as an agreement to discharge treated wastewater from your flue gas desulfurization system that is currently scheduled for discharge in November of 2011. Acceptance is based upon compliance with the terms listed below. These terms reflect the hours of operation of our facility, process concerns and staffing. The WRBP reserves the right to cancel the agreement at any time due to staffing concerns, logistics, non-payment or the identification of any negative impact on the operation of the plant or the existing land application program.

We understand that we will serve as one of several outlets for this discharge. Any testing results on the proposed discharge after start up at your facility will need to be forwarded to us for our review and files. We also reserve the right to require additional testing as needed.

The terms of the Special Agreement are as follows:

- The WRBP will accept up to 25,000 gallons per day of treated wastewater from PSNH's flue gas desulfurization system
- The cost shall be based upon a set charge of \$30.00 per 1000 gallons (\$.03 / gallon)
- Monthly invoices generated from the WRBP will be payable upon receipt
- Discharge haulers shall follow established procedures at the WRBP
- The discharge will be accepted between the hours of 7:15 am and 2:30 pm Monday through Friday
- The discharge will also be accepted on Saturdays between the hours of 7:30 am and 2:30 pm

Concord Office

29 Hazen Drive, P.O. Box 95, Concord, New Hampshire 03302-0095  
Telephone: (603) 271-3504 Fax: (603) 271-2982 TDD Access: Relay NH 1-800-735-2964



The State of New Hampshire  
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPROVAL**

**APPLICANT**

Indirect Discharger **PSNH**  
Address **97 River Rd., Bow, NH**  
Authorized Signature **Harold Keyes** Station Manager  
Engineer **Ronald Breton, GZA GeoEnvironmental**

**MUNICIPALITY**

Municipality/POTW **Winnepesaukee River Basin Program WWTF**  
Approval Signature **Nancy M. Lesieur** IPP Coordinator  
Date of IDR **January 18, 2012**

**APPROVAL**

PERMIT/REQUEST NUMBER **IDR 11-016 W**  
FLOW **25000** gallons/day DATE: **January 19, 2012**

The Department of Environmental Services has reviewed and hereby approves the request as follows: Approval of the discharge to the applicant's wastewater facilities is based on review of the supporting information submitted and is subject to the conditions indicated below and the standard Conditions of Approval on the second page.

**CONDITIONS:**

Approval is for acceptance of highly treated wastewater from the wet flue gas desulfurization system. The wastewater will be hauled by tanker truck to the POTW. Weekly sampling and analysis shall be performed until pollutant concentrations are determined to be consistent, at which time testing may be reduced to at least monthly.

George F. Carlson, Jr., P.E.

Telephone (603) 271-2052

**NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES  
INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST**

**CONDITIONS OF APPROVAL**

The department's approval of this discharge request is subject to the following conditions:

- (1) The indirect discharger shall fully comply with the applicable sewer use ordinance;
- (2) The indirect discharger shall fully comply with all federal, state and local pretreatment standards and requirements;
- (3) Using additional water to dilute effluent or introducing uncontaminated water to the effluent shall not be allowed as a substitute for any pretreatment necessary to maintain compliance;
- (4) The indirect discharger shall not make changes in the type of production, amount of flow, or pollutant characteristics, or any increase in pollutant concentration, without prior approval by the department through the submission of a new industrial wastewater discharge request;
- (5) The approval shall be based on and apply only to the subject discharge request and all associated plans and supporting information as submitted and shall be signed by the indirect discharger's authorized representative; and
- (6) The approval shall become void if the discharge approved does not begin within one year from the date of approval.

Upon receipt of notification from the department that the discharge request is approved, the municipality shall issue a discharge permit to the indirect discharger.

If there are any question or comments concerning this approval, please contact the Industrial Pretreatment Section Supervisor, at the Water Division, telephone 271-2052.





**Public Service  
of New Hampshire**

PSNH Energy Park  
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, NH 03105-0330  
(603) 669-4000  
www.psnh.com

May 11, 2011

The Northeast Utilities System

Mr. Dana Clement  
Superintendent  
Allenstown Wastewater Treatment Facility  
35 Canal Street  
Allenstown, New Hampshire 03275

Re: Industrial Wastewater Discharge Permit Application  
Public Service of New Hampshire (PSNH)

Dear Mr. Clement:

Based on your previous discussions with Allan Palmer of PSNH and Ron Breton of GZA GeoEnvironmental, Inc., our consulting engineer, PSNH is requesting that the Town of Allenstown consider our request to accept treated wastewater from our wet flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the approval from the New Hampshire Department of Environmental Services (NHDES) and issuance of a permit and/or a contract outlining the terms of service and financial compensation by the Town, it is our intention to transport treated wastewater by tanker truck from our power station in Bow to a designated discharge point at the Town's wastewater treatment facility.

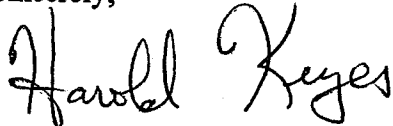
As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are adding post-treatment systems that can be operated to reduce the volume of the treated wastestream from roughly 100,000 gallons per day (gpd) to as small a volume as 5,000 gpd. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all of the wastewater we generate at your facility, we recognize that there may be restrictions and that only a portion of the total discharge may be accepted. This scenario has been considered in our overall wastewater management strategy.

During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We have also forwarded a copy of the NHDES Industrial Wastewater Indirect Discharge Request Application directly to Mr. George Carlson along with the required design review fee of \$1,000.00.

We trust that this submittal adequately addresses your informational needs. Should you have any questions, please contact Ron Breton at 232-8744 or me at 224-4081, extention 4130.

Sincerely,



Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

Attachment(s)

cc: George Carlson, P.E., NHDES

**INDUSTRIAL WASTEWATER DISCHARGE PERMIT APPLICATION**  
**Allenstown Sewer Commission - (603) 485-2027**

All items must be completed for this application to be considered complete. If this application is for a proposed discharge, indicate whether discharge information is actual or estimated. Existing discharges must give actual information for all questions. If an item is not applicable, indicate "NA". Please print or type all information. Attach additional pages where additional space is required.

**SECTION A: GENERAL INFORMATION**

1. This application is for an: Existing Discharge \_\_\_\_\_ Proposed Discharge  X
2. Name of facility:  PSNH Merrimack Station   
 Facility location:  97 River Road, Bow, New Hampshire 03304-3314   
 Mailing address (if different) \_\_\_\_\_

3. On behalf of the above-named applicant (owner), I hereby apply for a permit to discharge non-domestic wastewater to the wastewater collection and treatment facilities of the Town of Allenstown, New Hampshire. I certify that I am familiar with the Town of Allenstown's Sewer Use Ordinance, and the information contained in this application. 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. I further understand that if the actual wastewater discharged differs in any significant manner from the information contained herein, any permit issued based upon this application is void and such discharge shall be in violation of the Town of Allenstown's Sewer Use Ordinance.

Signature of Authorized Representative (as defined by PART III, Section 302 of the  
 Town of Allenstown's Sewer Use Ordinance - See Glossary)

|           |       |      |
|-----------|-------|------|
| Signature | Title | Date |
|-----------|-------|------|

**POLLUTION PREVENTION ACT OF 1990**

The Congress has declared it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally-safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally-safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally-safe manner.

The Town of Allenstown supports this policy and encourages the business and residential community to incorporate pollution prevention into their daily activities. Cost-free technical assistance may be obtained from the New Hampshire Pollution Prevention Program at (800) 273-9469. Additional resources are available and may be obtained by contacting the Wastewater Treatment Facility.



**CONFIDENTIALITY:** Per PART III Section 307 of the Town of Allenstown's Sewer Use Ordinance, information and data submitted as part of this application relating to wastewater characteristics shall be available to the public without restriction. Confidential and/or proprietary information shall be stamped "Confidential" or "Proprietary Information" or a written request shall accompany this application requesting confidentiality of this information.

4. Name of Owner: PSNH  
 Address of Owner: 780 North Commercial Street, Manchester, NH 03101  
 Owner's Telephone Number: 603-669-4000
5. Designated signatory authority in responsible charge of this facility:  
 Name and Title: Harold Keyes, Station Manager  
 Telephone Number: (603) 224-4081
6. Person to contact concerning information provided herein:  
 Name and Title: Allan Palmer, Senior Engineer  
 Business Telephone Number: (603) 634-2439
7. Have you been issued any federal, State, or local environmental permit(s)?  
 Yes  No

If yes, please list the permit(s):

| Description                                     | Permit No.         |
|---|--------------------|
| Flue Gas Desulfurization Unit                   | TP-008             |
| Electric Generating Unit #1                     | FP-T-0054          |
| Electric Generating Unit #2                     | TP-B-0462          |
| Emergency Boiler                                | TP-B-0490          |
| Emergency Generator #1                          | PO-B-1788          |
| Primary Coal Crusher                            | PO-BP-2416         |
| Secondary Coal Crusher                          | PO-BP-2417         |
| Combustion Turbine #1                           | PO-B-0034          |
| Combustion Turbine #2                           | PO-B-0035          |
| Title V Operating Permit                        | TV-AR-01           |
| Proposed Title V Operating Permit               | TV-AR-0055         |
| Emergency Cooling Water Pump Engine             | TP-0068            |
| Solid Waste Facility                            | DPHS-SW-85-012     |
| Ground Water Permit                             | GWP-19840065-B-004 |
| Permit to Operate Public Water System           | 11-026610          |
| Hazardous Waste Limited Permit                  | DES-HW-LP-06-22    |
| National Pollutant Discharge Elimination System | NH0001465          |

8. Is a Slug Control Plan prepared for this facility (See Glossary)?  
 If yes, attach a copy. Yes \_\_\_\_\_ No   x

**N/A PSNH Merrimack Station is not connected to the POTW via sewer lines. The proposed discharge will arrive to the POTW via tanker truck. Therefore a slug plan is not applicable.**

**SECTION B: PRODUCT OR SERVICE INFORMATION**

1. Provide a brief narrative description of manufacturing or service activity:

PSNH's Merrimack Station is a coal-fired power generating facility. Wastewater source is treated wastewater from a flue gas desulfurization (FGD) system.

2. STANDARD INDUSTRIAL CLASSIFICATION CODE

List the Standard Classification Codes (SIC) for all processes (See Glossary for definition):

| SIC Code Number | Industrial Group         |
|-----------------|--------------------------|
| <u>4911</u>     | <u>Electric Services</u> |

3. If your facility employs or will be employing processes in any of the industrial categories (Subject to National Categorical Pretreatment Standards - see Glossary) listed below, regardless of whether any of these processes generates wastewater or waste sludge, place a check beside the category or business activity (Check all that apply).

|  |   |
|--|---|
| <input type="checkbox"/> Aluminum Forming              | <input type="checkbox"/> Meat Processing                                |
| <input type="checkbox"/> Asbestos Manufacturing        | <input type="checkbox"/> Metal Finishing                                |
| <input type="checkbox"/> Battery Manufacturing         | <input type="checkbox"/> Metal Molding & Casting                        |
| <input type="checkbox"/> Builder's Paper               | <input type="checkbox"/> Non-Ferrous Metals Forming                     |
| <input type="checkbox"/> Centralized Waste Treatment   | <input type="checkbox"/> Non-Ferrous Metals Manufacturing               |
| <input type="checkbox"/> Cement Manufacturing          | <input type="checkbox"/> Organic Chemicals, Plastics & Synthetic Fibers |
| <input type="checkbox"/> Coil Coating                  | <input type="checkbox"/> Paint Formulating                              |
| <input type="checkbox"/> Copper Forming                | <input type="checkbox"/> Paving & Roofing (Tars & Asphalts)             |
| <input type="checkbox"/> Dairy Products Processing     | <input type="checkbox"/> Pesticides                                     |
| <input type="checkbox"/> Elec./Electronic Components   | <input type="checkbox"/> Petroleum Refining                             |
| <input type="checkbox"/> Electroplating                | <input type="checkbox"/> Pharmaceuticals                                |
| <input type="checkbox"/> Feedlots                      | <input type="checkbox"/> Phosphate Manufacturing                        |
| <input type="checkbox"/> Ferroalloy Manufacturing      | <input type="checkbox"/> Plastics Molding & Forming                     |
| <input type="checkbox"/> Fertilizer Manufacturing      | <input type="checkbox"/> Porcelain Enameling                            |
| <input type="checkbox"/> Fruits/Vegetable Process/Mfg. | <input type="checkbox"/> Pulp & Paper                                   |
| <input type="checkbox"/> Glass Manufacturing           | <input type="checkbox"/> Rubber Processing                              |
| <input type="checkbox"/> Grain Mills Manufacturing     | <input type="checkbox"/> Seafood Processing                             |
| <input type="checkbox"/> Ink Formulating               | <input type="checkbox"/> Soaps & Detergents Manufacturing               |
| <input type="checkbox"/> Inorganic Chemicals           | <input checked="" type="checkbox"/> Steam Electric                      |
| <input type="checkbox"/> Iron & Steel Manufacturing    | <input type="checkbox"/> Timber Products Manufacturing                  |
| <input type="checkbox"/> Leather Tanning & Finishing   | <input type="checkbox"/> Textile Mills                                  |

**SECTION C: PLANT OPERATIONAL CHARACTERISTICS**

1. Are your processes subject to seasonal variation? Yes \_\_\_\_\_ No  X   
 If yes, explain periods of peak operation and production.

2. Volume Information (attach sheets as needed):

| Description of Product or Service | Average Rate of Production / Qty of Services Provided |       |                                  |
|-----------------------------------|---|-------|----------------------------------|
|                                   | Amount  | Units | Time Basis (wk, month, yr, etc.) |
| Steam electricity generation      | 2.8 - 3.3 million                                     | MWH   | per year                         |
|                                   |   |       |                                  |
|                                   |   |       |                                  |

3. Schematic Flow Diagram: For each major activity in which wastewater is or will be generated, draw a diagram of the flow of materials, products, water and wastes from the start of the activity to its completion, showing all unit processes. Indicate which processes use water and which generate wastestreams. Include the average daily volume and maximum daily volume of each wastestream (new facilities may estimate). If estimates are used for flow data, this must be indicated. Use these numbers when showing these unit processes in the building layout diagram, Section C4. **SEE DRAWING # 3977-3-001-B and Figure 1.**
4. Building Layout Diagram: Provide drawings for each building on the premises. Show the location of water/flow meters, sampling stations, monitoring equipment and pretreatment facilities, chemical storage areas, numbered unit processes (from Schematic Flow Diagram), sanitary and storm sewer lines, street names, wells, and each facility sewer line connection to the public sewers. **SEE DRAWING # MK-S-5605. Note: No sewer connections exist as the wastewater will be transported to the POTW via tanker truck. See Figure 1 for unit process details.**
5. Description of potential expansion plans within the next 3 to 5 years. Include description of possible impacts on wastewater discharges to the sewer.

None

6. Shift Information **N/A There will no domestic wastewater discharge from the facility**

| Hours   |               | For each day of operation, list the number of employees working per shift |     |     |     |     |     |     |
|---------|---------------|---|-----|-----|-----|-----|-----|-----|
|         |               | Sun   | Mon | Tue | Wed | Thu | Fri | Sat |
| Shift 1 | 6:30am-6:30pm | 76  | 76  | 76  | 76  | 76  | 76  | 76  |
| Shift 2 | 6:30pm-6:30am | 32  | 32  | 32  | 32  | 32  | 32  | 32  |
| Shift 3 |               |   |     |     |     |     |     |     |
| Totals  |               | 108   | 108 | 108 | 108 | 108 | 108 | 108 |

**SECTION D: WATER USAGE & DISCHARGE**

1. Show the current quantities of water received and wastewater discharged daily.

| Water Used For  | INCOMING WATER |                  | OUTGOING WATER    |                  |                              |                   |
|---|----------------|------------------|-------------------|------------------|------------------------------|-------------------|
|   |                |                  | To Sanitary Sewer |                  | Other than to Sanitary Sewer |                   |
|   | Source *       | Average Gals/Day | Average Gals/Day  | Maximum Gals/Day | Average Gals/Day             | Discharge To (**) |
| Domestic / Sanitary                                   |                |                  |                   |                  |                              |                   |
| 1. Processes: List processes that generate wastewater |                |                  |                   |                  |                              |                   |
| 2.  |                |                  |                   |                  |                              |                   |
| 3.  |                |                  |                   |                  |                              |                   |
| Noncontact cooling                                    |                |                  |                   |                  |                              |                   |
| Contact cooling                                       |                |                  |                   |                  |                              |                   |
| Lawn Irrigation                                       |                |                  |                   |                  |                              | Irrigation        |
| Boiler blowdown                                       |                |                  |                   |                  |                              |                   |
| Other: <b>Flue gas desulfurization system</b>         | <b>B</b>       | 100,000          | 0                 | 0                | 100,000                      | <b>D</b>          |
| Stormwater  | Rainfall       |                  |                   |                  |                              |                   |
| Totals - Gallons per day                              |                | 100,000          |                   |                  | 100,000                      |                   |

**Note:** The proposed FGD system will generate up to 100,000 gpd on a continuous basis. However, several volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system.

2. If maximum flows expected to occur within the next year are different than above, indicate below.

|                |  |  |  |  |  |  |
|----------------|--|--|--|--|--|--|
| See note above |  |  |  |  |  |  |
|                |  |  |  |  |  |  |
|                |  |  |  |  |  |  |
|                |  |  |  |  |  |  |

**NOTES:**

\* = In the table above, enter the appropriate letter code indicating the source:

- A. Town water
- B. River or pond
- C. Groundwater
- D. Other (specify) \_\_\_\_\_

\*\* = In the table above, enter the code indicating the discharge point:

- A. Evaporation
- B. Storm drains
- C. Consumed in Products
- D. Other (specify) \_\_\_\_\_
- E. Surface waters (NPDES Permit No. \_\_\_\_\_)
- F. Holding tanks/leach fields
- G. Off-site disposal
- Transported via tanker trucks to the POTW

3. Describe the flow characteristics of continuous/batch/intermittent process discharges. (If additional space is required, use back of page.)

| Source           | Volume (gallons) | Duration (minutes) | Frequency (occurrences/day, etc.) | Time of Discharge (day & time) | Comments               |
|------------------|------------------|--------------------|-----------------------------------|--------------------------------|------------------------|
| FGD pretreatment | 4,000-100,000    | Variable           | 11 Max; Expected 1-6              | 24 hpd                         | See note D1 and below. |
|                  |                  |                    |                                   |                                |                        |
|                  |                  |                    |                                   |                                |                        |
|                  |                  |                    |                                   |                                |                        |

The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year. However, the wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

4. List past 4 quarters of water usage from Town water bills: **N/A**

| Year | Quarter | Cubic Feet (Acct.) | Cubic Feet (Acct.) | Cubic Feet (Acct.) | Totals |
|------|---------|--------------------|--------------------|--------------------|--------|
|      |         | No. _____)         | No. _____)         | No. _____)         |        |
| N/A  |         |                    |                    |                    |        |
|      |         |                    |                    |                    |        |
|      |         |                    |                    |                    |        |
|      |         |                    |                    |                    |        |

5. Describe any raw water treatment processes used.

Raw water source is treated wastewater recycled from an on-site treatment pond. No additional treatment is used prior to use in the FGD.

6. Describe any water recycling or material reclaiming processes used. List practices that reduce or eliminate the creation of pollutants or wastes at the source.

PSNH continually looks for opportunities for water conservation and recycling. Source water is recycled wastewater. Some of the treated wastewater from the proposed system will be recycled and used as make-up water.

7. Describe any wastewater treatment equipment or processes in use and processes from which they receive wastewater:

| Process Line | Type of Pretreatment   |
|--------------|--|
| FGD system   | FGD wastewater is treated using an advanced physical-chemical treatment system which includes metals precipitation, clarification, and filtration. |
|              | Two concentrators:   |
|              | Falling Film Evaporator  |
|              | Crystallizer   |

8. Furnish plans and specifications (if not previously submitted to the Allenstown Sewer Commission covering any existing or proposed pretreatment facilities. **SEE FIGURE 1 and ATTACHMENT 1**)
9. Wastewater discharges from buildings:

| Sewer connection location | Discharge Connects to | Average Volume (gals/day) |
|---------------------------|-----------------------|---------------------------|
| N/A                       |                       |                           |
|                           |                       |                           |
|                           |                       |                           |

10. Describe liquid wastes, if any, that are hauled away for disposal:

| Type of Waste                     | Waste Hauler     | Disposal Site   |
|-----------------------------------|------------------|-----------------|
| FGD wastewater treatment effluent | To be determined | Allenstown POTW |
|                                   |                  |                 |

11. Sampling Station(s):

**PSNH will provide this monitoring equipment at the site of generation if required but each tanker truck can be sampled as required.**

| Manufacturer | Sampler Model | Location/Designation |
|--------------|---------------|----------------------|
| N/A          |               |                      |

12. Flow Meter(s):

| Manufacturer | Model | Location |
|--------------|-------|----------|
| N/A          |       |          |

**SECTION F: WASTEWATER ANALYSIS**

Complete this section for analytes as required. Submit Chain-of-Custody forms and analytical results obtained from a State of New Hampshire certified laboratory for each discharge point to the Town's sewer system. All monitoring and analytical procedures must comply with procedures specified in 40 CFR Part 136.

Sampling of wastewater for these analyses must be representative of normal daily activities for this facility. The time, location and sampling methods must be approved by the Wastewater Department for acceptance as part of this application.

**ANALYSES FOR INDUSTRIAL DISCHARGE PERMIT APPLICATION**

|   | Req'd by Town | Analytical Results |
|---|---------------|--------------------|
| 1. Volatile Organic Compounds (Method 624):             | (A)           | attach results     |
| 2. Base Neutral/Acid Extractable Organics (Method 625): | (A)           | attach results     |
| 3. PCBs (Method 625):                                   | (A)           | attach results     |
| 4. Metals (total) and Cyanide:                          |               |                    |

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|              | Required by Town | Analytical Results |        |            | Required by Town | Analytical Results |        |
|--------------|------------------|--------------------|--------|------------|------------------|--------------------|--------|
| Aluminum     | X                | 0.83               | lb/day | Lead       | X                | 0.08               | lb/day |
| Arsenic      | X                | 0.02               | lb/day | Mercury    | X                | 0.000012           | lb/day |
| Beryllium    | X                | 0.08               | lb/day | Molybdenum | (A)              | No Data            |        |
| Cadmium      | X                | 0.04               | lb/day | Nickel     | X                | 0.83               | lb/day |
| Chromium (T) | X                | 0.13               | lb/day | Selenium   | X                | 2.5                | lb/day |
| Copper       | X                | 0.04               | lb/day | Silver     | X                | 0.04               | lb/day |
| Cyanide(T)   | (A)              | BDL                |        | Zinc       | X                | 0.04               | lb/day |
| Iron         | X                | 0.17               | lb/day |            |                  |                    |        |

**NOTE: Required Detection Limits (mg/l)**

|         |      |         |        |        |      |
|---------|------|---------|--------|--------|------|
| Copper  | 0.05 | Lead    | 0.005  | Silver | 0.01 |
| Cyanide | 0.04 | Mercury | 0.0005 | Zinc   | 0.05 |

5. Conventional Pollutants:

|                                   | Required by Town | Analytical Results |      |
|-----------------------------------|------------------|--------------------|------|
| Total Phenols                     | (A)              | BDL                |      |
| Ammonia (Total as N)              | (A)              | No Data            |      |
| Biochemical Oxygen Demand         | (A)              | BDL                |      |
| Chemical Oxygen Demand            | (A)              | No Data            |      |
| Total Dissolved Solids            | X                | 14,700             | mg/L |
| Total Suspended Solids            | (A)              | BDL                |      |
| pH                                | X                | 6 - 8              | SU   |
| Sulfide (as organosulfide)        | X                | 4.6                | mg/L |
| Sulfite                           | (A)              | BDL                |      |
| Sulfate                           | X                | 1,117              | mg/L |
| Closed-cup Flashpoint             | (B)              | N/A                |      |
| Total Oil & Grease (Method 413.1) | (A)              | BDL                |      |
| Total Petroleum Hydrocarbons      | (A)              | BDL                |      |

**NOTES:**

As a proposed process, no actual analytical data existis yet. Mass values are based on concentrations at 100,000 gpd. "X" Values provided by treatment design team.

(A) Due to the nature of the wastestream, best engineering judgment suggests these constituents will not be present above detection limits.

(B) The waste stream is aqueous and there are no combustibile materials used in the process.

The values presented represent an estimation of the absolute worst case wastewater characteristics.

All mass loadings are expected to be lower.

"BDL" = below detection limit

6. Other Constituents Characteristic of Your Operation:

|              | Required<br>by Town | Analytical Results |
|--------------|---------------------|--------------------|
| Formaldehyde | (A)                 | BDL                |
| Antimony     |                     | 0.4 lb/day         |
| Barium       |                     | 4.01 lb/day        |
| Manganese    |                     | 0.83 lb/day        |
| Thallium     |                     | 0.48 lb/day        |
| Calcium      |                     | 4651 mg/L          |
| Magnesium    |                     | 927 mg/L           |
| Sodium       |                     | 200 mg/L           |
| Alkalinity   |                     | 300 mg/L           |
| Chloride     |                     | 10,000 mg/L        |
| Fluoride     |                     | 118 mg/L           |
| Silica       |                     | 200 mg/L           |

**Note:**

(A) Due to the nature of the waste stream, best engineering judgment suggests these constituents will not be present above detection limits.



**IU to POTW**

**SECTION G: IDENTIFICATION OF RAW MATERIALS AND/OR POLLUTANTS PRESENT**

List all raw materials and chemical used in your facility operations that:

1. You know or have reason to believe are present in your wastewater discharge, or
2. Are hazardous wastes when disposed, or
3. Contain priority pollutants (see list on next page), or
4. Are stored at your facility in quantities of five (5) gallons or five (5) pounds or more at any given time.

Refer to Table 1, Page 10 for Priority Pollutant listing and itemize ID numbers as appropriate on this form. Computer inventory printouts may be used to provide the information required. Attach Material Safety Data Sheets (MSDSs) for all items that have not had MSDSs previously submitted.

| Raw Material / Product Name (List priority pollutant ingredients) | Purpose or Process for Raw Material Usage | Amount Used/Year (Pounds, gallons, etc.) | Estimated % Loss to Sewer |
|---|---|--|---------------------------|
| Limestone   | Air pollution control                     | 152,000 tons/yr                          | <1%                       |
| Ferric chloride   | Wastewater treatment                      | 7,614 lb/yr                              | <1%                       |
| Hydrochloric acid (32%)   | Wastewater treatment                      | 282,800 lb/yr                            | <1%                       |
| Sodium Hydroxide (50%)  | Wastewater treatment                      | 683,282 lb/yr                            | <1%                       |
| Antifoam 1430   | Wastewater treatment                      | 7,008 lb/yr                              | >90%                      |
| Antiscalant   | Wastewater treatment                      | 2,628 lb/yr                              | >90%                      |
| Organosulfide (TMT 15)  | Wastewater treatment                      | 219 tons/yr                              | <1%                       |
| Polymer (P813E / CORE SHELL 71307)                                | Wastewater treatment                      | 761 lb/yr                                | <1%                       |
|   |   |  |                           |
|   |   |  |                           |
|   |   |  |                           |
|   |   |  |                           |
|   |   |  |                           |
|   |   |  |                           |

**TOWN OF ALLENSTOWN, NEW HAMPSHIRE  
GLOSSARY**

**Authorized Representative** - An authorized representative shall be:

- a.
  - (i) A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or
  - (ii) The manager of one or more manufacturing, production, or operation facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- b. By a general partner or proprietor if the Industrial User is a partnership or sole proprietorship respectively.
- c. By a duly authorized representative of the individual designated in paragraph (a) or (b) of the section if:
  - (i) The authorization is made in writing by the individual described in paragraph (a) or (b);
  - (ii) The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the Industrial Discharge originates, such as the position of plant manager, operator of a well, or well field superintendent, or a position of equivalent responsibility, or having overall responsibility for environmental matters for the company; and
  - (iii) The written authorization is submitted to the Town.
- d. If an authorization under paragraph (c) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, or overall responsibility for environmental matters for the company, a new authorization satisfying the requirements of paragraph (c) of this section must be submitted to the Town prior to or together with any reports to be signed by an authorized representative.

**Industrial (Process) Wastewater** - The wastewater from industrial processes, trade, or business as distinct from domestic or sanitary sewage.

**NPDES** - National Pollutant Discharge Elimination System; the national program for issuing and enforcing permits for the discharge of pollutants from any point source into waters of the United States, under Sections 402, 318, and 405 of the Clean Water Act.

**Pretreatment Standards (Standards, Effluent Limitations)** - Shall mean prohibited discharge standards, categorical pretreatment standards, and local limits.

**Priority Pollutants** - A group of toxic chemicals listed by the EPA in 40 CFR Part 403, Appendix B as requiring restriction from entering municipal sewers or any receiving waters.

**Publicly Owned Treatment Works (POTW)** - The treatment works owned by the Town. This definition includes any devices or systems used in the collection, storage, treatment, recycling, and reclamation of sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances, which convey wastewater to the POTW treatment plant.

**Sanitary (Domestic) Wastewater** - Shall mean normal wastewater from household and toilet wastes discharged from any improved property, excluding ground, surface, or storm water.

**Slug Control Plan** - A plan prepared by an Industrial User to control slug discharges. Elements of the plan include: description of discharge practices, description of stored chemicals, procedures for notifying the POTW of slug discharges, and procedures to prevent adverse impact from accidental spills.

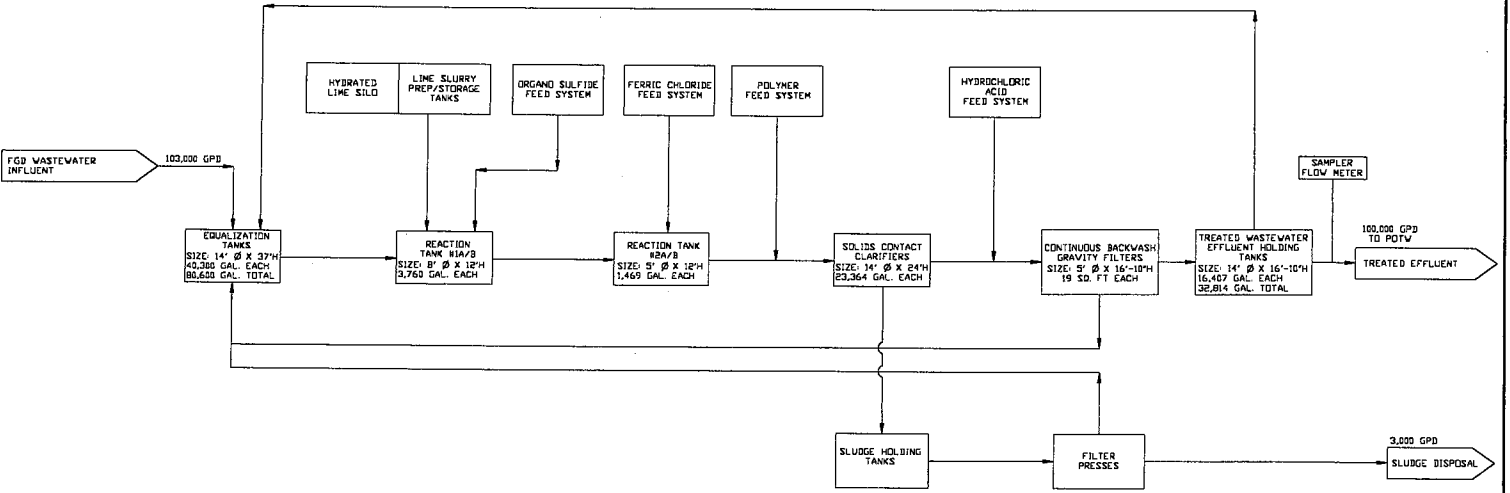
**Standard Industrial Classification (SIC) Codes** - A four-digit code number, which classifies individual business firms. SIC code listings are published by the United States Office of Management and Budget. See *Standard Industrial Classification Manual*, Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402.

**FIGURES**

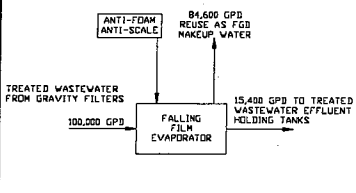
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NOTE:  
 1. THE WASTEWATER SYSTEM OPERATES TWO TREATMENT TRAINS IN PARALLEL.  
 2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

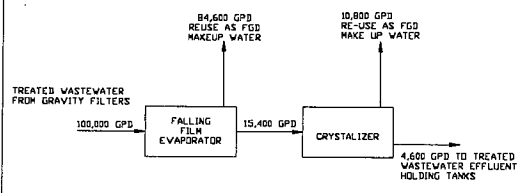
OPTION 1



OPTION 2



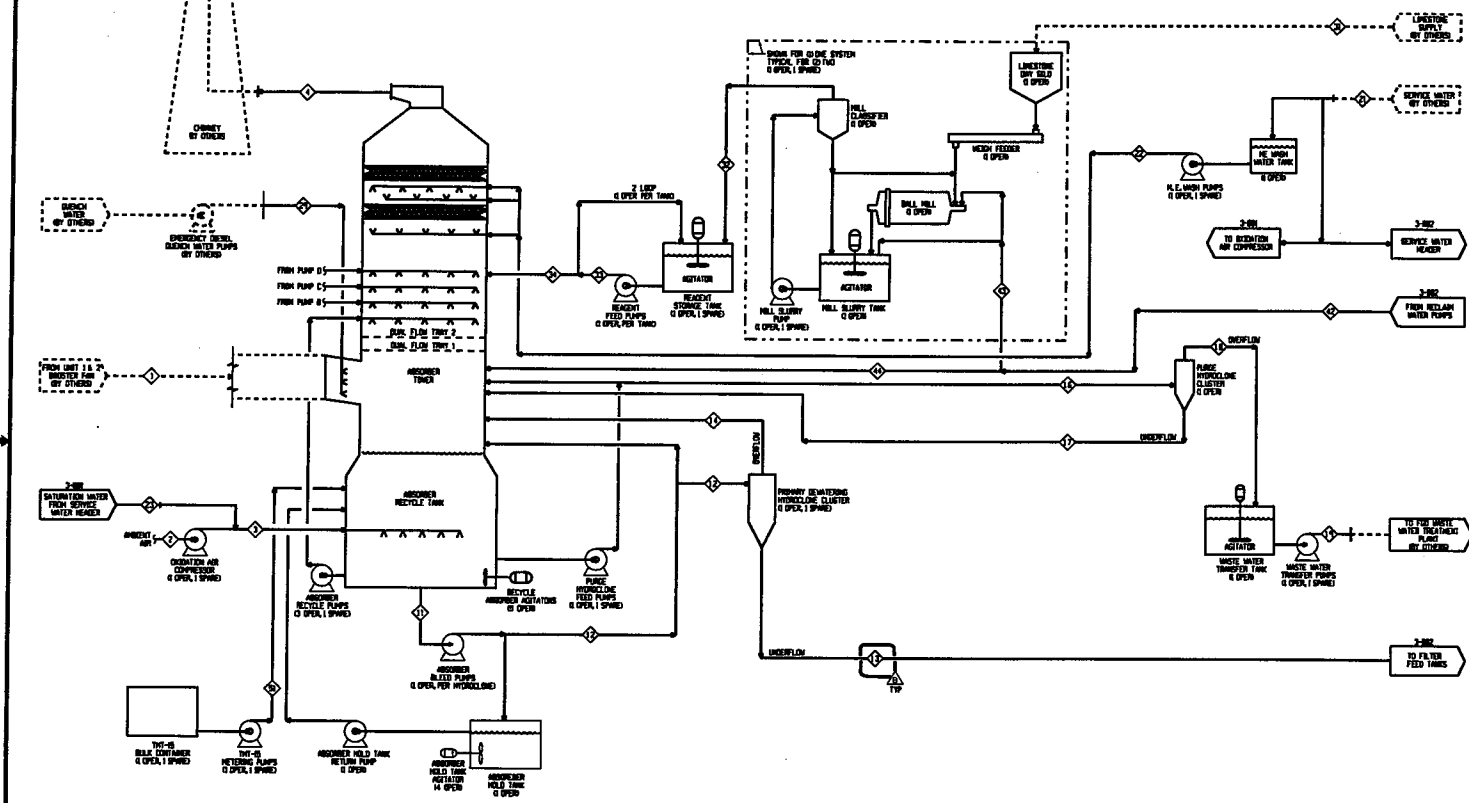
OPTION 3



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|  |                             |                    |                   |
|--|-----------------------------|--------------------|-------------------|
| INDUSTRIAL WASTEWATER DISCHARGE PERMIT APPLICATION<br>PSNH<br>BOW, NEW HAMPSHIRE   |                             |                    |                   |
| WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM   |                             |                    |                   |
| PREPARED BY:<br>CEA Environmental, Inc.<br>1000 North Main Street<br>Concord, NH 03301<br>TEL: 603-224-1100<br>FAX: 603-224-1101<br>WWW: www.cea.com | PROJECT NO.:<br>04022807/00 | CHECKED BY:<br>PFP | DATE:<br>MAY 2011 |
| REVIEWED BY:<br>PFP  | PROJECT NO.:<br>04022807/00 | CHECKED BY:<br>PFP | DATE:<br>MAY 2011 |
| PUBLIC SERVICE OF NEW HAMPSHIRE  |                             | REVISION NO.:      | SHEET NO.:        |
| FIGURE 1   |                             | 1                  |                   |

100-C-4160



| NO. | REVISION      | DATE     | BY | NOTE |
|-----|---------------|----------|----|------|
| 1   | DESIGN REVIEW | 11-20-88 |    |      |
| 2   | FOR APPROVAL  | 11-21-88 |    |      |

NOTE: FABRICATIONAL, MANUFACTURING, OR DETAILING HAS PROCEEDED ONLY WHEN DRAWING IS TESTED OR AUTHORIZED FOR SUCH PURPOSES.

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|      |    |       |             |                      |
|------|----|-------|-------------|----------------------|
| DATE | BY | SCALE | PROJECT NO. | PROJECT NAME         |
|      |    |       | 3977-3-001  | PROCESS FLOW DIAGRAM |

PUBLIC SERVICE OF NEW HAMPSHIRE  
MERRIMACK STATION UNITS #82  
BOW, NEW HAMPSHIRE

SIEMENS Power Generation, Inc.  
Environmental Systems & Services

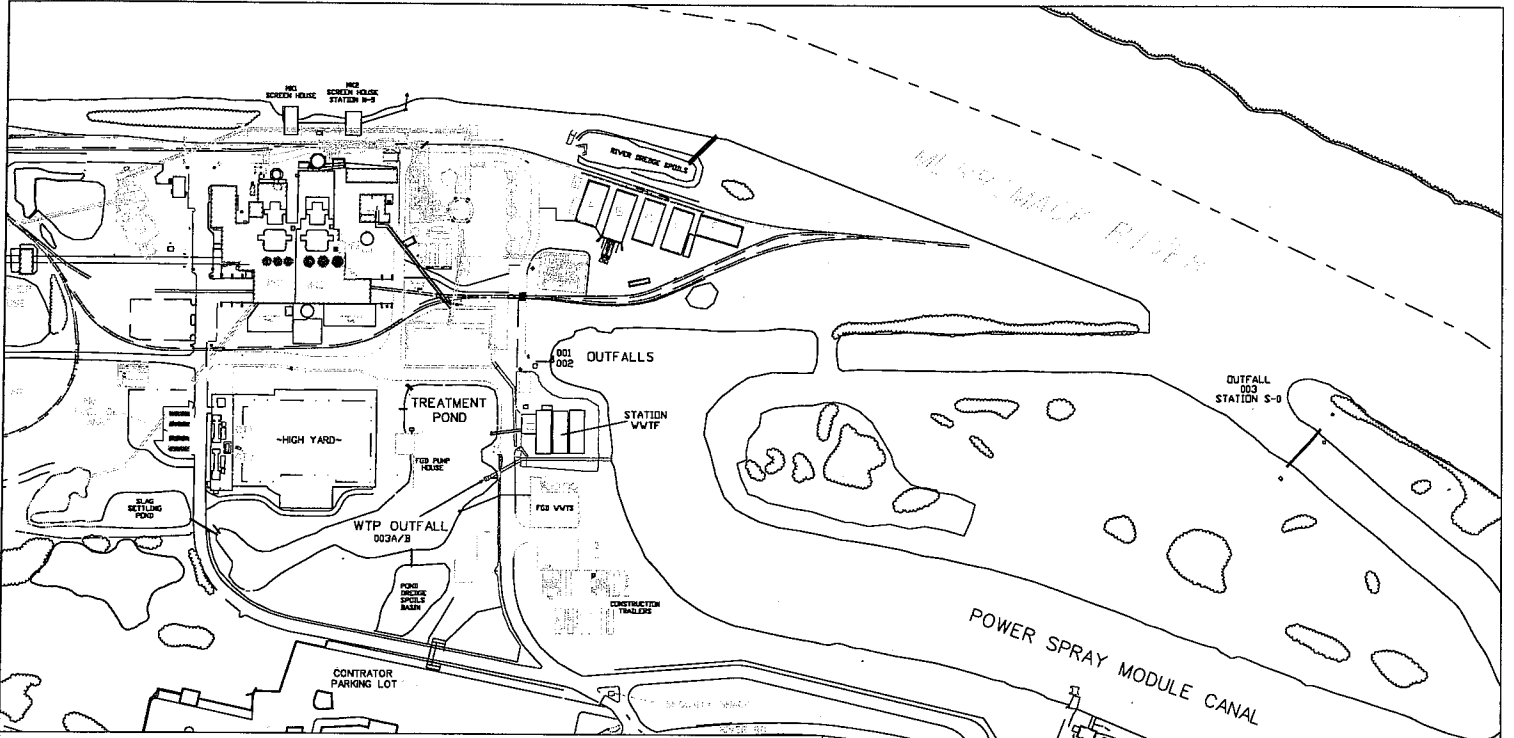
PLT DATE: 1/12/2001 3:53:08 PM (NOT PLOTTED BY 12/20/00)

**PRELIMINARY**

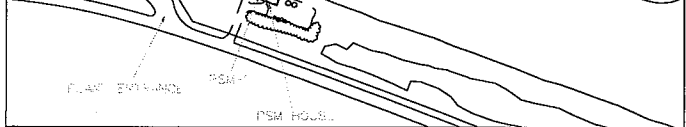
3977-3-001

B

i:\contract\3977 psnh\88 engineering information\6.5 cad\drafting\6.5.2 wapo drawings\39773001.dwg



NOTES:  
 -ALL OUTFALLS ARE LABELED WITH EPA ASSIGNED NUMBER  
 -FOR BREAKDOWN OF OUTFALLS 004 & 005 SEE DRAWING MK-M-1235



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|  |                                      |  |
|--|--------------------------------------|--|
|  | Public Service<br>of New Hampshire   | CONSTRUCTION SERVICES<br>DRAWING CODE<br>NUMBERED BY<br>DATE     |
|  | MERRIMACK STATION<br>WTP & S-0 PLANS | DRAWN BY: J.A. LAM S. J.C.<br>CHECKED BY: J.C.<br>DATE: 11/15/05 |

**ATTACHMENT 1**

**PLANS, SPECS, O&M PROCEDURES**

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INDUSTRIAL WASTEWATER DISCHARGE PERMIT APPLICATION  
ALLENSTOWN SEWER COMMISSION

PUBLIC SERVICE OF NEW HAMPSHIRE  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**PLANS AND SPECIFICATIONS**

**ATTACHMENT 1**

The proposed wastewater treatment system (WWTS) represents a modification to the facility which will minimize the impact on air quality and water. The conceptual design and treatment chemistry were developed by PSNH's current treatment design team. Engineering design review and permitting services were provided by GZA. **FIGURE 1** depicts the WWTS process flow and unit process details for the proposed treatment system.

**Wastewater Treatment System Description**

**Provided by Treatment System Design Team in Philosophy/Sequence of Operation Revision 2, August 2, 2010**

The FGD purge stream is unsuitable for reuse by other power plant facilities and, therefore, must be treated separately and discharged. The characteristics of this wastewater stream require extensive treatment. A dedicated FGD wastewater treatment system offered for this application consists of two major sub-systems:

- Physical-Chemical Treatment; and
- Sludge Handling/Dewatering System.

The FGD purge stream is initially directed to the two 50 percent (%) equalization tanks (each has 50% of the total specified storage capacity) to partially attenuate any chemical or hydraulic fluctuations resulting from the FGD operations. In addition, the equalization tanks can receive flow from the treated wastewater effluent pumps and filtrate sump pumps, which consists of filtrate from the filter presses, backwash reject, building trench drains and tank overflow.

At a fairly constant rate, flow from the two 50% equalization tanks shall be pumped to the two 100% capacity reaction tanks (No. 1A and 1B). The wastewater will cascade by gravity through two 100% capacity reaction tanks (No. 2A and 2B), on to the two 100% capacity solids contact clarifiers (No. A and B), then to the two 100% capacity gravity filters and on to the two 50% capacity treated wastewater effluent tanks.

Reaction tanks No. 1A and 1B are chemical conditioning tanks where pH adjustment/gypsum "desaturation" is conducted. In the pH adjustment/gypsum "desaturation" phase, hydrated lime is added to elevate the pH to between 8.5 and 9.2 to provide "desaturation" of gypsum from the wastewater which has a tendency to be supersaturated when received from the FGD process. If not brought to equilibrium, this supersaturation can result in gypsum scale formation in the downstream wastewater treatment plant equipment. In order to achieve the "desupersaturation" operation in a controlled fashion via a crystal growth mechanism, sludge is recycled from the downstream solids contact clarifier to provide seed crystals for gypsum nucleation. The desired solids concentration within the reaction tanks is 3% – 5% by weight. The pH is also elevated to aid in the precipitation of soluble metals as insoluble hydroxides and oxyhydroxides. This operating pH range has been selected to achieve optimal metals reduction while minimizing the formation of magnesium hydroxide which can occur at higher pH.



In addition, an organosulfide reagent is added to reaction tanks No. 1A and 1B to form organosulfide heavy metal complexes which have very low solubility products, thus resulting in maximum heavy metal removal. Of particular importance for this project is the removal of mercury.

In reaction tanks No. 2A and 2B, ferric chloride is added to form a dense floc and enhance the settling characteristics of the precipitate. Additionally, the hydrolyzed form of this coagulant provides precipitation sites for co-precipitation of other metals. Polymer shall be injected into the clarifier influent line in order to form a denser floc which in turn will enhance the settling characteristics.

Two 100% capacity solids contact clarifiers will be provided for clarifying the chemically conditioned waste stream.

Overflow from the solids contact clarifiers will flow by gravity to a standpipe. HCl is dosed into the wastewater to reduce the pH to approximately 6.5 to 7.0 Standard Units. An in-line static mixer with a HCl injection port shall be provided ahead of the standpipe to enhance the chemical blending with the clarified effluent.

The pH adjusted clarifier effluent shall flow by gravity to the two 100% capacity continuous backwash gravity filters for further suspended solids reduction.

The filtered effluent from the continuous backwash gravity filters will flow by gravity to the two 50% treated wastewater effluent storage tanks and shall be subsequently conveyed to the point of discharge by the treated wastewater discharge pumps. During low flow conditions and/or if the treated wastewater is found to be out of compliance, the discharge pumps shall be used to recycle flow back to the equalization tanks for reprocessing.

Two volume reduction steps can be utilized to concentrate the waste stream as necessary. A Falling Film Evaporator will reduce the volume by up to 85% (1-10/65), from 100,000 gpd to approximately 15,400 gpd. The volume of wastewater is reduced, concentrations of contaminants increase but the mass remains unchanged. Effluent from the Evaporator can be directed to a Crystallizer to reduce the volume by up to an additional 70% (1-3/10), from 15,400 gpd to approximately 4,600 gpd. It should be noted that the concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.

Sludge from the solids contact clarifier is pumped via the sludge recycle/transfer pumps to the two 50% capacity sludge holding tanks. In addition, sludge is recycled to reaction tanks No. 1A and 1B. Dewatering is achieved by two 100% capacity recessed plate and frame filter presses. Filtrate from the dewatering operation, as well as any drain water from filter press drip trays, floor drains and floor trenches, is directed to the filtrate sump and pumped to the equalization tanks for subsequent treatment.

Overflows are routed to a floor trench collection system which discharges to the filtrate sump. Flows to the filtrate sump are recycled back to the equalization tank.

**ATTACHMENT 2**

**MATERIAL SAFETY DATA SHEETS**

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Univar USA Inc Material Safety Data Sheet

---

MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052  
(425) 889 3400

---

Emergency Assistance

For emergency assistance involving chemicals call  
Chemtrec - (800) 424-9300

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**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 1 of 8  
Version: 1.2  
Revision Date: 2010/11/29

**DOW CORNING(R) ANTIFOAM 1430**

**1. PRODUCT AND COMPANY IDENTIFICATION**

Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686

**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 01228480

Revision Date: 2010/11/29

Generic Description: Silicone emulsion  
Physical Form: Viscous Liquid  
Color: White  
Odor: Slight odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. HAZARDS IDENTIFICATION**

**POTENTIAL HEALTH EFFECTS**

**Acute Effects**

Eye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.

**Prolonged/Repeated Exposure Effects**

Skin: Repeated or prolonged exposure may cause irritation.  
Inhalation: No known applicable information.  
Oral: No known applicable information.

**Signs and Symptoms of Overexposure**

No known applicable information.

**Medical Conditions Aggravated by Exposure**

No known applicable information.

**CONFIDENTIAL**

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 2 of 8  
Version: 1.2  
Revision Date: 2010/11/29

**DOW CORNING(R) ANTIFOAM 1430**

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**4. FIRST AID MEASURES**

Eye: If irritation occurs, flush eye(s) with lukewarm gently flowing water for 5 minutes. Obtain medical attention.

Skin: No health effects expected. If irritation does occur flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Inhalation: If symptoms are experienced remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.

Oral: If irritation or discomfort occur, obtain medical advice.

Notes to Physician: Treat according to person's condition and specifics of exposure.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.

Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

Unusual Fire Hazards: None.

**6. ACCIDENTAL RELEASE MEASURES**

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**DOW CORNING CORPORATION**  
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**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See Section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact. Avoid skin contact.

Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.

General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Suitable Gloves: Avoid skin contact by implementing good industrial hygiene practices and procedures. Select and use gloves and/or protective clothing to further minimize the potential for skin contact. Consult with your glove and/or personnel protective equipment manufacturer for selection of appropriate compatible materials.

Inhalation: No respiratory protection should be needed.

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Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Avoid skin contact. Use reasonable care.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions. For further information regarding aerosol inhalation toxicity, please refer to the guidance document regarding the use of silicone-based materials in aerosol applications that has been developed by the silicone industry ([www.SEHSC.com](http://www.SEHSC.com)) or contact the Dow Corning customer service group.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Viscous Liquid

Color: White

Odor: Slight odor

Specific Gravity @ 25°C: 1.0

Viscosity: 10000 cSt

Freezing/Melting Point: Not determined.

Boiling Point: > 35 °C

Vapor Pressure @ 25°C: Not determined.

Vapor Density: Not determined.

Solubility in Water: Not determined.

pH: Not determined.

Volatile Content: Not determined.

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.

Hazardous Polymerization: Hazardous polymerization will not occur.

Conditions to Avoid: None.

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Materials to Avoid: Oxidizing material can cause a reaction.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde. Metal oxides.

**11. TOXICOLOGICAL INFORMATION**

Special Hazard Information on Components

No known applicable information.

**12. ECOLOGICAL INFORMATION**

Environmental Fate and Distribution

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

| Hazard Parameters (LC50 or EC50) | High  | Medium           | Low   |
|----------------------------------|-------|------------------|-------|
| Acute Aquatic Toxicity (mg/L)    | <=1   | >1 and <=100     | >100  |
| Acute Terrestrial Toxicity       | <=100 | >100 and <= 2000 | >2000 |

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal. Call (989) 496-6315, if additional information is required.

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**DOW CORNING(R) ANTIFOAM 1430**

**14. TRANSPORT INFORMATION**

**DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

**Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Additional Regulatory Information: This product contains a component subject to a regulation other than TSCA.

**EPA SARA Title III Chemical Listings**

**Section 302 Extremely Hazardous Substances (40 CFR 355):**  
None.

**Section 304 CERCLA Hazardous Substances (40 CFR 302):**  
None.

**Section 311/312 Hazard Class (40 CFR 370):**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals (40 CFR 372):**  
None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

**Supplemental State Compliance Information**

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**DOW CORNING(R) ANTIFOAM 1430**

**California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u> |
|-------------------|-------------|-----------------------|
| 7664-93-9         | <0.1        | Sulfuric acid         |

**New Jersey**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>          |
|-------------------|-------------|--------------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                          |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane           |
| None              | 3.0 - 7.0   | Treated amorphous silica       |
| 9005-08-7         | 1.0 - 5.0   | Polyethylene glycol distearate |

**Pennsylvania**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>    |
|-------------------|-------------|--------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                    |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane     |
| None              | 3.0 - 7.0   | Treated amorphous silica |

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**DOW CORNING(R) ANTIFOAM 1430**

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

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## Univar USA Inc Material Safety Data Sheet

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For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

### Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

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**Westlake CA&O  
Corporation**

P.O. Box 527  
Calvert City, KY 42029-0527

**MATERIAL SAFETY DATA SHEET**

**ISSUED: 06/01/06**

**SODIUM HYDROXIDE SOLUTION - 50%**

**REVISED: 06/01/06**

**SECTION I - PRODUCT IDENTIFICATION**

Westlake CA&O  
2468 Industrial Parkway  
P O Box 527  
Calvert City, KY 42029

Telephone No.: (270) 395-4151  
Transportation Emergency No.:  
CHEMTREC: (800) 424-9300  
Medical Emergency No.:  
POISON CENTER: (216) 379-8562

Chemical Family: Alkali

Chemical Name/Synonyms: Solutions of: Caustic, Caustic Soda, Lye, Sodium hydrate

Trade Mark: None

Formula: Mixture

C.A.S. Registry No.: 1310-73-2

TSCA Inventory Status: All ingredients are listed on the USEPA's TSCA inventory

Canadian Domestic Substances List Status: All ingredients have been nominated or are eligible for inclusion

Workplace Hazardous Materials Information System (WHMIS) Classification: E

Product Use: Caustic Applications

SARA 313 Information: Not Applicable

**SECTION II - HAZARDOUS INGREDIENTS**

Hazard Summary Statement: CAUTION! CORROSIVE LIQUID. Contact with skin results in severe burns with possible deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mists causes irritation of the nose, throat, mucous membranes and lungs.

| <u>Material</u>                     | <u>C.A.S. Number</u> | <u>Amount in Product</u> | <u>ACGIH TLV-TWA</u>           | <u>OSHA PEL-TWA</u> |
|-------------------------------------|----------------------|--------------------------|--------------------------------|---------------------|
| Sodium Hydroxide <sup>2,4,5,6</sup> | 1310-73-2            | 50%                      | 2 mg/m <sup>3</sup><br>Ceiling | 2 mg/m <sup>3</sup> |

**N.A. - Not Applicable**

**N.E. - Not Established**

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## Legislative Footnotes

- <sup>1</sup> Ingredient listed on SARA Section 313 List of Toxic Chemicals.
- <sup>2</sup> Ingredient listed on the *Pennsylvania Hazardous Substances List*.
- <sup>3</sup> Ingredient listed on the California listing of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*.
- <sup>4</sup> Ingredient listed on the *Massachusetts Substance List*.
- <sup>5</sup> *Workplace Hazardous Materials Information System* ingredient found on the Ingredient Disclosure List - Canada.
- <sup>6</sup> Ingredient listed on the *New Jersey Right to Know Hazardous Substance List*.

### Notes

- TLV-TWA** - Threshold Limit Value - Time Weighted Average guideline for concentration of the chemical substance in the ambient workplace air. American Conference of Governmental Industrial Hygienists (ACGIH).
- OSHA PEL** - OSHA Permissible Exposure Limit, 8-hour TWA. 29 CFR 1910.1000, Transitional Limits column, Table Z-1-A, Table Z-2 and Table Z-3.

### SECTION III - PHYSICAL DATA

|   |  |
|---|--|
| Appearance: Colorless to gray,<br>syrupy liquid | Specific Gravity: 1.49 @ 65.6°C (150°F)<br>pH = 14 (strong alkali) |
| Odor: Mild, slightly pungent                    | Boiling Point: 148°C (298°F)                                       |
| Percent Volatiles: 50%                          | Vapor Pressure: 19 mm Hg @ 65.5°C (150°F)                          |
| Solubility in Water: Soluble                    | Vapor Density: N.A.  |
| Physical State: Liquid                          |  |

### SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point: Not combustible.

Lower Explosive Limit (LEL): Not Applicable

Upper Explosive Limit (UEL): Not Applicable

Self-Ignition Temperature: Not Applicable

## **Notes**

**Flash Point** -- The lowest initial temperature of air passing around the specimen at which sufficient combustible gas is evolved to be ignited by a small external pilot flame.

**Self-Ignition Temperature** -- The lowest initial temperature of air passing around the specimen at which, in absence of an ignition source, ignition occurs of itself, as indicated by an explosion, flame or sustained glow.

**Extinguishing Media**: Although not combustible, should a fire involve the product, flood with water using care not to splash or splatter this material.

**Special Firefighting Procedures**: As with most fire conditions, it is proper to wear a positive pressure self-contained breathing apparatus (SCBA). Personnel not wearing suitable protection must be removed from the area. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

**Unusual Fire and Explosion Hazards**: In contact with moisture or water sufficient heat may be generated to ignite adjacent combustible materials. Sodium hydroxide solutions can react violently when in contact with chlorinated hydrocarbons and metals such as aluminum, zinc or materials galvanized with zinc with resultant generation of hydrogen.

## **SECTION V - REACTIVITY**

**Stability**: Stable

**Hazardous Polymerization**: Will not occur.

**Hazardous Decomposition Products**: Not combustible.

**Incompatibility (Materials to Avoid)**: This product reacts with water generating heat. Do not add water to this product, always add caustic to water slowly and in small amounts to avoid boiling and spattering. This product reacts violently or explosively with chlorinated hydrocarbons. It attacks leather and wool resulting in destruction of those materials and possible chemical exposure to the individual. Caustic solutions can generate hydrogen gas on contact with aluminum, zinc or materials galvanized with zinc.

## **SECTION VI - HEALTH HAZARD DATA**

**Threshold Limit Value**: 2 mg/m<sup>3</sup> - Ceiling.

**Permissible Exposure Limit (PEL)**: 2 mg/m<sup>3</sup>

**Primary Routes of Exposure**: Inhalation, skin and eye contact.

Effects of Overexposure: This material is extremely corrosive to all body tissue. Skin contact will result in severe burns and frequently with deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mist will cause irritation and may even cause damage to the entire respiratory tract varying from mild irritation of mucous membranes to severe pneumonitis. Symptoms may not be immediately painful or visible. Swallowing usually results in severe injury.

Emergency and First Aid Procedures:

Inhalation: Remove affected individual to fresh air. Obtain medical attention immediately.

Eye Contact: Immediately flush eyes with lukewarm water for at least 15 minutes while lifting upper and lower eyelids. Continue to flush the eyes if there is any indication of residual chemical. Seek medical attention immediately.

Skin Contact: Immediately remove contaminated clothing, and flush exposed area with lukewarm water for at least 15 minutes. Continue to flush skin if there is any indication of residual chemical. Seek medical attention immediately.

Ingestion: DO NOT INDUCE VOMITING! Immediately dilute by drinking water or milk, then neutralize with diluted vinegar or fruit juice.

**SECTION VII - SPILL & LEAK PROCEDURE**

Steps to be taken in case material is released or spilled: Issue a warning: CORROSIVE MATERIAL. Keep non-essential personnel away from spill area. Wear rubber protective clothing, e.g., gloves, boots, aprons, and chemical splash goggles and face shield. Do not touch spilled material. Contain the spill and use absorbents and pumps to remove "ponded" liquid. Transfer the spilled material to caustic resistant containers labeled: CORROSIVE. Avoid flushing chemical into public sewers or water system. With careful handling, dilute acid, preferable acetic acid, may be used to neutralize final traces of caustic. Flush the cleaned area with water.

Waste Disposal Method: HAZARDOUS WASTE. EPA Hazardous Waste Number: D002 (if pH is greater than 12.5). Dispose of in a licensed hazardous waste disposal facility in accordance with all applicable Federal, State and Local health and pollution laws and regulations. (See 40 CFR 261).

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

Ventilation: Ventilation should always be provided to draw mists and vapors away from workers to prevent routine inhalation. Ventilation should be adequate to maintain the ambient workplace atmosphere below the limits listed in Section II.

Respiratory Protection: Wear a NIOSH/MSHA-approved, airline or self-contained respirator whenever exposures exceed the limits listed in Section II. Use in accordance with the manufacturers use limitations and OSHA Standard 1910.134 (29 CFR).



Eye/Face Protection: Chemical goggles with full face shield.

Protective Equipment: Wear impervious (e.g. rubber) gloves, boots or shoes, coveralls or other protective clothing as appropriate to prevent contact with liquid. Check with glove/clothing manufacturers to determine materials resistant to the chemicals shown in Section II.

Additional: *Do not smoke or consume food or beverage in the work areas. Wash thoroughly after handling the product.*

## **SECTION IX - SPECIAL PRECAUTIONS**

Material Handling: Do not breathe mists or vapors. Avoid skin and eye contact. Use under well-ventilated conditions. Utilize good personal hygiene practices, e.g., thoroughly washing after handling the product. Remove contaminated clothing and shower at once. Wash contaminated clothing before reuse. (Discard leather shoes.) **PROVIDE A SAFETY SHOWER AND EYEWASH STATION IN THE WORK AND HANDLING AREAS.**

Storage: Store in water-tight containers in a cool, dry place separate from the normal work area and away from materials that react with sodium hydroxide. Use corrosion resistant structural materials and lighting and ventilation systems in the storage area. Store in suitable, labeled containers and maintain in a tightly closed condition when not in use. Protect containers from physical damage. Post appropriate warning signs.

## **SECTION X - HAZARD CODES**

### NFPA (2002)

(National Fire Protection Association)

Health: 3  
Flammability: 0  
Reactivity: 1  
Special: Corrosive

### HMIS

(Hazardous Materials Identification System)

Health: 3  
Flammability: 0  
Reactivity: 1  
Personal Protection: X\*

### Key:

0 = Insignificant  
1 = Slight  
2 = Moderate  
3 = High  
4 = Extreme

\* See MSDS for specified protection

## **USER'S RESPONSIBILITY**

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this bulletin should be provided to the user's employees or customers. Westlake CA&O Corporation must rely upon the user to utilize this information to develop appropriate work practice guidelines and employee instructional programs for his or her operation.

## **DISCLAIMER OF LIABILITY**

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding the accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

## **SHIPPING INFORMATION**

(MSDS - SODIUM HYDROXIDE SOLUTION, 50%)

# **CONFIDENTIAL**

## IDENTIFICATION - DOMESTIC TRANSPORTATION

Proper Shipping Name (172.101(c)): SODIUM HYDROXIDE SOLUTION  
(Technical Name(s)) 172.203(k): (Contains 50% Sodium Hydroxide)  
Hazard Class 172.101(d): 8 UN/NA# 172.101(e): UN 1824  
Haz. Substance 171.8: Sodium Hydroxide Reportable Quantity: 1,000 Lbs  
Inhalation Hazard 172.2a(b): N/A  
Package Code 172.101(f): PG II Placarded: CORROSIVE

## PACKAGING (Part 173)

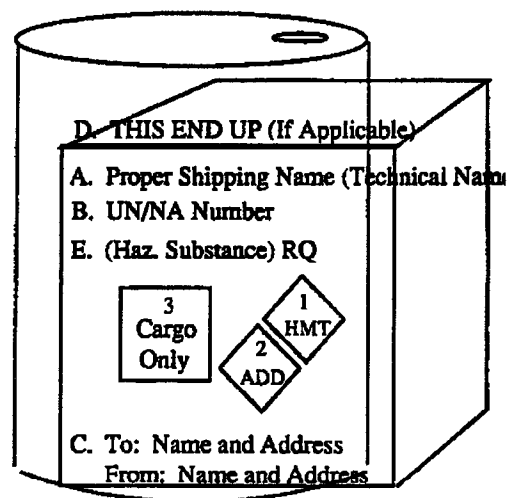
- ◆ Packaging Section (172.101(i)) –(Col. 8(A): 173.154)(Col. 8(B): 173.202)(Col. 8(C): 173.242)
- ◆ General Packaging Section - General 173.24 Hazard Class: CORROSIVE

## MARKING

- A. Proper Shipping Name (172.301(a)) (Technical Name) (172.301(b))
- B. UN/NA Number (172.301(a))
- C. Name & Address (172.301(d))
- D. THIS END UP (172.312(a))
- E. Hazardous Substance RQ (Name) (172.324)  
ORM Designation (172.316(a))  
Inhalation Hazard (172.313(a))

## DOMESTIC LABELING

1. HMT LABELS (172.400)
2. Additional Subsidiary Hazard (172.402(a))



## IATA 2005 Edition

Proper Shipping Name (Col. B): Sodium Hydroxide Solution  
Class/Division (Col. C): 8 Subsidiary Risk (Col. D): N/A  
UN/ID# (Col. A): UN 1824  
Carrier Special Provisions (Col. M): A3

## PACKAGING

- ◆ Max. Qty. Per Pkg. (Cols. H/J) - Passenger: 1 Liter Cargo: 30 Liters
- ◆ Packaging Instructions (Cols. G/I) - Passenger: 809 Cargo: 813



P.O. Box 160  
Corner Brook  
Newfoundland  
Canada  
A2H 6C7

## MATERIAL SAFETY DATA SHEET

### LIMESTONE

#### 1. Product Information:

Limestone is a naturally occurring mineral. It is used in the manufacture of quicklime and hydrated lime, steel production, as a soil sweetener, mineral filler and construction aggregate.

Producer: ATLANTIC MINERALS LIMITED  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

#### 2. Chemical Components:

|                                       | <u>%</u> | <u>CAS #</u> |
|---------------------------------------|----------|--------------|
| Calcium Carbonate                     | 95 - 100 | 1317-65-3    |
| Magnesium Carbonate                   | 0 - 1    | 546-93-0     |
| Clay Minerals<br>(Aluminum Silicates) | 0 - 3    | 1302-65-3    |
| Amorphous Silica                      | trace    | 7631-86-9    |
| Crystalline Silica                    | trace    | 14808-60-7   |
| Iron Oxide                            | trace    | 1309-37-1    |

Exposure Limit - classed as nuisance dust  
- TWAEV (time weighted average exposure value) = 10mg/m<sup>3</sup> (total dust)

#### 3. Physical Data:

Solid - white to grey  
Specific Gravity - 2.6 - 2.8  
Solubility in water - negligible  
pH in water - neutral

4. Fire or Explosive Hazards: Not applicable

#### 5. Reactivity Data:

Reacts vigorously with mineral acids producing carbon dioxide.  
Decomposes at >850 °C to quicklime and carbon dioxide.

6. Toxicological Properties: Classified as nuisance dust.

Route of entry: skin contact, eye contact, inhalation, ingestion.

---

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:  
Quarry Site:

Tel: (709) 634-8255  
Tel: (709) 644-2447

Fax: (709) 634-3939  
Fax: (709) 644-2449

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# MATERIAL SAFETY DATA SHEET

## LIMESTONE

**Acute Exposure:** Inhalation may cause nose, throat, or lung irritation and choking depending on the degree of exposure. May cause eye irritation and damage to cornea. May cause dry skin or skin irritation. Ingestion of large quantities may cause intestinal distress.

**Chronic Exposure:** Prolonged or repeated exposure may cause lung injury.

**Exposure Limit:** TWAEV (time weighted average exposure limit value) = 10 mg/m<sup>3</sup> (total dust)

### 7. Preventative Measures:

**Skin Contact -** Use protective clothing to prevent skin contact.

**Eye Protection -** Use safety glasses or goggles to prevent eye contact.

**Respiratory Protection -** Not required under ordinary conditions but an approved respiratory is necessary when exposed to dust above exposure limits.

**Waste Disposal -** Dispose as a common waste.

### 8. First Aid Measures:

**Inhalation -** Move to fresh air. Seek medical attention for discomfort.

**Eye contact -** Rinse thoroughly with water. Seek medical attention for abrasion.

**Skin Contact -** Wash with soap and water.

**Ingestion -** Do not induce vomiting but drink plenty of water. Seek medical attention for discomfort.

### 9. Preparation Information:

MSDS prepared by: **ATLANTIC MINERALS LIMITED**  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

Phone: (709) 634-8255

Preparation Date: June 2009.

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:

Tel: (709) 634-8255

Fax: (709) 634-3939

Quarry Site:

Tel: (709) 644-2447

Fax: (709) 644-2449

# CONFIDENTIAL

# SAFETY DATA SHEET

# OxyChem<sup>®</sup>



## Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Company Identification:** Occidental Chemical Corporation  
5005 LBJ Freeway  
P.O. Box 809050  
Dallas, Tx 75380-9050

**24 Hour Emergency Telephone Number:** 1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)

**To Request an MSDS: Customer Service:** MSDS@oxy.com or 1-972-404-3245  
1-800-752-5151 or 1-972-404-3700

**Trade Name:** Hydrochloric Acid (HCl)

**Synonyms:**

- Muriatic Acid
- HCl Solution
- Aqueous hydrogen chloride

**Product Use:** Process chemical, Metal cleaning, Water purification, Petroleum industry

### 2. HAZARDS IDENTIFICATION

\*\*\*\*\*

#### EMERGENCY OVERVIEW:

**Color:** Colorless  
**Physical State:** Liquid  
**Appearance:** Clear  
**Odor:** Irritating, Pungent, Sharp  
**Signal Word:** Danger

**MAJOR HEALTH HAZARDS:** CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN AND EYES. CAUSES PERMANENT EYE DAMAGE. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

**PHYSICAL HAZARDS:** May spatter or generate heat when mixed with water. Contact with metals may evolve flammable hydrogen gas.

**PRECAUTIONARY STATEMENTS:** Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Use only with adequate ventilation.

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

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## 2. HAZARDS IDENTIFICATION

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### POTENTIAL HEALTH EFFECTS:

**Inhalation:** May cause irritation (possibly severe), chemical burns, and pulmonary edema.

**Skin contact:** May cause irritation (possibly severe) and chemical burns.

**Eye contact:** May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

**Ingestion:** Not a likely route of exposure.

**Target Organs Affected:** Respiratory System, Skin, Eye

**Chronic Effects:** Repeated or prolonged exposure to dilute solutions may result in dermatitis. Discoloration of the teeth may occur as a result of long term exposure.

**Interaction with Other Chemicals Which Enhance Toxicity:** None known

**Medical Conditions Aggravated by Exposure:** None known

**See Section 11: TOXICOLOGICAL INFORMATION**

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## 3. COMPOSITION/INFORMATION ON INGREDIENTS

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| Hazardous Component | Concentration (by weight %) | CAS - No. |
|---------------------|-----------------------------|-----------|
| Water               | 63 - 91                     | 7732-18-5 |
| Hydrogen chloride   | 9 - 36                      | 7647-01-0 |

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## 4. FIRST AID MEASURES

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

**SKIN CONTACT:** Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:** Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:** Not a likely route of exposure.

# Hydrochloric Acid (HCl) (All Grades)

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## 4. FIRST AID MEASURES

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## 5. FIRE-FIGHTING MEASURES

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**Fire Hazard:** Negligible fire hazard.

**Extinguishing Media:** Use media appropriate for surrounding fire

**Fire Fighting:** Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

**Sensitivity to Mechanical Impact:** Not sensitive.

**Sensitivity to Static Discharge:** Not sensitive.

**Flash point:** Not flammable

**Hazardous Combustion Products:** Hydrogen chloride, Chlorine, Hydrogen gas

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:**

Remove sources of ignition. Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Stop leak if possible without personal risk. Consider evacuation of personnel located downwind if material is leaking. Shut off ventilation system if needed. Completely contain spilled material with dikes, sandbags, etc. Neutralize with soda ash or dilute caustic soda. Collect with appropriate absorbent and place into suitable container. Liquid material may be removed with a properly rated vacuum truck. Keep out of water supplies and sewers. This material is acidic and may lower the pH of the surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

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## 7. HANDLING AND STORAGE

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**Storage Conditions:** Store and handle in accordance with all current regulations and standards. Store in rubber-lined steel, acid-resistant plastic or glass containers. Keep container tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Keep away from heat, sparks and open flames. Keep separated from incompatible substances. Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from physical damage. Dike and vent storage tanks.

**Handling Procedures:** Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

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# Hydrochloric Acid (HCl) (All Grades)

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## 7. HANDLING AND STORAGE

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### OSHA Regulatory Exposure limit(s):

| Hazardous Component | CAS - No. | OSHA Final PEL<br>TWA | OSHA Final PEL<br>STEL | OSHA Final PEL<br>Ceiling    |
|---------------------|-----------|-----------------------|------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | ----                  | ----                   | 5 ppm<br>7 mg/m <sup>3</sup> |

### Non-Regulatory Exposure Limit(s):

The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

| Hazardous Component | CAS - No. | ACGIH<br>TWA | ACGIH<br>STEL | ACGIH<br>Ceiling | OSHA<br>TWA<br>(Vacated) | OSHA<br>STEL<br>(Vacated) | OSHA Ceiling<br>(Vacated)    |
|---------------------|-----------|--------------|---------------|------------------|--------------------------|---------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | ----         | ----          | 2 ppm            | ----                     | ----                      | 5 ppm<br>7 mg/m <sup>3</sup> |

**ENGINEERING CONTROLS:** Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT:

**Eye Protection:** Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin and Body Protection:** Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots.

**Hand Protection:** Wear appropriate chemical resistant gloves

**Protective Material Types:** Nitrile, Neoprene, Butyl rubber, Polyvinyl chloride (PVC), Responder®, Trelchem®, Tychem®

| Hazardous Component | Immediately Dangerous to Life/ Health (IDLH) |
|---------------------|--|
| Hydrogen chloride   | 50 ppm IDLH                                  |

**Respiratory Protection:** A NIOSH approved full-face respirator equipped with acid gas cartridges (appropriate for hydrogen chloride) may be permissible under certain circumstances where airborne concentrations of hydrogen chloride are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. When the level may be above the IDLH, use an SCBA or pressure-demand supplied air with an auxiliary self-contained escape pack. Pressure-demand SCBA (self-contained breathing apparatus) must be used when there is a potential for uncontrolled release or unknown concentrations. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Physical State:</b>             | Liquid                             |
| <b>Appearance:</b>                 | Clear                              |
| <b>Color:</b>                      | Colorless                          |
| <b>Odor:</b>                       | Irritating, Pungent, Sharp         |
| <b>Odor Threshold</b>              | 0.3 ppm (causes olfactory fatigue) |
| <b>Molecular Weight:</b>           | 36.46                              |
| <b>Molecular Formula:</b>          | HCl                                |
| <b>Flash point:</b>                | Not flammable                      |
| <b>Boiling Point/Range:</b>        | 140 - 221°F (60 - 105 °C)          |
| <b>Freezing Point/Range:</b>       | -29 to 5 °F (-34 to -15 °C)        |
| <b>Vapor Pressure:</b>             | 14.6 - 80 mmHg @ 20°C              |
| <b>Vapor Density (air=1):</b>      | 1.3 @ 20°C                         |
| <b>Specific Gravity (water=1):</b> | 1.05 - 1.18                        |
| <b>Density:</b>                    | 8.75 - 9.83 lbs/gal                |
| <b>Water Solubility:</b>           | 100%                               |
| <b>pH:</b>                         | 2 (0.2% solution)                  |
| <b>Volatility:</b>                 | 9 - 36% by volume                  |
| <b>Evaporation Rate (ether=1):</b> | < 1.00 (butyl acetate=1)           |

**10. STABILITY AND REACTIVITY**

|   |   |
|---|---|
| <b>Reactivity/ Stability:</b>                 | Stable at normal temperatures and pressures.  |
| <b>Conditions to Avoid:</b>                   | Avoid heat, flames, sparks and other sources of ignition. Avoid contact with water. Will react with some metals forming flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Avoid contact with incompatible materials. |
| <b>Incompatibilities/ Materials to Avoid:</b> | Metals, Alkalis, Oxidizing agents, Mercuric sulfate, Perchloric acid, Carbides of calcium, cesium, rubidium, Acetylides of cesium and rubidium, Phosphides of calcium and uranium, Lithium silicide   |
| <b>Hazardous Decomposition Products:</b>      | Chlorine, Hydrogen chloride, Hydrogen gas   |
| <b>Hazardous Polymerization:</b>              | Will not occur  |

**11. TOXICOLOGICAL INFORMATION**

|                                |                 |
|--------------------------------|-----------------|
| <b>Standard Draize (Eye):</b>  | rabbit-eye mild |
| <b>Standard Draize (Skin):</b> | human-skin mild |

**TOXICITY DATA:**

**11. TOXICOLOGICAL INFORMATION**

| Hazardous Component | LD50 Oral                             | LC50 Inhalation     | LD50 Dermal         |
|---------------------|---------------------------------------|---------------------|---------------------|
| Hydrogen chloride   | 700 mg/kg (Rat)<br>900 mg/kg (Rabbit) | 3124 ppm (1 hr-Rat) | 5010 mg/kg (Rabbit) |

**TOXICITY:**

Inhalation will cause severe irritation and possible burns with coughing and choking. If inhaled deeply, edema and hemorrhage of the lungs may occur. Prolonged exposure may cause discoloration and/or erosion of teeth. Contact with eyes causes immediate severe irritation with possible burns, permanent visual impairment, or total loss of sight. Skin contact with this material may cause severe irritation and corrosion of tissue. Ingestion may cause immediate burns of the mouth, esophagus, and stomach. Ingestion may cause intense pain, nausea, vomiting, bleeding, circulating collapse, shock and death.

**CARCINOGENICITY:** This product is not classified as a carcinogen by NTP, IARC or OSHA.

**12. ECOLOGICAL INFORMATION****ECOTOXICITY DATA:**

LC50 *Gambusia affinis*: 282 mg/L 96 h  
 LC50 goldfish: 178 mg/L (1 to 2 hour survival time)  
 LC50 bluegill: 3.6 mg/L 48 h  
 LC50 shrimp: 100 – 330 mg/L

**FATE AND TRANSPORT:**

**BIODEGRADATION:** This material is inorganic and not subject to biodegradation.

**PERSISTENCE:** This material is believed not to persist in the environment. This material is believed to exist in the disassociated state in the environment. If released to soil, hydrogen chloride will sink into the soil. The acid will dissolve some soil material (in particular, anything with a carbonate base) and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table. If released to water, it dissociates almost completely and will be neutralized by natural alkalinity and carbon dioxide.

**BIOCONCENTRATION:** This material is not expected to bioconcentrate in organisms.

**ADDITIONAL ECOLOGICAL INFORMATION:** This material has exhibited toxicity to terrestrial organisms. May decrease pH of waterways and adversely affect aquatic life.

**13. DISPOSAL CONSIDERATIONS**

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## 13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D002

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## 14. TRANSPORT INFORMATION

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### U.S.DOT 49 CFR 172.101:

**PROPER SHIPPING NAME:** Hydrochloric acid solution  
**DOT UN NUMBER:** UN1789  
**HAZARD CLASS/ DIVISION:** 8  
**PACKING GROUP:** II  
**LABELING** 8  
**REQUIREMENTS:**  
**DOT RQ (lbs):** RQ 5,000 Lbs. (Hydrochloric acid)

### CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

**SHIPPING NAME:** Hydrochloric acid solution  
**UN NUMBER:** UN1789  
**CLASS:** 8  
**PACKING/RISK GROUP:** II

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## 15. REGULATORY INFORMATION

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### U.S. REGULATIONS

#### OSHA REGULATORY STATUS:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

#### CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

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| Hazardous Component | RCRA Reportable Quantities |
|---------------------|----------------------------|
| Hydrogen chloride   | 5000 lb (final RQ)         |

**EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):**

If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

| Hazardous Component | EPCRA RQs                   | Threshold Planning Quantity (TPQs) |
|---------------------|-----------------------------|------------------------------------|
| Hydrogen chloride   | 5000 lb (EPCRA RQ) (liquid) | 500 lb (TPQ) (gas only)            |

**EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):**

Acute Health Hazard, Reactive Hazard

**EPCRA SECTION 313 (40 CFR 372.65):**

The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to-Know Reporting requirements.

| Hazardous Component                   | Status                     |
|---------------------------------------|----------------------------|
| Hydrogen Chloride (Hydrochloric Acid) | Listed - Aerosol form only |

**OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):**

Not regulated

**NATIONAL INVENTORY STATUS**

**U.S. INVENTORY STATUS (TSCA):** All components are listed or exempt

**TSCA 12(b):** This product is not subject to export notification

**CANADIAN DOMESTIC SUBSTANCE LIST (DSL/NDL):** All components are listed.

**STATE REGULATIONS**

| Hazardous Component   | Hydrogen chloride           |
|---|-----------------------------|
| California Proposition 65 Cancer WARNING:                       | Not Listed                  |
| California Proposition 65 CRT List - Male reproductive toxin:   | Not Listed                  |
| California Proposition 65 CRT List - Female reproductive toxin: | Not Listed                  |
| Massachusetts Right to Know Hazardous Substance List            | Listed                      |
| New Jersey Right to Know Hazardous Substance List               | sn 1012; sn 2909 (gas only) |
| New Jersey Special Health Hazards Substance List                | corrosive                   |
| New Jersey - Environmental Hazardous Substance List             | Listed                      |
| Pennsylvania Right to Know Hazardous Substance List             | Listed                      |
| Pennsylvania Right to Know Special Hazardous Substances         | Not Listed                  |
| Pennsylvania Right to Know Environmental Hazard List            | Listed                      |
| Rhode Island Right to Know Hazardous Substance List             | Listed                      |

**CANADIAN REGULATIONS**

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This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

|  |                   |
|--|-------------------|
| <b>Hazardous Component</b>                             | Hydrogen chloride |
| <b>Canada - CEPA Schedule I - Toxic Substance list</b> | Not Listed        |
| <b>WHMIS Classification:</b>                           | E                 |

## 16. OTHER INFORMATION

### Disclaimer:

This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

**HMIS: (SCALE 0-4)** (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

**Health:** 3      **Flammability:** 0      **Reactivity:** 1

**NFPA 704 - Hazard Identification Ratings (SCALE 0-4)**

**Health:** 3      **Flammability:** 0      **Reactivity:** 1

### IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

**pHREEdom® 5200M**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : pHREEdom® 5200M

APPLICATION : SCALE CONTROL

COMPANY IDENTIFICATION : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

## NFPA 704M/HMIS RATING

HEALTH: 1/2 FLAMMABILITY: 1/1 INSTABILITY: 0/0 OTHER:

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

| Hazardous Substance(s)                   | CAS NO | % (w/w)     |
|--|--------|-------------|
| Sodium salt of phosphonmethyated diamine |        | 10.0 - 30.0 |

**3. HAZARDS IDENTIFICATION****\*\*EMERGENCY OVERVIEW\*\*****WARNING**

Irritating to eyes.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

## PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

## HUMAN HEALTH HAZARDS - ACUTE :

## EYE CONTACT :

Can cause moderate irritation.

## SKIN CONTACT :

May cause irritation with prolonged contact.

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**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****INGESTION :**

Not a likely route of exposure. No adverse effects expected.

**INHALATION :**

Not a likely route of exposure. No adverse effects expected.

**AGGRAVATION OF EXISTING CONDITIONS :**

A review of available data does not identify any worsening of existing conditions.

**HUMAN HEALTH HAZARDS - CHRONIC :**

No adverse effects expected other than those mentioned above.

**4. FIRST AID MEASURES****EYE CONTACT :**

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

**SKIN CONTACT :**

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

**INGESTION :**

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

**INHALATION :**

Remove to fresh air, treat symptomatically. Get medical attention.

**NOTE TO PHYSICIAN :**

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

**5. FIRE FIGHTING MEASURES****FLASH POINT :** > 200 F / > 93.3 C**EXTINGUISHING MEDIA :**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

**FIRE AND EXPLOSION HAZARD :**

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

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## MATERIAL SAFETY DATA SHEET

PRODUCT

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### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

#### STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labelled containers.

#### SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

#### ENGINEERING MEASURES :

General ventilation is recommended.

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

#### HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

#### SKIN PROTECTION :

Wear standard protective clothing.

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**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****EYE PROTECTION :**

Wear chemical splash goggles.

**HYGIENE RECOMMENDATIONS :**

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                     |                             |
|---------------------|-----------------------------|
| PHYSICAL STATE      | Liquid                      |
| APPEARANCE          | Clear Light yellow          |
| ODOR                | Slight                      |
| SPECIFIC GRAVITY    | 1.17 - 1.21 @ 77 °F / 25 °C |
| DENSITY             | 9.7 - 10.1 lb/gal           |
| SOLUBILITY IN WATER | Complete                    |
| pH (100 %)          | 4.2 - 5.2                   |
| VISCOSITY           | 16 cps @ 40 °F / 4.4 °C     |
| VOC CONTENT         | 0 % Calculated              |

Note: These physical properties are typical values for this product and are subject to change.

**10. STABILITY AND REACTIVITY****STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur, Oxides of phosphorus

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.

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**MATERIAL SAFETY DATA SHEET**

**PRODUCT**

**pHREEdom® 5200M**

**EMERGENCY TELEPHONE NUMBER(S)**

**(800) 424-9300 (24 Hours) CHEMTREC**

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**12. ECOLOGICAL INFORMATION**

**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

**ACUTE FISH RESULTS :**

| Species        | Exposure | LC50         | Test Descriptor |
|----------------|----------|--------------|-----------------|
| Fathead Minnow | 96 hrs   | > 1,000 mg/l | Product         |

Rating : Essentially non-toxic

**ACUTE INVERTEBRATE RESULTS :**

| Species       | Exposure | LC50         | EC50 | Test Descriptor |
|---------------|----------|--------------|------|-----------------|
| Daphnia magna | 48 hrs   | > 1,000 mg/l |      | Product         |

Rating : Essentially non-toxic

**MOBILITY :**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 30 - 50%      |

The portion in water is expected to be soluble or dispersible.

**BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**AIR TRANSPORT (ICAO/IATA) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**MARINE TRANSPORT (IMDG/IMO) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**15. REGULATORY INFORMATION****NATIONAL REGULATIONS, USA :****OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium salt of phosphonomethylated diamine : Eye irritant

**CERCLA/SUPERFUND, 40 CFR 117, 302 :**

Notification of spills of this product is not required.

**SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :****SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

**SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :**

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

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**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

None of the substances are specifically listed in the regulation.

**CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

None of the substances are specifically listed in the regulation.

**CALIFORNIA PROPOSITION 65 :**

This product does not contain substances which require warning under California Proposition 65.

**MICHIGAN CRITICAL MATERIALS :**

None of the substances are specifically listed in the regulation.

**STATE RIGHT TO KNOW LAWS :**

None of the substances are specifically listed in the regulation.

**NATIONAL REGULATIONS, CANADA :****WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS CLASSIFICATION :**

D2B - Materials Causing Other Toxic Effects - Toxic Material

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :**

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

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**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****INTERNATIONAL CHEMICAL CONTROL LAWS****EUROPE**

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

**16. OTHER INFORMATION**

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

**REFERENCES**

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department

Date issued : 02/21/2004

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**MATERIAL SAFETY DATA SHEET**

**PRODUCT**

**pHREEdom® 5200M**

**EMERGENCY TELEPHONE NUMBER(S)**

**(800) 424-9300 (24 Hours) CHEMTREC**

Version Number : 1.4

**Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198**

**(630)305-1000**

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**MATERIAL SAFETY DATA SHEET****TMT 15®**

Material no.

101001

Version

1.8 / US

Specification

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**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING****Product information**

Trade name : TMT 15®  
Use of the Substance / Preparation : For industrial use  
Function : Precipitant

Company : Evonik Degussa Corporation  
379 Interpace Parkway  
Parsippany, NJ 07054  
USA

Telephone : 973-541-8000

Telefax : 973-541-8040

**US: CHEMTREC EMERGENCY NUMBER** : 800-424-9300

**CANADA: CANUTEC EMERGENCY NUMBER** : 613-996-6666

Product Regulatory Services : 973-541-8060

**2. HAZARDS IDENTIFICATION****\*\*\* EMERGENCY OVERVIEW \*\*\***

*Form-liquid    Color-colourless to yellowish    Odor-almost odourless*

Irritating to eyes.

**Eye contact**

irritating

**Skin Contact**

Slightly irritating.

**Inhalation**

No hazard expected in normal use.

**Ingestion**

No hazard expected in normal use.



**MATERIAL SAFETY DATA SHEET****TMT 15®**Material no.  
Specification  
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**2 / 10****3. COMPOSITION/INFORMATION ON INGREDIENTS****Chemical nature**Aqueous preparation  
Content min. 15 %

The preparation contains:

**Information on ingredients / Hazardous components**1,3,5-triazine-2,4,6(1H,3H,5H)-trithione, trisodium salt  
CAS-No. 17766-26-6 Percent (Wt./ Wt.)**Other information**

This material is classified as hazardous under OSHA regulations.

**4. FIRST AID MEASURES****General advice**Remove victims from hazardous area.  
Observe self-protection (eye protection).**Inhalation**No particular measures required.  
If necessary: Provide with fresh air.**Skin contact**Upon skin contact, wash with plenty of water.  
Remove contaminated or saturated clothing.**Eye contact**Keeping eyelid open, immediately rinse thoroughly for at least 5 minutes using plenty of water or, if necessary, eye rinsing solution.  
Consult an ophthalmologist.**Ingestion**Do not induce vomiting.  
Have the mouth rinsed with water.  
Have patient drink plenty of water in small sips.  
Consult a physician.**Notes to physician**Specific therapy/antidote treatment: none known  
If required, therapy of irritative effect.  
If substance has been swallowed:  
Early endoscopy in order to assess mucosa lesions in the oesophagus and stomach which may appear.  
If necessary, aspirate leftover substance.**5. FIRE-FIGHTING MEASURES**

**MATERIAL SAFETY DATA SHEET****TMT 150**

|               |        |               |            |
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Flash point does not flash

Autoignition temperature not applicable

**Suitable extinguishing media**

water mist quenching powder foam

**Extinguishing media which must not be used for safety reasons**

None known

**Specific hazards during fire fighting**

In the case of fire, the following hazardous smoke fumes may be produced: nitric oxides, sulphur oxides.

**Special protective equipment for fire-fighters**

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

**Further information**

Standard procedure for chemical fires.

Ensure there are sufficient retaining facilities for water used to extinguish fire. Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Wear personal protective equipment; see section 8.

**Environmental precautions**

Observe regulations on prevention of water pollution (collect, dam up, cover up).

Do not allow the product into the following compartments:

surface water

stretches of water

Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, rivers, groundwater or soil.

**Methods for cleaning up**

Absorb with liquid-binding material (e.g. inert absorbent or universal binder).

Dispose of absorbed material in accordance with the regulations.

see section 13.

Rinse away any residue with plenty of water.

**Additional advice**

Isolate and seal off defective containers immediately.

**7. HANDLING AND STORAGE****Handling****Safe handling advice**

Handle in accordance with good industrial hygiene and safety practices.

**MATERIAL SAFETY DATA SHEET**

TMT 15®



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Avoid contact with skin and eyes.  
Wear personal protective equipment.  
For personal protection see section 8.  
Immediately change moistened and saturated work clothes.

No eating, drinking, smoking, or snuffing tobacco at work.  
Wash hands before breaks and at the end of workday.  
preventive skin protection

**Advice on protection against fire and explosion**

The product is not combustible.

**Storage****Requirements for storage areas and containers**

clean, dry.  
Use shatterproof containers.  
Protect from frost.  
Transport and store container in upright position only.  
Always close container tightly after removal of product.

**Further information**

Use by date of the product: min. 2 years.  
Use alkali-resistant materials.

**Advice on common storage**

Store away from: oxidizing agents, acids.

---

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

Remarks                      No substance-specific limiting value being known.

**Component occupational exposure guidelines****Engineering measures**

No dangerous reactions are known to occur with correct handling and storage.

**Personal protective equipment****Respiratory protection**

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

**Hand protection**

|                    |  |
|--------------------|--|
| Glove material     | Polychloroprene (PCP), for example: Camapren 720, Kächele-Cama Latex GmbH (KCL), Germany |
| Material thickness | 0.65 mm  |
| Break through time | > 480 min  |
| Method             | DIN EN 374   |

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The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

**Eye protection**

wear basket-shaped glasses or safety goggles with side-shields.

**Skin and body protection**

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

**Hygiene measures**

No eating, drinking, smoking, or snuffing tobacco at work.

Wash face and/or hands before break and end of work.

Avoid contaminating clothes with product.

Immediately change moistened and saturated work clothes.

**Protective measures**

Avoid contact with skin and eyes.

Handle in accordance with good industrial hygiene and safety practices.

Wear suitable protective clothing, gloves and eye/face protection.

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

|       |                         |
|-------|-------------------------|
| Form  | liquid                  |
| Color | colourless to yellowish |
| Odor  | almost odourless        |

**Safety data**

|                           |                             |           |
|---------------------------|-----------------------------|-----------|
| pH                        | ca. 12.3                    | (22.5 °C) |
| Melting point/range       | -3 °C                       |           |
| Boiling point/range       | 101 °C                      |           |
| Flash point               | does not flash              |           |
| Flammability              | not applicable              |           |
| Autoignition temperature: | not applicable              |           |
| Autoinflammability        | not spontaneously flammable |           |
| Explosiveness             | not applicable              |           |
| Vapor pressure            | 22 mbar                     | (20 °C)   |
| Density                   | ca. 1.12 g/cm <sup>3</sup>  | (20 °C)   |

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|   |                                       |
|---|---------------------------------------|
| Partition coefficient (n-octanol/water) | log Pow: < -2<br>Method: (calculated) |
| Viscosity, dynamic                      | 1.6 mPa.s (20 °C)                     |
| conductivity                            | ca. 60 mS/cm (22 °C)                  |
| Molecular Weight                        | 243.22 g/Mol                          |

**Further information**

|                      |                     |
|----------------------|---------------------|
| Miscibility in water | completely miscible |
|----------------------|---------------------|

**10. STABILITY AND REACTIVITY**

|                                  |  |
|----------------------------------|--|
| Conditions to avoid              | frost.   |
| Materials to avoid               | strong oxidant, acids.   |
| Hazardous decomposition products | None known   |
| Thermal decomposition            | > 370 °C<br>solid<br>No decomposition if stored and applied as directed.                               |
| Hazardous reactions              | No dangerous reactions are known to occur with correct handling and storage.<br><br>product is stable. |

**11. TOXICOLOGICAL INFORMATION**

|                               |   |
|-------------------------------|---|
| Product Acute oral toxicity   | LD50 Rat: 7878 mg/kg<br>Method: analogy OECD-method<br>related to substance: TMT (15%)                    |
| Product Acute dermal toxicity | LD50 Rat: > 2000 mg/kg<br>Method: OECD Test Guideline 402<br>related to substance: TMT (55%)              |
| Product Skin irritation       | Rabbit / 4 h<br>slightly irritating<br>Method: OECD Test Guideline 404<br>related to substance: TMT (55%) |
| Product Eye irritation        | Rabbit<br>irritant<br>Method: OECD Test Guideline 405<br>related to substance: TMT (55%)                  |

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|                                |   |
|--------------------------------|---|
| Product Sensitization          | maximization test guinea pig: not sensitizing<br>Method: OECD Test Guideline 406<br>related to substance: TMT (55%)   |
| Product Repeated dose toxicity | Oral Rat<br>Testing period: 30 d<br>NOAEL: 526 mg/kg<br>target organ/effect: Erythrocytes<br>Method: OECD Test Guideline 407<br>related to substance: TMT (55%) |
| Product Genotoxicity in vitro  | Ames test S. typhimurium / E. coli<br>negative<br>Method: analogy OECD-method<br>related to substance: TMT (15%)  |
| Product Genotoxicity in vivo   | Micronucleus test mouse Oral<br>negative<br>Method: OECD TG 474<br>related to substance: TMT (15%)  |
| Product Human experience       | To date handling this product has not been known to cause any detrimental effects.  |

**12. ECOLOGICAL INFORMATION****Elimination information (persistence and degradability)**

|                  |  |
|------------------|--|
| Biodegradability | aerobic<br>inoculum: Activated sludge<br>Not readily biodegradable.<br>0 %<br>Exposure time: 28 d<br>Method: OECD TG 302 B<br>related to substance: TMT (15%)        |
|                  | anaerobic<br>inoculum: Activated sludge<br>Not readily biodegradable.<br>0 %<br>Exposure time: 60 d<br>Method: CO2 Evolution Test<br>related to substance: TMT (15%) |

**Ecotoxicity effects**

|                  |   |
|------------------|---|
| Toxicity to fish | LC0 static test Leuciscus idus melanotus: 1000 mg/l / 96 h<br>Analytical monitoring: no<br>Method: DIN 38412 Teil 15<br>related to substance: TMT (acid form) |
|------------------|---|

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LC0 static test *Leuciscus idus melanotus*: 1500 mg/l / 48 h

Analytical monitoring: no

Method: DIN 38412 Teil 15

related to substance: TMT (acid form)

LC50 semi-static test *Brachydanio rerio*: > 560 - 1000 mg/l / 96 h

Analytical monitoring: no

Method: OECD TG 203

Noxious effect due to pH shift

pH: 8 - 11

related to substance: TMT (60%)

Toxicity to daphnia

EC50 *Daphnia magna*: ca. 1056 mg/l / 24 h

Method: OECD TG 202

Noxious effect due to pH shift

pH: 8 - 11

related to substance: TMT (60%)

Toxicity to algae

IC 50 *scenedesmus subspicatus*: 273 mg/l / 72 h

End point: Biomass

Analytical monitoring: no

Method: OECD 201

related to substance: TMT (15%)

Toxicity to bacteria

EC50 Activated sludge: 1036 mg/l / 3 h

Analytical monitoring: no

Method: DEV L3 (TTC test)

related to substance: TMT (60%)

**Further information on ecology**

Chemical Oxygen Demand (COD)

139800 mg/l

Method: DEV H 41

related to substance: TMT (15%)

Biochemical Oxygen Demand (BOD)

0 mg/g

Concentration: 16 mg/l (BOD5)

Method: DEV H5/a2 (dilution method)

related to substance: TMT (60%)

AOX

The product does not contain any organically bonded halogen.

General Ecological Information

does not contain any heavy metals and compounds from EC directive 76/464:

is adsorbed to activated sludge

**13. DISPOSAL CONSIDERATIONS****WASTE DISPOSAL**

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Advice on disposal

Waste must be disposed of in accordance with local, state, provincial and federal laws and regulations. Empty containers must be handled with care due to product residue.

**14. TRANSPORT INFORMATION****Transport/further information**

Not classified as dangerous in the meaning of transport regulations.

**15. REGULATORY INFORMATION****US Federal Regulations****OSHA**

If listed below, chemical specific standards apply to the product or components:

- None listed

**Clean Air Act Section (112)**

If listed below, components present at or above the de minimus level are hazardous air pollutants:

- None listed

**CERCLA Reportable Quantities**

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- None listed

**SARA Title III Section 311/312 Hazard Categories**

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard

**SARA Title III Section 313 Reportable Substances**

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- None listed

**Toxic Substances Control Act (TSCA)**

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed



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**State Regulations****California Proposition 65**

A warning under the California Drinking Water Act is required only if listed below:

- None listed

**International Chemical Inventory Status**

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact Evonik Degussa Corporation Product Regulatory Services Department:

- |                          |                   |
|--------------------------|-------------------|
| • Europe (EINECS/ELINCS) | Listed/registered |
| • USA (TSCA)             | Listed/registered |
| • Canada (DSL)           | Listed/registered |
| • Australia (AICS)       | Listed/registered |
| • Japan (MITI)           | Listed/registered |
| • Korea (TCCL)           | Listed/registered |
| • Philippines (PICCS)    | Listed/registered |
| • China                  | Listed/registered |

**16. OTHER INFORMATION****HMIS Ratings**

|                   |   |
|-------------------|---|
| Health :          | 2 |
| Flammability :    | 0 |
| Physical Hazard : | 0 |

**Further information**

Data for the production of the safety data sheet from the studies available and from the literature. Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure .

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**SAFETY DATA SHEET**

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : CORE SHELL® 71307

APPLICATION : SLUDGE DEWATERING AGENTFLOCCULANT

COMPANY IDENTIFICATION :  
Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

## NFPA 704M/HMIS RATING

HEALTH : 1/1 FLAMMABILITY : 1/1 INSTABILITY : 0/0 OTHER :  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Based on our hazard evaluation, none of the substances in this product are hazardous.

**3. HAZARDS IDENTIFICATION****\*\*EMERGENCY OVERVIEW\*\*****CAUTION**

May cause irritation with prolonged contact.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Protect product from freezing.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

## PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

## HUMAN HEALTH HAZARDS - ACUTE :

## EYE CONTACT :

Can cause mild irritation.

## SKIN CONTACT :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

## INGESTION :

Not a likely route of exposure. If swallowed a jelly mass may form which in digestion may cause blockage.

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For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access

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## SAFETY DATA SHEET

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

### INHALATION :

Not a likely route of exposure. No adverse effects expected.

### SYMPTOMS OF EXPOSURE :

#### Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

### AGGRAVATION OF EXISTING CONDITIONS :

Skin contact may aggravate an existing dermatitis condition.

### HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

## 4. FIRST AID MEASURES

### EYE CONTACT :

Flush affected area with water. Get medical attention.

### SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

### INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93.3 °C ( PMCC )

### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

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## SAFETY DATA SHEET

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS :

Notify appropriate government, occupational health and safety and environmental authorities. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. Water in contact with the product will cause slippery floor conditions. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

### ENVIRONMENTAL PRECAUTIONS :

This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

## 7. HANDLING AND STORAGE

### HANDLING :

Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

### STORAGE CONDITIONS :

Protect product from freezing. Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

### UNSUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

### ENGINEERING MEASURES :

General ventilation is recommended.

### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. If significant mists, vapors or aerosols are generated an approved respirator is recommended. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

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### HAND PROTECTION :

Neoprene gloves Nitrile gloves Butyl gloves PVC gloves

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                     |                                 |
|---------------------|---------------------------------|
| PHYSICAL STATE      | Emulsion                        |
| APPEARANCE          | Opaque Off-white Light brown    |
| ODOR                | Hydrocarbon                     |
| SPECIFIC GRAVITY    | 0.995 - 1.078 @ 77 °F / 25 °C   |
| DENSITY             | 8.30 - 9.00 lb/gal              |
| SOLUBILITY IN WATER | Emulsifiable                    |
| pH (100 %)          | 4.0 - 5.0                       |
| VISCOSITY           | 400 - 1,500 cps @ 72 °F / 22 °C |
| VOC CONTENT         | 28.7 % Calculated               |

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Avoid temperatures below 0 and above 93 degrees C which will cause polymer to precipitate. Avoid extremes of temperature.

### MATERIALS TO AVOID :

Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

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**SAFETY DATA SHEET**

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**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: Low

**12. ECOLOGICAL INFORMATION****ECOTOXICOLOGICAL EFFECTS :**

The tests for (products or similar products) were performed in clean water as set forth by USEPA (EPA/600/4-90/027). In order to evaluate the potential toxicity mitigation, the tests for (representative polymers) were performed in environmentally relevant water with dissolved organic carbon (DOC: 4.5 mg/l). The toxicity of this product is due to an external mode of action, e.g., suffocation or immobilization. In the presence of suspended material, e.g., DOC, the polymers are bound to suspended material and the bioavailability is substantially reduced. As a result, the toxicity is expected to be lower. Under normal use and discharge conditions, the LC50 values of the representative polymers tested in the presence of DOC are expected to apply to this product. However, for large spills, the clean water data is more applicable.

**ACUTE FISH RESULTS :**

| Species           | Exposure | LC50        | Test Descriptor                                 |
|-------------------|----------|-------------|---|
| Zebra Danio       | 96 hrs   | 1 - 10 mg/l | Representative polymer tested in water with DOC |
| Inland Silverside | 96 hrs   | 185.14 mg/l | Product   |
| Rainbow Trout     | 96 hrs   | 0.51 mg/l   | Product   |

**ACUTE INVERTEBRATE RESULTS :**

| Species                         | Exposure | LC50          | EC50 | Test Descriptor                                 |
|---------------------------------|----------|---------------|------|---|
| Daphnia magna                   | 48 hrs   | 10 - 100 mg/l |      | Representative polymer tested in water with DOC |
| Daphnia magna                   | 48 hrs   | 6.09 mg/l     |      | Product   |
| Mysid Shrimp (Mysidopsis bahia) | 96 hrs   | 3.38 mg/l     |      | Product   |

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**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****CHRONIC FISH RESULTS :**

| Species        | Exposure | NOEC / LOEC          | End Point | Test Descriptor |
|----------------|----------|----------------------|-----------|-----------------|
| Topsmelt       | 7 Days   | 1 mg/l / > 10 mg/l   |           | Similar Product |
| Fathead Minnow | 7 Days   | 1.25 mg/l / 2.5 mg/l | Growth    | Similar Product |

**CHRONIC INVERTEBRATE RESULTS :**

| Species            | Test Type | NOEC / LOEC             | End Point    | Test Descriptor |
|--------------------|-----------|-------------------------|--------------|-----------------|
| Ceriodaphnia dubia | 3 Brood   | 0.156 mg/l / 0.313 mg/l | Reproduction | Similar Product |

**ADDITIONAL ECOLOGICAL DATA**

NOEC on earthworm: &gt; 1000 mg/l (representative polymer) AOX information: Product contains no organic halogens.

**MOBILITY :**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 10 - 30% | 70 - 90%      |

The portion in water is expected to be soluble or dispersible.

**BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

**ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**AIR TRANSPORT (ICAO/IATA) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**MARINE TRANSPORT (IMDG/IMO) :**

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.  
Technical Name(s) : Cationic polymer  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III

**15. REGULATORY INFORMATION**

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

**NATIONAL REGULATIONS, USA :**

**OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**  
Based on our hazard evaluation, none of the substances in this product are hazardous.

**CERCLA/SUPERFUND, 40 CFR 302 :**  
Notification of spills of this product is not required.

**SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :**

**SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**  
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

**SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :**  
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

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Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s)  | Citations |
|---------------|-----------|
| • Adipic Acid | Sec. 311  |

**CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s) | Citations |
|--------------|-----------|
| • Acrylamide | Sec. 112  |

**CALIFORNIA PROPOSITION 65 :**

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels, which would require a warning under the statute.

**MICHIGAN CRITICAL MATERIALS :**

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

**STATE RIGHT TO KNOW LAWS :**

The following substances are disclosed for compliance with State Right to Know Laws:

Adipic Acid

124-04-9

**INTERNATIONAL CHEMICAL CONTROL LAWS :**

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## SAFETY DATA SHEET

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### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

### EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

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Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,  
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department  
Date issued : 05/06/2010  
Version Number : 1.16

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## Material Safety Data Sheet

### Ferric Chloride 32% to 45% Photo Etch Grade

#### General Information

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Company's Name: Borden & Remington  
Company's Street: 63 Water St.  
Company's City: Fall River  
Company's State: MA  
Company's Country: US  
Company's Zip Code: 02722  
Company's Emerg Ph #: 800-424-9300 (CHEMTREC)  
Company's Info Ph #: 508-675-0096  
Date MSDS Prepared: 24FEB93  
Safety Data Review Date: January 2010

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#### Ingredients/Identity Information

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Proprietary: NO  
Ingredient: FERRIC CHLORIDE  
Ingredient Sequence Number: 01  
Percent: 32-45  
NIOSH (RTECS) Number: LJ9100000  
CAS Number: 7705-08-0  
ACGIH TLV: 1 MG/CUM

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Proprietary: NO  
Ingredient: HYDROCHLORIC ACID, HYDROGEN CHLORIDE, MURIATIC ACID  
HYDROCHLORIDE  
Ingredient Sequence Number: 02  
Percent: <3  
NIOSH (RTECS) Number: MW4025000  
CAS Number: 7647-01-0  
OSHA PEL: 5 PPM  
ACGIH TLV: C 11 MG/CUM  
Other Recommended Limit: 7 PPM

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Proprietary: NO  
Ingredient: FERROUS CHLORIDE  
Ingredient Sequence Number: 03  
Percent: <0.5  
NIOSH (RTECS) Number: NO5400000  
CAS Number: 7758-94-3  
ACGIH TLV: 1 MG/CUM

Proprietary: NO  
Ingredient: WATER  
Ingredient Sequence Number: 04  
Percent: BALANCE  
NIOSH (RTECS) Number: ZC0110000  
CAS Number: 7732-18-5

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#### Physical/Chemical Characteristics

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Appearance And Odor: REDDISH BROWN LIQUID W/SLIGHT ODOR OF IRON/ACID  
Boiling Point: 230F  
Melting Point: -58F  
Vapor Pressure (MM Hg/70 F): NEGLIGIBLE  
Specific Gravity: 1.432  
Evaporation Rate And Ref: (BU AC=1): >1  
Solubility In Water: COMPLETE  
pH: <2

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#### Fire and Explosion Hazard Data

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Extinguishing Media: WATER SPRAY, FOG, FOAM, DRY CHEMICAL, CO2/OTHER AGENTS AS APPROPRIATE FOR SURROUNDING FIRE  
Special Fire Fighting Proc: WEAR SELF CONTAINED BREATHING APPARATUS & FULL PROTECTIVE CLOTHING AS APPROPRIATE FOR SURROUNDING FIRE. COOL EXTERIOR OF STORAGE TANKS.  
Unusual Fire And Expl Hazrds: NONE

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#### Reactivity Data

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Stability: YES  
Cond To Avoid (Stability): HEAT  
Materials To Avoid: STRONG ALKALIS & ALKALI METALS  
Hazardous Decomp Products: HYDROGEN CHLORIDE GAS  
Hazardous Poly Occur: NO

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### Health Hazard Data

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LD50-LC50 Mixture: ORAL LD50(RAT): 900 MG/KG(IRON TOXICITY)  
Route Of Entry - Inhalation: YES  
Route Of Entry - Skin: NO although will cause serious chemical burns  
Route Of Entry - Ingestion: YES  
Health Haz Acute And Chronic: INHALATION: RESPIRATORY TRACT IRRITANT.  
IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES:  
IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED  
QUICKLY.  
Carcinogenicity - NTP: NO  
Carcinogenicity - IARC: NO  
Carcinogenicity - OSHA: NO  
Explanation Carcinogenicity: NONE  
Signs/Symptoms Of Overexp: IRRITATION, BURNS, TEARING, TISSUE  
DISCOLORATION  
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. IF NOT  
BREATHING , GIVE CPR. INGESTION: DRINK COPIOUS AMOUNTS OF WATER.  
DON'T INDUCE VOMITING. SKIN: FLUSH W/WATER FOR 15 MINS. EYES:  
FLUSH W/WATER FOR 15 MINS. FORCIBLY HOLD EYELIDS APART TO  
ENSURE COMPLETE IRRIGATION OF EYE/ LID TISSUE. OBTAIN MEDICAL  
ATTENTION IN ALL CASES.

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### Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: CONTAIN TO PREVENT CONTAMINATION OF  
WATER WAY. NEUTRALIZE W/LIME/SODA ASH. FLUSH W/WATER.  
Waste Disposal Method: DISPOSE OF NEUTRALIZED/WASTE  
PRODUCT/CONTAMINATED SOIL & OTHER MATERIAL IN ACCORDANCE  
W/LOCAL, STATE & FEDERAL REGULATIONS.  
Precautions-Handling/Storing: KEEP CONTAINERS CLOSED & DRY. STORE AWAY  
FROM IGNITION SOURCES & STRONG ALKALIES & ALKALI METALS.  
PROTECT CONTAINER FROM PHYSICAL DAMAGE.  
Other Precautions: USE HANDLING EQUIPMENT COMPATIBLE W/PRODUCT.  
EMPTIED COANTAINER MAY RETAIN VAPOR & PRODUCT RESIDUE. AVOID  
BREATHING FUMES.  
MINIMIZE SKIN CONTACT W/PROTECTIVE CLOTHING. AVOID CONTACT  
W/BARE METALS.

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### Control Measures

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Respiratory Protection: USE NIOSH/MSHA APPROVED, FULL FACE RESPIRATOR  
AS APPROPRIATE.

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**Ventilation: GOOD GENERAL ROOM VENTILATION TO MINIMIZE EXPOSURE TO VAPORS & MIST.**

**Protective Gloves: IMPERVIOUS RUBBER**

**Eye Protection: SPLASHPROOF CHEMICAL SAFETY GOGGLES**

**Other Protective Equipment: EYEWASH FOUNTAINS, PROTECTIVE CLOTHING, FULL FACE SHIELD, RUBBER FOOTWEAR, RESISTANT HOOD, FULL BODY SUIT, SAFETY SHOWER**

**Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING. DON'T WEAR CONTACT LENSES.**

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**Label Data**

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**Label Required: YES**

**Label Status: G**

**Common Name: FERRIC CHLORIDE SOLUTION**

**Special Hazard Precautions: INHALATION: RESPIRATORY TRACT IRRITANT. IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES: IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY. IRRITATION, BURNS, TEARING, TISSUE DISCOLORATION**

**Label Name: Borden & Remington**

**Label Street: 106 Ferry St.**

**Label City: Fall River**

**Label State: MA**

**Label Zip Code: 02722**

**Label Country: US**

**Label Emergency Number: 800-424-9300**

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## MATERIAL SAFETY DATA SHEET

### Section 1. Chemical Product and Company Identification

**Product Name:** ChemTreat P813E  
**Product Use:** Water Clarification/Solids Conditioning Agent  
**Manufacturer's Name:** ChemTreat, Inc.  
**Emergency Telephone Number:** (800) 424-9300  
**Address (Corporate Headquarters):** 4461 Cox Road  
Glen Allen, VA 23060  
**Telephone Number for Information:** (800) 648-4579  
**Date of MSDS:** March 18, 2009

### Section 2. Hazard(s) Identification



**Signal Word:** WARNING!

**Hazard Statement(s):** May be harmful in contact with skin.  
May be harmful if inhaled.  
May be harmful if swallowed.

**Precautionary Statement(s):** No significant health risks are expected from exposures under normal conditions of use.

### Section 3. Composition/Hazardous Ingredients

| Component                               | CAS Registry # | Wt. % |
|---|----------------|-------|
| Petroleum distillate hydrotreated light | 64742-47-8     | 10-30 |

### Section 4. First Aid Measures

**Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

**Eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

**Skin:** Wash with plenty of soap and water. Call a poison center or doctor/physician if you feel unwell.

**Ingestion:** DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.

ChemTreat P813E

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Notes to Physician: N/A

Additional First Aid Remarks: N/A

## ***Section 5. Fire Fighting Measures***

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**Flammability of the Product:** Not flammable.

**Suitable Extinguishing Media:** Use extinguishing media suitable to surrounding fire.

**Specific Hazards Arising from the Chemical:** Use water spray to keep containers cool.

**Protective Equipment:** If product is involved in a fire, wear full protective clothing including a positive-pressure, NIOSH approved, self-contained breathing apparatus.

## ***Section 6. Accidental Release Measures***

---

**Personal Precautions:** Use appropriate Personal Protective Equipment (PPE).

**Environmental Precautions:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

**Methods for Cleaning up:** Contain and recover liquid when possible. Flush spill area with water spray.

**Other Statements:** None.

## ***Section 7. Handling and Storage***

---

**Handling:** Wear appropriate Personal Protection Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust. Material is very slippery if spilled.

**Storage:** Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only. Do not store or handle in aluminum, zinc, copper, or their alloys. Protect from heat and sources of ignition.

## Section 8. Exposure Controls/Personal Protection

### Exposure Limits

| Component                               | Source | Exposure Limits |
|---|--------|-----------------|
| Petroleum distillate hydrotreated light |        | N/E             |

### Carcinogenicity Category

| Component                               | Source | Code | Brief Description |
|---|--------|------|-------------------|
| Petroleum distillate hydrotreated light |        |      | N/E               |

### Engineering Controls:

Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

### Personal Protection

- Eyes:** Wear chemical splash goggles or safety glasses with full-face shield. Maintain eyewash fountain in work area.
- Skin:** Maintain quick-drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
- Respiratory:** If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

## Section 9. Physical and Chemical Properties

|                                       |                                |
|---------------------------------------|--------------------------------|
| <b>Physical State and Appearance:</b> | Liquid Emulsion, White, Opaque |
| <b>Specific Gravity:</b>              | 1.0800                         |
| <b>pH:</b>                            | N/A                            |
| <b>Freezing Point:</b>                | 0°F                            |
| <b>Flash Point:</b>                   | >200°F                         |
| <b>Odor:</b>                          | Mild                           |
| <b>Melting Point:</b>                 | N/A                            |
| <b>Boiling Point:</b>                 | 212 – 347°F                    |
| <b>Solubility in Water:</b>           | Limited by viscosity           |
| <b>Evaporation Rate:</b>              | <1                             |
| <b>Vapor Density:</b>                 | Similar to water               |
| <b>Molecular Weight:</b>              | N/D                            |
| <b>Viscosity:</b>                     | N/A                            |
| <b>Flammable Limits:</b>              | N/A                            |
| <b>Autoignition Temperature:</b>      | N/A                            |
| <b>Density:</b>                       | 9.01 lb/ga                     |
| <b>Vapor Pressure:</b>                | N/A                            |
| <b>% VOC</b>                          | 25                             |

## ***Section 10. Stability and Reactivity***

---

|   |  |
|---|--|
| <b>Chemical Stability:</b>                      | Stable at normal temperatures and pressures.                 |
| <b>Incompatibility with Various Substances:</b> | Strong oxidizers, Strong bases                               |
| <b>Hazardous Decomposition Products:</b>        | Carbon dioxide, Carbon monoxide, Ammonia, Oxides of nitrogen |
| <b>Possibility of Hazardous Reactions:</b>      | None known.  |

## ***Section 11. Toxicological Information***

---

| Chemical Name | Exposure | Type of Effect | Concentration | Species |
|---------------|----------|----------------|---------------|---------|
| N/D           |          |                |               |         |

**Comments:** None.

## ***Section 12. Ecological Information***

---

| Species            | Duration | Type of Effect | Test Results |
|--------------------|----------|----------------|--------------|
| Bluegill Sunfish   | 96h      | LC50           | 84.4 mg/l    |
| Rainbow Trout      | 96h      | LC50           | 53.2 mg/l    |
| Ceriodaphnia dubia | 48h      | LC50           | 1.205 mg/l   |
| Daphnia pulex      | 48h      | LC50           | 7.3 mg/l     |
| Fathead Minnow     | 96h      | LC50           | 240 mg/l     |
|                    | 48h      | LC50           | 143 mg/l     |

**Comments:** None.

## ***Section 13. Disposal Considerations***

---

Dispose of in accordance with local, state and federal regulations.



## Section 14. Transport Information

---

### DOT Classification

**DOT Name:** COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID  
**Technical Name:** N/A  
**Hazard Class:** Not D.O.T. Regulated.  
**UN/NA#:** N/A  
**Packing Group:** N/A

## Section 15. Regulatory Information

---

### Inventory Status

**United States (TSCA):** All ingredients listed.  
**Canada (DSL/NDSL):** All ingredients listed.

### Federal Regulations

#### SARA Title III Rules

##### Sections 311/312 Hazard Classes

**Fire Hazard:** No  
**Reactive Hazard:** No  
**Release of Pressure:** No  
**Acute Health Hazard:** Yes  
**Chronic Health Hazard:** No

### Other Sections

| Component                               | Section 313    | Section 302 EHS |           |
|---|----------------|-----------------|-----------|
|   | Toxic Chemical | TPC             | GERCLA/RO |
| Petroleum distillate hydrotreated light | N/A            | N/A             | N/A       |

### State Regulations

**California Proposition 65:** This product contains chemical(s) known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm.



### Special Regulations

| Component                               | States |
|---|--------|
| Petroleum distillate hydrotreated light | None   |

### International Regulations

#### Canada

**WHMIS Classification:** N/A

**Controlled Product Regulations (CPR):** N/A

## Section 16. Other Information

### HMIS Hazard Rating

**Health:** 1  
**Flammability:** 1  
**Physical Hazard:** 0  
**PPE:** X

**Notes:** The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.  
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha-numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end-user must determine if the code is appropriate for their use.

**NSF:** N/A

**FDA:** N/A

**KOSHER:** This product has not been evaluated for Kosher approval.

**FIFRA:** N/A

**Other:** None



## Abbreviations

| Abbreviation | Definition  |
|--------------|---|
| <            | Less Than   |
| >            | Greater Than  |
| ACGIH        | American Conference of Governmental Industrial Hygienists |
| EHS          | Environmental Health and Safety Dept                      |
| N/A          | Not Applicable  |
| N/D          | Not Determined  |
| N/E          | Not Established   |
| OSHA         | Occupational Health and Safety Dept                       |
| PEL          | Personal Exposure Limit                                   |
| STEL         | Short Term Exposure Limit                                 |
| TLV          | Threshold Limit Value                                     |
| TWA          | Time Weight Average                                       |
| UNK          | Unknown   |

Prepared by: Regulatory Affairs Department

## *Disclaimer*

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Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.





**Public Service  
of New Hampshire**

PSNH Energy Park  
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, NH 03105-0330  
(603) 669-4000  
www.psnh.com

May 11, 2011

The Northeast Utilities System

Mr. Christopher J. Crowley  
Pretreatment Supervisor  
City of Manchester  
Department of Highways  
Environmental Protection Division  
300 Winston Street  
Manchester, New Hampshire 03103

Re: Industrial Wastewater Discharge Permit Application  
Public Service of New Hampshire (PSNH)

Dear Mr. Crowley:

Based on your previous discussions with Allan Palmer of PSNH and Ron Breton of GZA GeoEnvironmental, Inc., our consulting engineer, PSNH is requesting that the City of Manchester consider our request to accept treated wastewater from our wet flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the approval from the New Hampshire Department of Environmental Services (NHDES) and issuance of a permit and/or a contract outlining the terms of service and financial compensation by the City, it is our intention to transport treated wastewater by tanker truck from our power station in Bow to your Winston Street facility or to some other designated discharge location in the collection system.

As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are adding post-treatment systems that can be operated to reduce the volume of the treated wastestream from roughly 100,000 gallons per day (gpd) to as small a volume as 5,000 gpd. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all of the wastewater we generate at your facility, we recognize that there may be restrictions and that only a portion of the total discharge may be accepted. This scenario has been considered in our overall wastewater management strategy.


During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We have also forwarded a copy of the NHDES Industrial Wastewater Indirect Discharge Request Application directly to Mr. George Carlson along with the required design review fee of \$1,000.00.



We trust that this submittal adequately addresses your informational needs. Should you have any questions, please contact Ron Breton at 232-8744 or me at 224-4081, extension 4130.

Sincerely,



Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

Attachment(s)

cc: George Carlson, P.E., NHDES

**CITY OF MANCHESTER - Highway Department**  
**Environmental Protection Division**  
**Industrial Wastewater Discharge Permit Application**

**Date:** \_\_\_\_\_

**{I} Facility Information:** Provide information for the facility.

All Items are to be completed. If an item is not applicable indicate N/A

|  |  |                                  |                 |
|--|--|----------------------------------|-----------------|
| Company Name: PSNH   |  | Industrial Sewer User Permit No. |                 |
| Facility Address: 97 River Road, Bow NH 03304  |  |                                  |                 |
| Corporate Facility Address (If Different): 780 North Commercial Street, Manchester, NH 03101 |  |                                  |                 |
| Business Description: Electric Utility   |  |                                  |                 |
| Business Expansion within the next 3 to 5 years: (Explanation Y or N) No                     |  |                                  |                 |
|  |  |                                  |                 |
| Initial Discharge Date:  | 10/15/11   |                                  |                 |
| Operations Schedule:   | 24/7/365   |                                  |                 |
| Number of Employees:   | 115  |                                  |                 |
| Visitor's Safety Equipment   | Hardhat, safety glasses, hearing protection and protective footwear (i.e., steel-toed shoes) |                                  |                 |
|  |  |                                  |                 |
| Categorical Industrial User No.  | 40 CFR 423   |                                  |                 |
| North America Industry Classification No.  | 221112   |                                  |                 |
| Standard Industrial Classification No.   | 4911   |                                  |                 |
| Authorized Representative:   | Harold Keyes   | Title:                           | Station Manager |
| Telephone: (603) 224-4081  |  | Email:                           | keyeshe@nu.com  |
|  |  |                                  |                 |
| Secondary Contact:   | Allan Palmer   | Title:                           | Senior Engineer |
| Telephone: (603) 634-2439  |  | Email:                           | palmeag@nu.com  |

**{II} Environmental Permits:** List permit number for all applicable categories.

|   |  |         |           |
|---|--|---------|-----------|
| Stormwater: NH0001465   |  |         |           |
| NPDES: NH0001465  |  |         |           |
| Hazardous Waste Status  | [ ] VSQG   | [ ] SQG | [ X ] LQG |
| (Check One):  |  |         |           |
| Air Quality: TP-008, FP-T-0054, TP-B-0462TP-B-0490, PO-B-1788, PO-BP-2416, PO-BP-2417, PO-B-0034, PO-B-0035, TV-AR-01, TV-AR-0055, TP-0068, |  |         |           |
| Recycling   |  |         |           |
| Flammable Storage   |  |         |           |
| Other   | DES-HW-LP-06-22, DEHS-SW-85-012, GWP-19840065-B-004, 11-026610, NH0001465. |         |           |

**CITY OF MANCHESTER - Highway Department**  
**Environmental Protection Division**  
**Industrial Wastewater Discharge Permit Application**

**{III} City of Manchester Water Works Account Information:** List all City of Manchester Water works Meter number and Locations of meters in facility. *N/A*

| ABR Number | Meter Number | Location In Facility | Area Served |
|------------|--------------|----------------------|-------------|
| N/A        |              |                      |             |
|            |              |                      |             |
|            |              |                      |             |
|            |              |                      |             |
|            |              |                      |             |

**{IV} Facility Water Usage:** Describe all water usage, indicating water source, destination, and flow rates. Identify average flow rates (Gallons Per Day) based on historical and/or estimated water usage.

Water Source (check):     Private Well / River     Public Supply (Manchester Water Works)

| Water Usage           | Source (Private/Public) | Destination (Sewer/Specify Other)          | Flow Rate (GPD) | Estimate (GPD) |
|-----------------------|-------------------------|--|-----------------|----------------|
| Manufacturing Process |                         |  |                 |                |
| Cleaning              |                         |  |                 |                |
| Contact Cooling       |                         |  |                 |                |
| Non-Contact Cooling   |                         |  |                 |                |
| Cooling Towers        |                         |  |                 |                |
| Boiler                |                         |  |                 |                |
| Sanitary              |                         |  |                 |                |
| Reclamation           |                         |  |                 |                |
| Air Scrubber          | Private <sup>1</sup>    | Proposed to be hauled to POTW <sup>2</sup> | Up to 100,000   | Up to 100,000  |
| Evaporation           |                         |  |                 |                |
| Irrigation            |                         |  |                 |                |
| Other                 |                         |  |                 |                |

Total Facility Water Usage =   N/A  

- (1) On-site treatment pond (reuse of treated waste water). Original source is principally river water (Merrimack River).
- (2) NOTE: The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year and generate up to 100,000 gpd on a continuous basis. However, several volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system. The wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

**{V} Manufacturing Processes:** Provide a general description of the facility's manufacturing process. Describe and number manufacturing processes (e.g. Process 001) that generate industrial wastewater. List Process Summary (s) Contaminants, Pounds of product Amounts (Units) and Wastewater generated (Gallons per Day).

Describe any Potential Plans within the next 3 to 5 years. Include description of possible impacts on wastewater discharge to the sewer.

**General Description of the Manufacturing Processes:**

PSNH's Merrimack Station is a coal-fired power generating facility. Wastewater source is treated wastewater from a flue gas desulfurization (FGD) system.

| Process No. | Manufacturing Process        | Process Summary  | Contaminants              | Amount (Units) | Wastewater (GPD) |
|-------------|------------------------------|--|---------------------------|----------------|------------------|
| 01          | Air pollution control device | A limestone (CaCO3) slurry is utilized to precipitate Ca2SO4. See Drawing # 3977-3-001-B | See Table 1               | See Table 1    | Up to 100,000    |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  |                           |                |                  |
|             |                              |  | <b>Process Sub Totals</b> |                |                  |

|                   |                     |                 |                   |               |                  |
|-------------------|---------------------|-----------------|-------------------|---------------|------------------|
| <b>Unit Keys:</b> | A.) Pounds          | B.) Square Feet | C.) Square Meters | D.) Tons      | E.) Gallons      |
|                   | F.) Liters          | G.) Barrels     | H.) Bushels       | I.) Kilograms | J.) Pieces Units |
|                   | K.) Other (specify) |                 |                   |               |                  |

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

*(Use additional paper to describe processes if necessary)*

**{VI} Wastewater Treatment System:** Provide a general description of the wastewater treatment system. Describe all unit processes that treat industrial wastewater, including chemical additions, contaminants removed and flow rates (Gallons Per Day). List all treatment processes according to flow pattern and indicate whether process is Batch [B] or Continuous [C]. For batch processes, indicate the number of batches per day (e.g. 2B = two batches per day).

**General Treatment System Description:**

The wastewater treatment system is designed to remove metals and other pollutants using advanced chemical / physical treatment.

| B/C | Unit Process                        | Chemical Additions                            | Contaminants Removed                             | Flow Rate (GPD)             |
|-----|-------------------------------------|---|--|-----------------------------|
| C   | Reaction tank 1                     | Hydrated lime, organo sulfide                 | N/A  | Up to 100,000               |
| C   | Reaction tank 2                     | Ferric chloride                               | N/A  | Up to 100,000               |
| C   | Solids contact clarifier            | Polymer                                       | Calcium sulfate, TSS, hardness, metal hydroxides | Up to 100,000               |
| C   | Continuous backwash gravity filters | Hydrochloric acid (dosed prior to filtration) | TSS  | Up to 100,000               |
| C   | Falling Film Evaporator             | Anitscalant, Antifoam                         | N/A (volume reduction)                           | As low as 15,400 (effluent) |
| C   | Crystallizer                        | N/A   | N/A (volume reduction)                           | As low as 4,600 (effluent)  |

*(Use additional paper to describe processes if necessary)*

**{VII} Wastewater Treatment Operators and/or Authorized Representatives:** Provide information for all operators and/or authorized representatives, including title, typical work shift hours.

| Name           | Title                            | Shift Hours  |
|----------------|----------------------------------|--------------|
| Arthur Auclair | Senior Environmental Coordinator | 9am – 5:30pm |
| Dave Fradette  | Maintenance Supervisor           | 7am – 3:30pm |
| Paul Raichle   | Operations Manager               | 7am – 3:30pm |
| Ken Kroh       | Working Foreman-Chemical Analyst | 7am – 3:30pm |
|                |                                  |              |
|                |                                  |              |

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

**{VIII} Sampling Site Monitoring Equipment:** Number all sampling sites (e.g. Site 001) and provide a brief description of their locations. Describe all monitoring equipment, including the make/model of equipment and the frequency of calibration.

| Site No. | Sample Site Description         | Flow Meter | pH Meter |
|----------|---------------------------------|------------|----------|
| 001      | Treated Wastewater Storage Tank | See note   | See note |
|          |                                 |            |          |
|          |                                 |            |          |
|          |                                 |            |          |

**NOTE:** PSNH will provide this monitoring equipment at the site of generation as required.

**{IX} Sewer Discharges:** Describe each sewer outfall (size/location) and list all discharges to each outfall. Number each connection to correlate with sampling sites described above (e.g. Outfall No. 001). Include discharges from the treatment system, as well as other usages (e.g. sanitary, boiler). Specify whether discharge is Batch [B] or Continuous [C] and include flow rates (Gallons per Day). For batch discharges, indicate the number of batches per day (e.g. 2B = two batches per day). **N/A**

| Outfall No. | Sewer Connection<br>(Size / Location) | [B/C] | Wastewater Discharge<br>(Treatment System / Specify Other) | Discharge Rate (GPD) |
|-------------|---------------------------------------|-------|--|----------------------|
| N/A         |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |
|             |                                       |       |  |                      |

*(Use additional paper to describe discharges if necessary)*

Total Sewer Discharge = **N/A**

**NOTE:** PSNH is not connected to the POTW via sewer lines. The proposed discharge will arrive to the POTW via tanker truck.

**{X} Chemical & Hazardous Waste Storage:** Describe all storage of chemicals and hazardous waste, including chemicals stored, storage container types, spill control measures (e.g. secondary containment, spill response equipment), floor drains, and accumulation / consumption rates. Indicate the occurrence of slug releases in the past five years and existence of an updated Slug Control Plan \*. Submit a Slug Control Plan to EPD and make the plan available for implementation at the facility. **N/A PSNH Merrimack Station is not connected to the POTW via sewer lines. The proposed discharge will arrive to the POTW via tanker truck. Therefore a slug plan is not applicable.**

|                          |   |
|--------------------------|---|
| <input type="checkbox"/> | <b>Check box to indicate NO slug release / spill of chemicals or hazardous waste in previous five years</b> |
| <input type="checkbox"/> | <b>Check box to indicate a written Slug Control Plan is prepared and available for implementation</b>       |

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

\* The Slug Control Plan must contain, at a minimum, a description of all discharge practices, a description of all chemical storage, a facility site plan indicating the locations of all chemical / hazardous waste storage facilities, a protocol for notifying the Utility of a slug release, a description of spill control measures, and a certification statement attesting to the implementation of the plan.

**N/A because facility is not connected to POTW via sewer lines. All wastewater will be transported in tanker trucks.**

| Storage Site | Chemicals / Waste Stored | Container Type | Spill Control Measures | Destination Of Drains | Accumulation / Consumption Rate |
|--------------|--------------------------|----------------|------------------------|-----------------------|---------------------------------|
| N/A          |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |

**{XI} Monitoring Report for New Businesses:** Sample all industrial wastewater discharges from the facility. Submit a Baseline Monitoring Report (BMR)\*\* to the EPD that includes analytical results for the following parameters. See attached Table 1

\*\* The BMR must contain a description of sample collection methods (including a description of all sample sites), a EPD self-monitoring report sheet that summarizes the analytical results, all chains of custody documenting the transport of samples, and the analytical results from a state-certified laboratory. Refer to **Standard Methods** for the proper collection and analysis of samples.

|          |          |  |             |   |                     |
|----------|----------|--|-------------|---|---------------------|
| Flow     | pH       | BOD  | COD         | TSS   | TTO's *** 624 / 625 |
| Aluminum | Antimony | Arsenic  | Beryllium   | Cadmium                                       | Chromium            |
| Copper   | Cyanide  | Fluoride   | Lead        | Mercury                                       | Molybdenum          |
| Nickel   | Nitrogen | Oil & Grease (Petroleum mineral)<br>1664 HEM/SGT |             | Oil & Grease (Animal & vegetable)<br>1664 HEM |                     |
| Phenols  | Selenium | Silver   | Temperature | Thallium                                      | Zinc                |
|          |          |  |             |   |                     |
|          |          |  |             |   |                     |

\*\*\* TTO's (Total Toxic Organics) = Summation of all quantifiable values greater than 0.01 mg/L for toxic organics listed in 40 CFR 413.02(i). 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 624, and 625, respectively.

**{XII} Monitoring Report for Permit Renewals:** Sample all industrial wastewater discharges from the facility. Submit a the Self Monitoring Report (SMR) to the EPD that includes analytical results for the following parameters.

\*\* The SMR must contain a description of sample collection methods (including a description of all sample sites), a EPD self-monitoring report sheet that summarizes the analytical results, all chains of custody documenting the transport of samples, and the analytical results from a state-certified laboratory. Refer to **Standard Methods** for the proper collection and analysis of samples.

|             |          |   |           |   |                     |
|-------------|----------|---|-----------|---|---------------------|
| Flow        | pH       | BOD   | COD       | TSS   | TTO's *** 624 / 625 |
| Aluminum    | Antimony | Arsenic   | Beryllium | Cadmium                                       | Chromium            |
| Copper      | Cyanide  | Fluoride  | Lead      | Mercury                                       | Molybdenum          |
| Nickel      | Nitrogen | Oil & Grease(Petroleum mineral)<br>1664 HEM/SGT |           | Oil & Grease (Animal & vegetable)<br>1664 HEM |                     |
| Phenols     | Selenium | Silver  | Sulfate   | Sulfide                                       | Sulfite             |
| Temperature | Thallium | Zinc  |           |   |                     |
|             |          |   |           |   |                     |

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

\*\*\* TTO's (Total Toxic Organics) = Summation of all quantifiable values greater than 0.01 mg/L for toxic organics listed in 40 CFR 413.02(i). 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 624, and 625, respectively.

**{XIII} Identification of RAW Material and or Pollutants Present**

List all raw material and chemicals used in your facility that:

- 1) You know or have reason to believe are present in your discharge, or
- 2) Are hazardous wastes when disposed, or
- 3) Contain priority pollutants.

Refer to Table 1, Page 8 for Priority Pollutant listings and list ID numbers as appropriate on this form. Use additional sheets as necessary. Complete inventor printouts maybe used to provide the information required. Attached Material Safety Data Sheets for all items that have not had MSDSs previously submitted.

| Raw Material                     | Purpose                   | Amount used /year lbs. | Estimated loss to Sewer |
|----------------------------------|---------------------------|------------------------|-------------------------|
| Limestone                        | Gypsum and metals removal | 152,000 (tons)         | <1%                     |
| Ferric chloride                  | Metals removal            | 7,614                  | <1%                     |
| Hydrochloric acid (32%)          | neutralization            | 282,800                | <1%                     |
| Sodium Hydroxide (50%)           | neutralization            | 683,282                | <1%                     |
| Organosulfide (TMT 15)           | Precipitant               | 291 (tons)             | <1%                     |
| Polymer (P813E Core Shell 71307) | Floculation               | 761                    | <1%                     |
| Antifoam                         | Evaporator antifoam       | 7,008                  | >90%                    |
| Antiscale                        | Evaporator antiscale      | 2,628                  | >90%                    |

Usage estimated by treatment design team. (Attach additional Sheets as needed)

| Metals and Cyanide |           | Organics – Acid Compounds |                       | Organics – Volatile Compounds |                            | Pesticides |                    |
|--------------------|-----------|---------------------------|-----------------------|-------------------------------|----------------------------|------------|--------------------|
| 114                | Antimony  | 021                       | 2,4,6-trichlorophenol | 002                           | Acrolein                   | 089        | Aldrin             |
| 115                | Arsenic   | 022                       | p-chloro-m-cresol     | 003                           | Acrylonitrile              | 090        | Dieldrin           |
| 117                | Beryllium | 024                       | 2-chlorophenol        | 004                           | Benzene                    | 091        | Chlordane          |
| 118                | Cadmium   | 031                       | 2,4-dichlorophenol    | 006                           | Carbon tetrachloride       | 092        | 4,4-DDT            |
| 119                | Chromium  | 034                       | 2,4-dimethylphenol    | 007                           | Chlorobenzene              | 093        | 4,4-DDE            |
| 120                | Copper    | 057                       | 2-nitrophenol         | 010                           | 1,2-dichloroethane         | 094        | 4,4-DDD            |
| 121                | Cyanide   | 058                       | 4-nitrophenol         | 011                           | 1,1,1-trichloroethane      | 095        | Alpha-endosulphan  |
| 122                | Lead      | 059                       | 2,4-dinitrophenol     | 013                           | 1,1-dichloroethane         | 096        | Beta-endosulphan   |
| Metals and Cyanide |           | Organics – Acid Compounds |                       | Organics – Volatile Compounds |                            | Pesticides |                    |
| 123                | Mercury   | 060                       | 4,6-dinitro-o-cresol  | 014                           | 1,1,2-trichloroethane      | 097        | Endosan sulfate    |
| 124                | Nickel    | 064                       | Pentachlorophenol     | 015                           | 1,1,2,2-tetrachloroethane  | 098        | Endrin             |
| 125                | Selenium  | 065                       | Phenol                | 016                           | Chloroethane               | 099        | Endrin aldehyde    |
| 126                | Silver    |                           |                       | 019                           | 2-chloroethylvinyl ether   | 100        | Haptachlor         |
| 127                | Thallium  |                           |                       | 023                           | Chloroform                 | 101        | Heptachlor epoxide |
| 128                | Zinc      |                           |                       | 029                           | 1,1-dichloroethylene       | 102        | Alpha – BHC        |
|                    |           |                           |                       | 030                           | 1,2-trans-dichloroethylene | 103        | Beta – BHC         |
|                    |           |                           |                       | 032                           | 1,2-dichloropropane        | 104        | Gamma – BHC        |
|                    |           |                           |                       | 033                           | 1,3-dichloropropene        | 105        | Delta –BHC         |
|                    |           |                           |                       | 038                           | Ethylbenzene               | 106        | PCB – 1242         |
|                    |           |                           |                       | 044                           | Methylene chloride         | 107        | PCB – 1254         |
|                    |           |                           |                       | 045                           | Methyl chloride            | 108        | PCB – 1221         |
|                    |           |                           |                       | 046                           | Methyl bromide             | 109        | PCB – 1232         |
|                    |           |                           |                       | 047                           | Bromoform                  | 110        | PCB – 1248         |



**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

|  |  |     |                      |     |            |
|--|--|-----|----------------------|-----|------------|
|  |  | 048 | Dichlorobromomethane | 111 | PCB - 1260 |
|  |  | 051 | Chlorodibromomethane | 112 | PCB-1016   |
|  |  | 085 | Tetrachloroethylene  | 113 | Toxaphene  |
|  |  | 086 | Toluene              |     |            |
|  |  | 087 | Trichloroethylene    |     |            |
|  |  | 088 | Vinyl chloride       |     |            |

| <b>Organics – Base Neutral Compounds</b> |                               |     |                              |
|--|-------------------------------|-----|------------------------------|
| 001                                      | Acenaphthene                  | 056 | Nitrobenzene                 |
| 005                                      | Benzidine                     | 061 | N-nitrosodimethylamine       |
| 006                                      | Asbestos                      | 062 | N-nitrosodiphenylamine       |
| 008                                      | 1,2,4-Trichlorobenzene        | 063 | N-nitrosodi-n-propylamine    |
| 009                                      | Hexachlorobenzene             | 066 | Bis (2-ethylhexyl) phthalate |
| 012                                      | Hexachloroethane              | 067 | Butylbenzyl Phthalate        |
| 018                                      | Bis (2-chloroethyl) ether     | 068 | Di-n-butyl phthalate         |
| 020                                      | 2-chloronaphthalene           | 069 | Di-n-octyl phthalate         |
| 025                                      | 1,2-dichlorobenzene           | 070 | Diethyl phthalate            |
| 026                                      | 1,3-dichlorobenzene           | 071 | Dimethyl phthalate           |
| 026                                      | 3,3-dichlorobenzidine         | 072 | Benzo (a) anthracene         |
| 027                                      | 1,4-dichlorobenzene           | 073 | Benzo (a) pyrene             |
| 035                                      | 2,4-dinitrotoluene            | 074 | Benzo (b) Fluoranthene       |
| 036                                      | 2,6-dinitrotoluene            | 075 | Benzo (k) Fluoranthene       |
| 037                                      | 1,2-diphenylhydrazine         | 076 | Chrysene                     |
| 039                                      | Fluoranthene                  | 077 | Acenaphthylene               |
| 040                                      | 4-chlorophenyl phenyl ether   | 078 | Anthracene                   |
| 041                                      | 4-bromophenyl phenyl ether    | 079 | Benzo(ghi)perylene           |
| 042                                      | Bis (2-chloroisopropyl) ether | 080 | Fluorene                     |
| 043                                      | Bis (2-chloroethoxy) methane  | 081 | Phenanthrene                 |
| 052                                      | Hexachlorobutadiene           | 082 | Dibenzo (a,h) anthracene     |
| 053                                      | Hexachlorocyclopentadiene     | 083 | Indeno (1,2,3-cd) pyrene     |
| 054                                      | Isophorone                    | 084 | Pyrene                       |
| 055                                      | Naphthalene                   |     |                              |
|  |                               |     |                              |
|  | Miscellaneous                 |     |                              |
|  |                               |     |                              |

**{XIV} Facility Site Plan:** *Submit a Facility Site Plan to the EPD* that depicts a building layout for the facility. Locate all manufacturing processes that generate industrial wastewater, all wastewater treatment processes, and all chemical / hazardous waste storage facilities. Include locations of all water supplies and all wastewater discharges. Number manufacturing processes and sewer outfalls to correlate with other information provided in this application.  
**SEE DRAWING # MK-S-5605**

**{XV} Process Flow Diagram:** *Submit a Process Flow Diagram to the EPD* that illustrates the flow of industrial wastewater through the facility. Identify all manufacturing processes that generate industrial wastewater, and all wastewater treatment system components. Include component sizes and volumes, as well as system flow rates. Ensure that process flow inputs and outputs establish an accurate water balance for the facility.  
**SEE DRAWING # 3977-3-001-B (FGD) and Figure 1 (WWTS)**

**Environmental Protection Division  
Industrial Wastewater Discharge Permit Application**

**{XVI} New Permit Application with >10,000 GPD or Treatment on site:** All new permit applications that have >10,000 GPD or some kind of Wastewater Treatment on site. The applicant must obtain an Industrial Wastewater Indirect Discharge request Application (IDR) Form. The forms are available by down loading from the State of New Hampshire DES web page. <http://des.nh.gov>

**ENCLOSED**

**{XVII} Permit Application Submittal:** All permit application submittals must include the following items:

1. *Permit Application*
2. *Slug Control Plan N/A*
3. *Baseline Monitoring Report or Permit Renewal Report*
4. *Facility Site Plan*
5. *Process Flow Diagram*

Submit to:

Pretreatment Supervisor  
City of Manchester Department of Highways  
Environmental Protection Division (EPD)  
300 Winston Street  
Manchester, New Hampshire 03103

**{XV} Certification:** An authorized representative of the facility shall sign below to indicate that all information provided herein is accurate and complete. The person who signs this application will be deemed the signatory authority for the facility.

Harold Keyes

Station Manager

\_\_\_\_\_  
Printed Name of Authorized Representative

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature of Authorized Representative

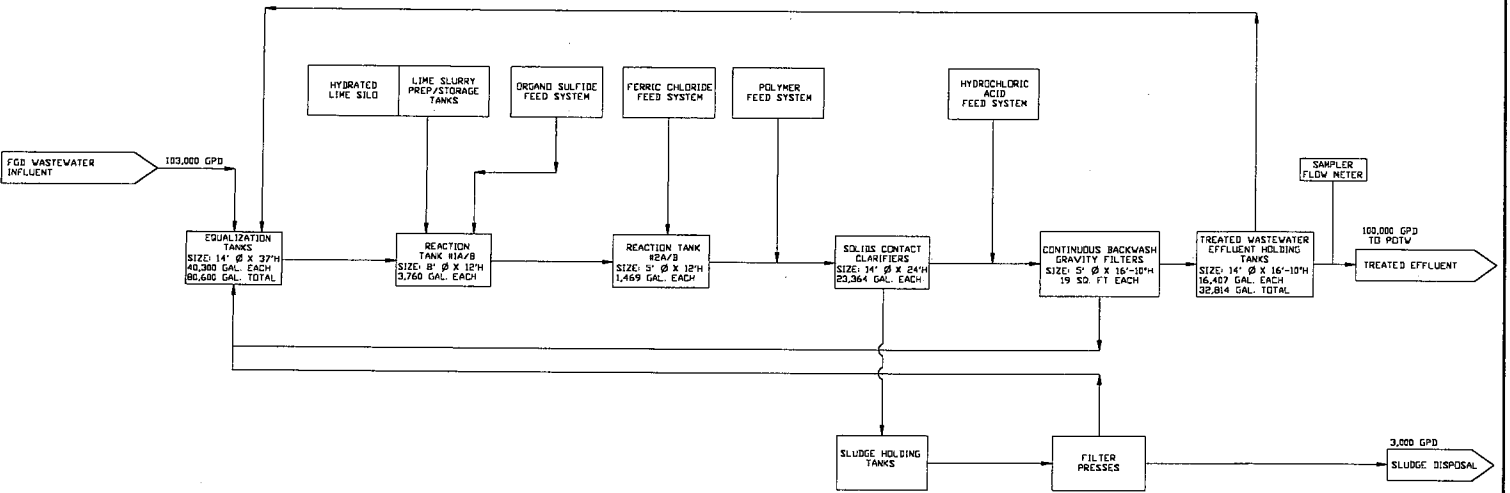
\_\_\_\_\_  
Date

*(Use additional paper to describe processes if necessary)*

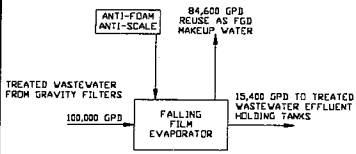
**FIGURES**

NOTE:  
 1. THE WASTEWATER SYSTEM OPERATES TWO TREATMENT TRAILS IN PARALLEL.  
 2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

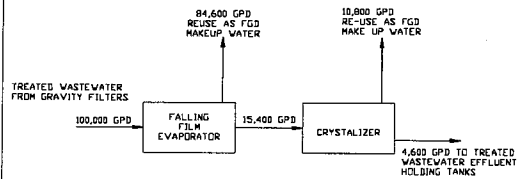
OPTION 1



OPTION 2



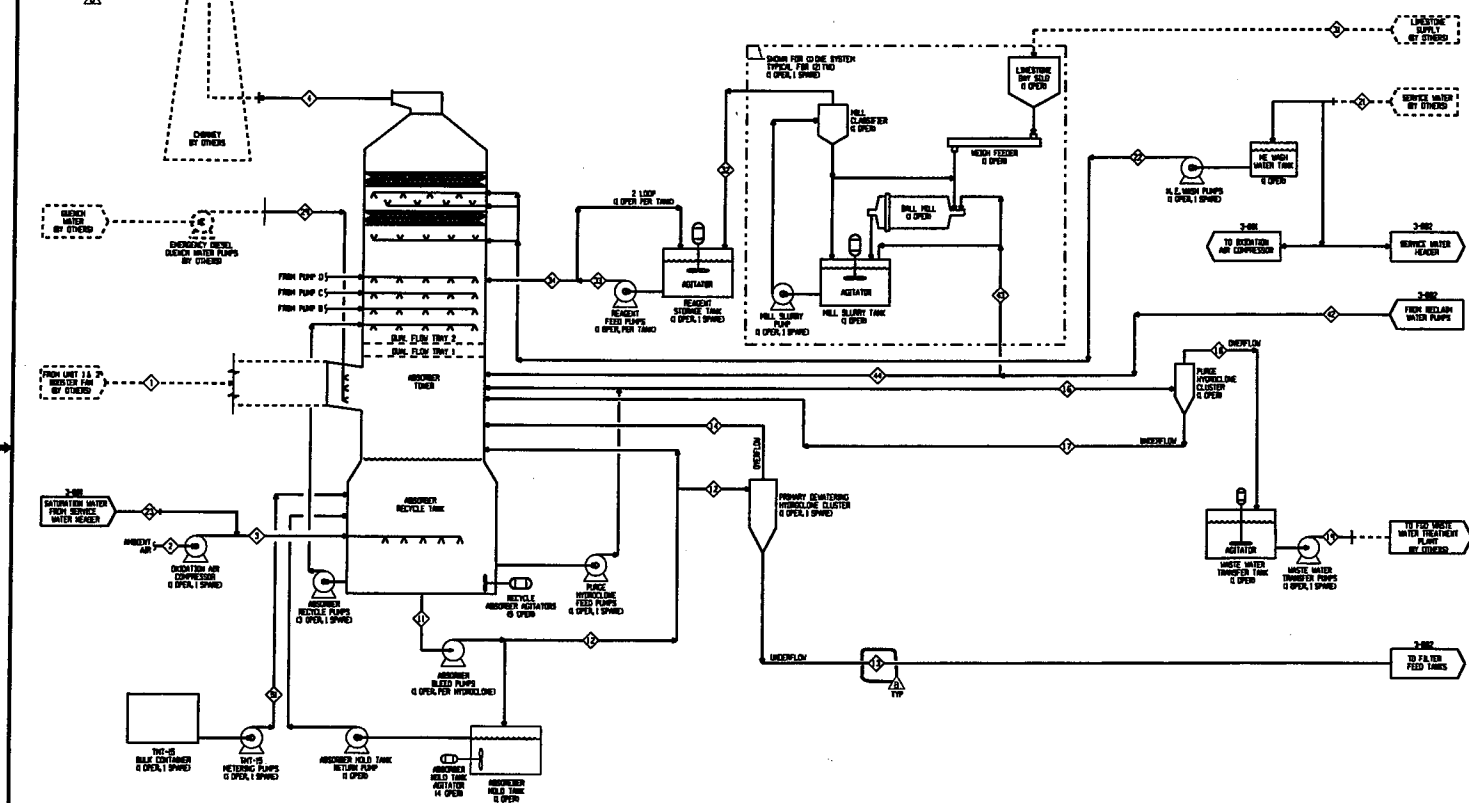
OPTION 3



INDUSTRIAL WASTEWATER DISCHARGE PERMIT APPLICATION  
 PSNH  
 BOW, NEW HAMPSHIRE  
 WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

|   |                             |  |   |
|---|-----------------------------|--|---|
| <small>UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF EEA ENVIRONMENTAL, INC. (EEA). THE INFORMATION SHOWN ON THIS DRAWING IS SOLELY FOR USE BY OURS CLIENT ON THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION COVENANT ON THE DRAWING. THE DRAWING SHALL NOT BE REPRODUCED, COPIED, OR RELEASED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF EEA. ANY OTHER USE, REUSE, OR REPRODUCTION OF THIS DRAWING EXPRESS OR IMPLIED, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF EEA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO EEA.</small> |                             | PREPARED BY:<br>EEA Environmental, Inc.<br>Environment and Infrastructure<br>100 UNIVERSITY AVENUE<br>CONCORD, NEW HAMPSHIRE 03301 | PREPARED FOR:<br>PUBLIC SERVICE OF<br>NEW HAMPSHIRE |
| PROJECT NO.:<br>DATE:   | REVISED BY:<br>DATE:        | CHECKED BY:<br>SCALE:  | FIGURE<br>1   |
| MAY 2011  | PROJECT NO.:<br>04000007.00 | REVISION NO.:  | SHEET NO.:  |

100-S-2768



| NO. | REVISION                | DATE     | BY | CHKD. |
|-----|-------------------------|----------|----|-------|
| 1   | ISSUED FOR CONSTRUCTION | 11-29-01 |    |       |
| 2   | FOR APPROVAL            | 12-11-01 |    |       |

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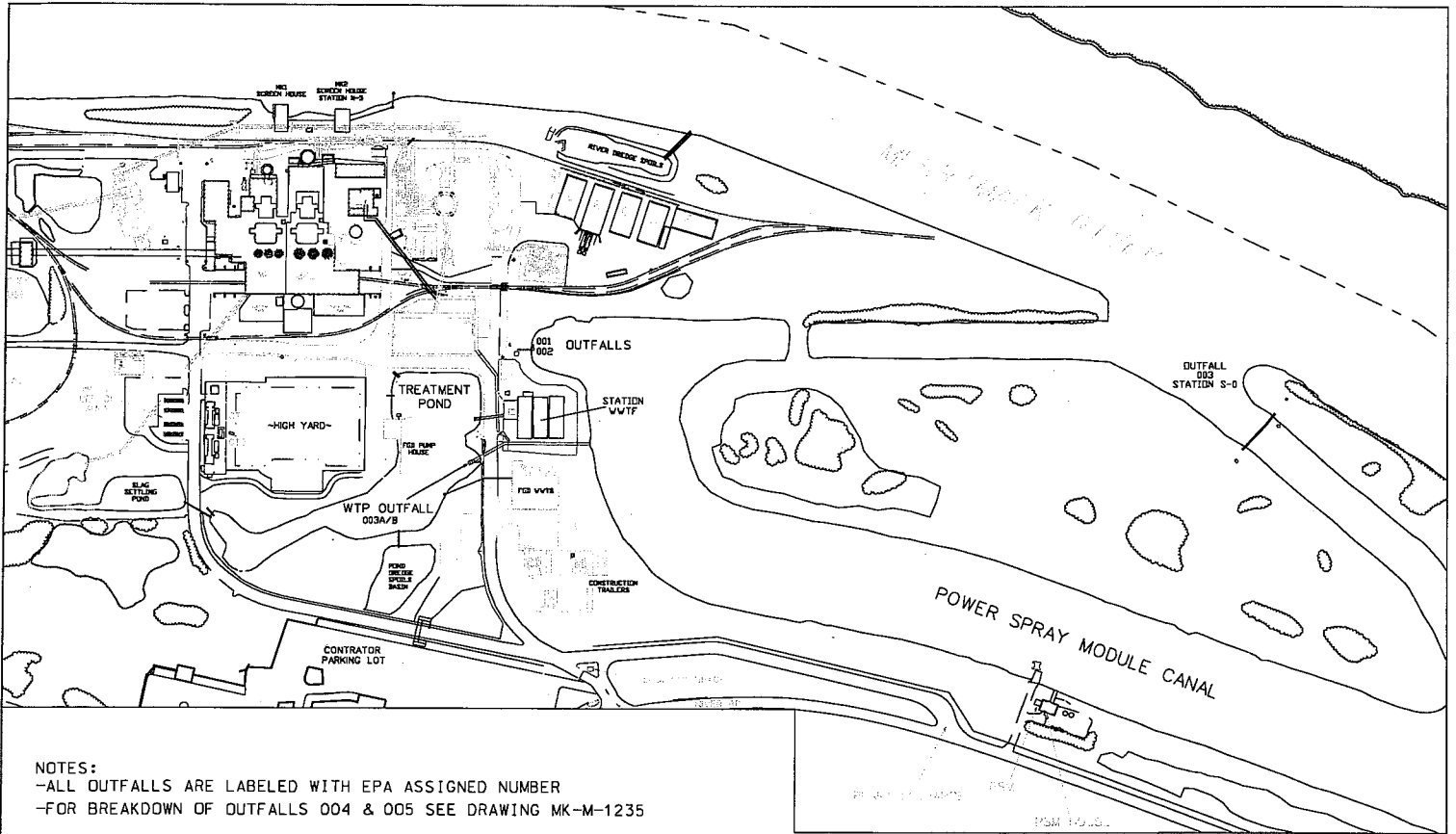
DATE: 11/29/01  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 SCALE: AS SHOWN  
 SHEET NO: 3977-3-001

PUBLIC SERVICE OF NEW HAMPSHIRE  
 MERRIMACK STATION UNITS #2  
 BOW, NEW HAMPSHIRE

**PRELIMINARY**

SIEMENS Power Generation, Inc.  
 Environmental Systems & Services

PROCESS FLOW DIAGRAM  
 3977-3-001  
 B



NOTES:  
 -ALL OUTFALLS ARE LABELED WITH EPA ASSIGNED NUMBER  
 -FOR BREAKDOWN OF OUTFALLS 004 & 005 SEE DRAWING MK-M-1235

|  |                     |  |
|--|---------------------|--|
| Public Service<br>of New Brunswick                     |                     | CONSTRUCTION SERVICES<br>CONSULTING GROUP<br>WATERWORKS DIVISION |
| <b>HERPINY STATION<br/>         OUTFALLS SITE PLAN</b> |                     |  |
| DRAWN BY<br>DATE                                       | DESIGNED BY<br>DATE |  |
| CHECKED BY<br>DATE                                     | REVIEWED BY<br>DATE |  |
| PROJECT NO.<br>SHEET NO.                               | TOTAL SHEETS        |  |

**TABLE**

**TABLE 1  
REPRESENTATIVE WASTEWATER CHARACTERISTICS**

PSNH

FLOW: 4,000 - 100,000 gpd

| <b>METAL</b>      | <b>MASS LOADING<br/>(lb/day)</b> |
|-------------------|----------------------------------|
| Aluminum          | 0.83                             |
| Antimony          | 0.40                             |
| Arsenic           | 0.02                             |
| Barium            | 4.01                             |
| Beryllium         | 0.08                             |
| Cadmium           | 0.04                             |
| Chromium          | 0.13                             |
| Copper            | 0.04                             |
| Iron              | 0.17                             |
| Lead              | 0.08                             |
| Manganese         | 0.83                             |
| Mercury           | 0.000012                         |
| Nickel            | 0.83                             |
| Silver            | 0.04                             |
| Zinc              | 0.04                             |
| Selenium          | 2.50                             |
| Thallium          | 0.48                             |
| <i>Molybdenum</i> | <i>No Data</i>                   |
| <i>Cyanide</i>    | <i>BDL</i>                       |
| <i>Phenols</i>    | <i>BDL</i>                       |

| <b>POLLUTANT</b>   | <b>CONCENTRATION<br/>(mg/L)</b> |
|--------------------|---------------------------------|
| Nitrogen           | <i>No Data</i>                  |
| Fluoride           | 118                             |
| <i>BOD</i>         | <i>BDL</i>                      |
| <i>COD</i>         | <i>No Data</i>                  |
| <i>TTO</i>         | <i>BDL</i>                      |
| <i>O&amp;G</i>     | <i>BDL</i>                      |
| <b>TEMPERATURE</b> | < 104° F                        |

**NOTE:**

1. lb/day means pounds per day, gpd means gallons per day.
2. Please note, steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably below the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case waste water characteristics. All mass loadings are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.



**ATTACHMENT 1**

**MATERIAL SAFETY DATA SHEETS**



Univar USA Inc Material Safety Data Sheet

---

MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052  
(425) 889 3400

---

Emergency Assistance

For emergency assistance involving chemicals call  
Chemtrec - (800) 424-9300

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 1 of 8  
Version: 1.2  
Revision Date: 2010/11/29

**DOW CORNING(R) ANTIFOAM 1430**

**1. PRODUCT AND COMPANY IDENTIFICATION**

Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686

**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 01228480

Revision Date: 2010/11/29

Generic Description: Silicone emulsion  
Physical Form: Viscous Liquid  
Color: White  
Odor: Slight odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. HAZARDS IDENTIFICATION**

**POTENTIAL HEALTH EFFECTS**

**Acute Effects**

Eye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.

**Prolonged/Repeated Exposure Effects**

Skin: Repeated or prolonged exposure may cause irritation.  
Inhalation: No known applicable information.  
Oral: No known applicable information.

**Signs and Symptoms of Overexposure**

No known applicable information.

**Medical Conditions Aggravated by Exposure**

No known applicable information.

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 2 of 8  
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**DOW CORNING(R) ANTIFOAM 1430**

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**4. FIRST AID MEASURES**

Eye: If irritation occurs, flush eye(s) with lukewarm gently flowing water for 5 minutes. Obtain medical attention.

Skin: No health effects expected. If irritation does occur flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Inhalation: If symptoms are experienced remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.

Oral: If irritation or discomfort occur, obtain medical advice.

Notes to Physician: Treat according to person's condition and specifics of exposure.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.

Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

Unusual Fire Hazards: None.

**6. ACCIDENTAL RELEASE MEASURES**

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 3 of 8  
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**DOW CORNING(R) ANTIFOAM 1430**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

**Note:** See Section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact. Avoid skin contact.  
Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.  
Suitable Gloves: Avoid skin contact by implementing good industrial hygiene practices and procedures. Select and use gloves and/or protective clothing to further minimize the potential for skin contact. Consult with your glove and/or personnel protective equipment manufacturer for selection of appropriate compatible materials.  
Inhalation: No respiratory protection should be needed.

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 4 of 8  
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**DOW CORNING(R) ANTIFOAM 1430**

Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Avoid skin contact. Use reasonable care.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions. For further information regarding aerosol inhalation toxicity, please refer to the guidance document regarding the use of silicone-based materials in aerosol applications that has been developed by the silicone industry ([www.SEHSC.com](http://www.SEHSC.com)) or contact the Dow Corning customer service group.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Viscous Liquid

Color: White

Odor: Slight odor

Specific Gravity @ 25°C: 1.0

Viscosity: 10000 cSt

Freezing/Melting Point: Not determined.

Boiling Point: > 35 °C

Vapor Pressure @ 25°C: Not determined.

Vapor Density: Not determined.

Solubility in Water: Not determined.

pH: Not determined.

Volatile Content: Not determined.

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.

Hazardous Polymerization: Hazardous polymerization will not occur.

Conditions to Avoid: None.

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 5 of 8  
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**DOW CORNING(R) ANTIFOAM 1430**

Materials to Avoid: Oxidizing material can cause a reaction.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde. Metal oxides.

**11. TOXICOLOGICAL INFORMATION**

Special Hazard Information on Components

No known applicable information.

**12. ECOLOGICAL INFORMATION**

Environmental Fate and Distribution

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

| Hazard Parameters (LC50 or EC50) | High  | Medium           | Low   |
|----------------------------------|-------|------------------|-------|
| Acute Aquatic Toxicity (mg/L)    | <=1   | >1 and <=100     | >100  |
| Acute Terrestrial Toxicity       | <=100 | >100 and <= 2000 | >2000 |

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal. Call (989) 496-6315, if additional information is required.

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 6 of 8  
Version: 1.2  
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**DOW CORNING(R) ANTIFOAM 1430**

**14. TRANSPORT INFORMATION**

**DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

**Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Additional Regulatory Information: This product contains a component subject to a regulation other than TSCA.

**EPA SARA Title III Chemical Listings**

**Section 302 Extremely Hazardous Substances (40 CFR 355):**  
None.

**Section 304 CERCLA Hazardous Substances (40 CFR 302):**  
None.

**Section 311/312 Hazard Class (40 CFR 370):**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals (40 CFR 372):**  
None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

**Supplemental State Compliance Information**



**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

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**DOW CORNING(R) ANTIFOAM 1430**

**California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u> |
|-------------------|-------------|-----------------------|
| 7664-93-9         | <0.1        | Sulfuric acid         |

**New Jersey**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>          |
|-------------------|-------------|--------------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                          |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane           |
| None              | 3.0 - 7.0   | Treated amorphous silica       |
| 9005-08-7         | 1.0 - 5.0   | Polyethylene glycol distearate |

**Pennsylvania**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>    |
|-------------------|-------------|--------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                    |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane     |
| None              | 3.0 - 7.0   | Treated amorphous silica |

**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 8 of 8  
Version: 1.2  
Revision Date: 2010/11/29

**DOW CORNING(R) ANTIFOAM 1430**

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

## Univar USA Inc Material Safety Data Sheet

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For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

### Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process



**Westlake CA&O  
Corporation**

P.O. Box 527  
Calvert City, KY 42029-0527

**MATERIAL SAFETY DATA SHEET**

**ISSUED: 06/01/06**

**SODIUM HYDROXIDE SOLUTION - 50%**

**REVISED: 06/01/06**

**SECTION I - PRODUCT IDENTIFICATION**

Westlake CA&O  
2468 Industrial Parkway  
P O Box 527  
Calvert City, KY 42029

Telephone No.: (270) 395-4151  
Transportation Emergency No.:  
CHEMTREC: (800) 424-9300  
Medical Emergency No.:  
POISON CENTER: (216) 379-8562

Chemical Family: Alkali

Chemical Name/Synonyms: Solutions of: Caustic, Caustic Soda, Lye, Sodium hydrate

Trade Mark: None

Formula: Mixture

C.A.S. Registry No.: 1310-73-2

TSCA Inventory Status: All ingredients are listed on the USEPA's TSCA inventory

Canadian Domestic Substances List Status: All ingredients have been nominated or are eligible for inclusion

Workplace Hazardous Materials Information System (WHMIS) Classification: E

Product Use: Caustic Applications

SARA 313 Information: Not Applicable

**SECTION II - HAZARDOUS INGREDIENTS**

Hazard Summary Statement: CAUTION! CORROSIVE LIQUID. Contact with skin results in severe burns with possible deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mists causes irritation of the nose, throat, mucous membranes and lungs.

| <u>Material</u>                     | <u>C.A.S. Number</u> | <u>Amount in Product</u> | <u>ACGIH TLV-TWA</u>           | <u>OSHA PEL-TWA</u> |
|-------------------------------------|----------------------|--------------------------|--------------------------------|---------------------|
| Sodium Hydroxide <sup>2,4,5,6</sup> | 1310-73-2            | 50%                      | 2 mg/m <sup>3</sup><br>Ceiling | 2 mg/m <sup>3</sup> |

**N.A. - Not Applicable**

**N.E. - Not Established**

## Legislative Footnotes

- <sup>1</sup> Ingredient listed on SARA Section 313 List of Toxic Chemicals.
- <sup>2</sup> Ingredient listed on the *Pennsylvania Hazardous Substances List*.
- <sup>3</sup> Ingredient listed on the California listing of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*.
- <sup>4</sup> Ingredient listed on the *Massachusetts Substance List*.
- <sup>5</sup> *Workplace Hazardous Materials Information System* ingredient found on the Ingredient Disclosure List - Canada.
- <sup>6</sup> Ingredient listed on the *New Jersey Right to Know Hazardous Substance List*.

### Notes

- TLV-TWA** - Threshold Limit Value - Time Weighted Average guideline for concentration of the chemical substance in the ambient workplace air. American Conference of Governmental Industrial Hygienists (ACGIH).
- OSHA PEL** - OSHA Permissible Exposure Limit, 8-hour TWA. 29 CFR 1910.1000, Transitional Limits column, Table Z-1-A, Table Z-2 and Table Z-3.

### SECTION III - PHYSICAL DATA

|   |   |
|---|---|
| Appearance: Colorless to gray,<br>syropy liquid | Specific Gravity: 1.49 @ 65.6°C (150°F)   |
| Odor: Mild, slightly pungent                    | pH = 14 (strong alkali)                   |
| Percent Volatiles: 50%                          | Boiling Point: 148°C (298°F)              |
| Solubility in Water: Soluble                    | Vapor Pressure: 19 mm Hg @ 65.5°C (150°F) |
| Physical State: Liquid                          | Vapor Density: N.A.                       |

### SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point: Not combustible.

Lower Explosive Limit (LEL): Not Applicable

Upper Explosive Limit (UEL): Not Applicable

Self-Ignition Temperature: Not Applicable

## Notes

*Flash Point* -- The lowest initial temperature of air passing around the specimen at which sufficient combustible gas is evolved to be ignited by a small external pilot flame.

*Self-Ignition Temperature* -- The lowest initial temperature of air passing around the specimen at which, in absence of an ignition source, ignition occurs of itself, as indicated by an explosion, flame or sustained glow.

Extinguishing Media: Although not combustible, should a fire involve the product, flood with water using care not to splash or splatter this material.

Special Firefighting Procedures: As with most fire conditions, it is proper to wear a positive pressure self-contained breathing apparatus (SCBA). Personnel not wearing suitable protection must be removed from the area. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

Unusual Fire and Explosion Hazards: In contact with moisture or water sufficient heat may be generated to ignite adjacent combustible materials. Sodium hydroxide solutions can react violently when in contact with chlorinated hydrocarbons and metals such as aluminum, zinc or materials galvanized with zinc with resultant generation of hydrogen.

## SECTION V - REACTIVITY

Stability: Stable

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products: Not combustible.

Incompatibility (Materials to Avoid): This product reacts with water generating heat. Do not add water to this product, always add caustic to water slowly and in small amounts to avoid boiling and spattering. This product reacts violently or explosively with chlorinated hydrocarbons. It attacks leather and wool resulting in destruction of those materials and possible chemical exposure to the individual. Caustic solutions can generate hydrogen gas on contact with aluminum, zinc or materials galvanized with zinc.

## SECTION VI - HEALTH HAZARD DATA

Threshold Limit Value: 2 mg/m<sup>3</sup> - Ceiling.

Permissible Exposure Limit (PEL): 2 mg/m<sup>3</sup>

Primary Routes of Exposure: Inhalation, skin and eye contact.

**Effects of Overexposure:** This material is extremely corrosive to all body tissue. Skin contact will result in severe burns and frequently with deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mist will cause irritation and may even cause damage to the entire respiratory tract varying from mild irritation of mucous membranes to severe pneumonitis. Symptoms may not be immediately painful or visible. Swallowing usually results in severe injury.

**Emergency and First Aid Procedures:**

**Inhalation:** Remove affected individual to fresh air. Obtain medical attention immediately.

**Eye Contact:** Immediately flush eyes with lukewarm water for at least 15 minutes while lifting upper and lower eyelids. Continue to flush the eyes if there is any indication of residual chemical. Seek medical attention immediately.

**Skin Contact:** Immediately remove contaminated clothing, and flush exposed area with lukewarm water for at least 15 minutes. Continue to flush skin if there is any indication of residual chemical. Seek medical attention immediately.

**Ingestion:** DO NOT INDUCE VOMITING! Immediately dilute by drinking water or milk, then neutralize with diluted vinegar or fruit juice.

**SECTION VII - SPILL & LEAK PROCEDURE**

**Steps to be taken in case material is released or spilled:** Issue a warning: CORROSIVE MATERIAL. Keep non-essential personnel away from spill area. Wear rubber protective clothing, e.g., gloves, boots, aprons, and chemical splash goggles and face shield. Do not touch spilled material. Contain the spill and use absorbents and pumps to remove "ponded" liquid. Transfer the spilled material to caustic resistant containers labeled: CORROSIVE. Avoid flushing chemical into public sewers or water system. With careful handling, dilute acid, preferable acetic acid, may be used to neutralize final traces of caustic. Flush the cleaned area with water.

**Waste Disposal Method:** HAZARDOUS WASTE. EPA Hazardous Waste Number: D002 (if pH is greater than 12.5). Dispose of in a licensed hazardous waste disposal facility in accordance with all applicable Federal, State and Local health and pollution laws and regulations. (See 40 CFR 261).

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

**Ventilation:** Ventilation should always be provided to draw mists and vapors away from workers to prevent routine inhalation. Ventilation should be adequate to maintain the ambient workplace atmosphere below the limits listed in Section II.

**Respiratory Protection:** Wear a NIOSH/MSHA-approved, airline or self-contained respirator whenever exposures exceed the limits listed in Section II. Use in accordance with the manufacturers use limitations and OSHA Standard 1910.134 (29 CFR).

Eye/Face Protection: Chemical goggles with full face shield.

Protective Equipment: Wear impervious (e.g. rubber) gloves, boots or shoes, coveralls or other protective clothing as appropriate to prevent contact with liquid. Check with glove/clothing manufacturers to determine materials resistant to the chemicals shown in Section II.

Additional: Do not smoke or consume food or beverage in the work areas. Wash thoroughly after handling the product.

### **SECTION IX - SPECIAL PRECAUTIONS**

Material Handling: Do not breathe mists or vapors. Avoid skin and eye contact. Use under well-ventilated conditions. Utilize good personal hygiene practices, e.g., thoroughly washing after handling the product. Remove contaminated clothing and shower at once. Wash contaminated clothing before reuse. (Discard leather shoes.) PROVIDE A SAFETY SHOWER AND EYEWASH STATION IN THE WORK AND HANDLING AREAS.

Storage: Store in water-tight containers in a cool, dry place separate from the normal work area and away from materials that react with sodium hydroxide. Use corrosion resistant structural materials and lighting and ventilation systems in the storage area. Store in suitable, labeled containers and maintain in a tightly closed condition when not in use. Protect containers from physical damage. Post appropriate warning signs.

### **SECTION X - HAZARD CODES**

#### NFPA (2002)

(National Fire Protection Association)

Health: 3  
Flammability: 0  
Reactivity: 1  
Special: Corrosive

#### HMIS

(Hazardous Materials Identification System)

Health: 3  
Flammability: 0  
Reactivity: 1  
Personal Protection: X\*

#### Key:

0 = Insignificant  
1 = Slight  
2 = Moderate  
3 = High  
4 = Extreme

\* See MSDS for specified protection



## **USER'S RESPONSIBILITY**

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this bulletin should be provided to the user's employees or customers. Westlake CA&O Corporation must rely upon the user to utilize this information to develop appropriate work practice guidelines and employee instructional programs for his or her operation.

## **DISCLAIMER OF LIABILITY**

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding the accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

## **SHIPPING INFORMATION**

**IDENTIFICATION - DOMESTIC TRANSPORTATION**

Proper Shipping Name (172.101(c)): SODIUM HYDROXIDE SOLUTION  
(Technical Name(s)) 172.203(k): (Contains 50% Sodium Hydroxide)  
Hazard Class 172.101(d): 8 UN/NA# 172.101(e): UN 1824  
Haz. Substance 171.8: Sodium Hydroxide Reportable Quantity: 1,000 Lbs  
Inhalation Hazard 172.2a(b): N/A  
Package Code 172.101(f): PG II Placarded: CORROSIVE

**PACKAGING (Part 173)**

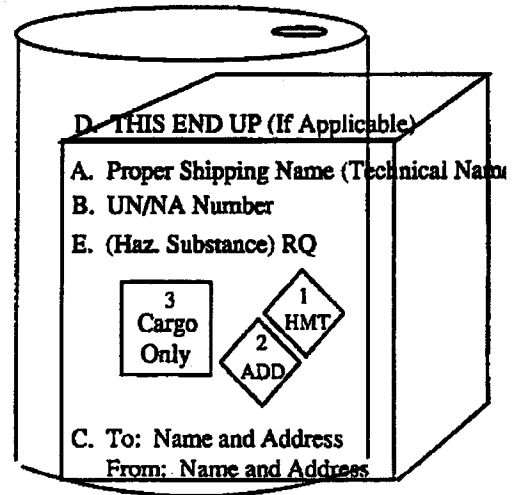
- ◆ Packaging Section (172.101(i)) –(Col. 8(A): 173.154)(Col. 8(B): 173.202)(Col. 8(C): 173.242)
- ◆ General Packaging Section - General 173.24 Hazard Class: CORROSIVE

**MARKING**

- A. Proper Shipping Name (172.301(a)) (Technical Name) (172.301(b))
- B. UN/NA Number (172.301(a))
- C. Name & Address (172.301(d))
- D. THIS END UP (172.312(a))
- E. Hazardous Substance RQ (Name) (172.324)  
ORM Designation (172.316(a))  
Inhalation Hazard (172.313(a))

**DOMESTIC LABELING**

- 1. HMT LABELS (172.400)
- 2. Additional Subsidiary Hazard (172.402(a))



**IATA 2005 Edition**

Proper Shipping Name (Col. B): Sodium Hydroxide Solution  
Class/Division (Col. C): 8 Subsidiary Risk (Col. D): N/A  
UN/ID# (Col. A): UN 1824  
Carrier Special Provisions (Col. M): A3

**PACKAGING**

- ◆ Max. Qty. Per Pkg. (Cols. H/J) - Passenger: 1 Liter Cargo: 30 Liters
- ◆ Packaging Instructions (Cols. G/I) - Passenger: 809 Cargo: 813



P.O. Box 160  
Corner Brook  
Newfoundland  
Canada  
A2H 6C7

## MATERIAL SAFETY DATA SHEET

### LIMESTONE

#### 1. Product Information:

Limestone is a naturally occurring mineral. It is used in the manufacture of quicklime and hydrated lime, steel production, as a soil sweetener, mineral filler and construction aggregate.

Producer: ATLANTIC MINERALS LIMITED  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

#### 2. Chemical Components:

|                                       | <u>%</u> | <u>CAS #</u> |
|---------------------------------------|----------|--------------|
| Calcium Carbonate                     | 95 - 100 | 1317-65-3    |
| Magnesium Carbonate                   | 0 - 1    | 546-93-0     |
| Clay Minerals<br>(Aluminum Silicates) | 0 - 3    | 1302-65-3    |
| Amorphous Silica                      | trace    | 7631-86-9    |
| Crystalline Silica                    | trace    | 14808-60-7   |
| Iron Oxide                            | trace    | 1309-37-1    |

Exposure Limit - classed as nuisance dust  
- TWAEV (time weighted average exposure value) = 10mg/m<sup>3</sup> (total dust)

#### 3. Physical Data:

Solid - white to grey  
Specific Gravity - 2.6 - 2.8  
Solubility in water - negligible  
pH in water - neutral

4. Fire or Explosive Hazards: Not applicable

#### 5. Reactivity Data:

Reacts vigorously with mineral acids producing carbon dioxide.  
Decomposes at >850 °C to quicklime and carbon dioxide.

6. Toxicological Properties: Classified as nuisance dust.

Route of entry: skin contact, eye contact, inhalation, ingestion.

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:  
Quarry Site:

Tel: (709) 634-8255  
Tel: (709) 644-2447

Fax: (709) 634-3939  
Fax: (709) 644-2449

**CONFIDENTIAL**



# MATERIAL SAFETY DATA SHEET

## LIMESTONE

Acute Exposure: Inhalation may cause nose, throat, or lung irritation and choking depending on the degree of exposure. May cause eye irritation and damage to cornea. May cause dry skin or skin irritation. Ingestion of large quantities may cause intestinal distress.

Chronic Exposure: Prolonged or repeated exposure may cause lung injury.

Exposure Limit: TWAEV (time weighted average exposure limit value) = 10 mg/m<sup>3</sup> (total dust)

### 7. Preventative Measures:

Skin Contact - Use protective clothing to prevent skin contact.

Eye Protection - Use safety glasses or goggles to prevent eye contact.

Respiratory Protection - Not required under ordinary conditions but an approved respiratory is necessary when exposed to dust above exposure limits.

Waste Disposal - Dispose as a common waste.

### 8. First Aid Measures:

Inhalation - Move to fresh air. Seek medical attention for discomfort.

Eye contact - Rinse thoroughly with water. Seek medical attention for abrasion.

Skin Contact - Wash with soap and water.

Ingestion - Do not induce vomiting but drink plenty of water. Seek medical attention for discomfort.

### 9. Preparation Information:

MSDS prepared by:

**ATLANTIC MINERALS LIMITED**  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

Phone: (709) 634-8255

Preparation Date:

June 2009.

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:  
Quarry Site:

Tel: (709) 634-8255  
Tel: (709) 644-2447

Fax: (709) 634-3939  
Fax: (709) 644-2449

# CONFIDENTIAL

# SAFETY DATA SHEET

# OxyChem<sup>®</sup>



## Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Company Identification:** Occidental Chemical Corporation  
5005 LBJ Freeway  
P.O. Box 809050  
Dallas, Tx 75380-9050

**24 Hour Emergency Telephone Number:** 1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)

**To Request an MSDS: Customer Service:** MSDS@oxy.com or 1-972-404-3245  
1-800-752-5151 or 1-972-404-3700

**Trade Name:** Hydrochloric Acid (HCl)

**Synonyms:**

- Muriatic Acid
- HCl Solution
- Aqueous hydrogen chloride

**Product Use:** Process chemical, Metal cleaning, Water purification, Petroleum industry

### 2. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW:

**Color:** Colorless  
**Physical State:** Liquid  
**Appearance:** Clear  
**Odor:** Irritating, Pungent, Sharp  
**Signal Word:** Danger

**MAJOR HEALTH HAZARDS:** CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN AND EYES. CAUSES PERMANENT EYE DAMAGE. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

**PHYSICAL HAZARDS:** May spatter or generate heat when mixed with water. Contact with metals may evolve flammable hydrogen gas.

**PRECAUTIONARY STATEMENTS:** Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Use only with adequate ventilation.

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

## 2. HAZARDS IDENTIFICATION

\*\*\*\*\*

### POTENTIAL HEALTH EFFECTS:

**Inhalation:** May cause irritation (possibly severe), chemical burns, and pulmonary edema.

**Skin contact:** May cause irritation (possibly severe) and chemical burns.

**Eye contact:** May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

**Ingestion:** Not a likely route of exposure.

**Target Organs Affected:** Respiratory System, Skin, Eye

**Chronic Effects:** Repeated or prolonged exposure to dilute solutions may result in dermatitis. Discoloration of the teeth may occur as a result of long term exposure.

**Interaction with Other Chemicals Which Enhance Toxicity:** None known

**Medical Conditions Aggravated by Exposure:** None known

See Section 11: TOXICOLOGICAL INFORMATION

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Component | Concentration (by weight %) | CAS - No. |
|---------------------|-----------------------------|-----------|
| Water               | 63 - 91                     | 7732-18-5 |
| Hydrogen chloride   | 9 - 36                      | 7647-01-0 |

## 4. FIRST AID MEASURES

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

**SKIN CONTACT:** Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:** Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:** Not a likely route of exposure.

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

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## 4. FIRST AID MEASURES

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## 5. FIRE-FIGHTING MEASURES

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**Fire Hazard:** Negligible fire hazard.

**Extinguishing Media:** Use media appropriate for surrounding fire

**Fire Fighting:** Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

**Sensitivity to Mechanical Impact:** Not sensitive.

**Sensitivity to Static Discharge:** Not sensitive.

**Flash point:** Not flammable

**Hazardous Combustion Products:** Hydrogen chloride, Chlorine, Hydrogen gas

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:**

Remove sources of ignition. Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Stop leak if possible without personal risk. Consider evacuation of personnel located downwind if material is leaking. Shut off ventilation system if needed. Completely contain spilled material with dikes, sandbags, etc. Neutralize with soda ash or dilute caustic soda. Collect with appropriate absorbent and place into suitable container. Liquid material may be removed with a properly rated vacuum truck. Keep out of water supplies and sewers. This material is acidic and may lower the pH of the surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

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## 7. HANDLING AND STORAGE

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**Storage Conditions:** Store and handle in accordance with all current regulations and standards. Store in rubber-lined steel, acid-resistant plastic or glass containers. Keep container tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Keep away from heat, sparks and open flames. Keep separated from incompatible substances. Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from physical damage. Dike and vent storage tanks.

**Handling Procedures:** Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

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# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

## 7. HANDLING AND STORAGE

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### OSHA Regulatory Exposure limit(s):

| Hazardous Component | CAS - No. | OSHA Final PEL<br>TWA | OSHA Final PEL<br>STEL | OSHA Final PEL<br>Ceiling    |
|---------------------|-----------|-----------------------|------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | -----                 | -----                  | 5 ppm<br>7 mg/m <sup>3</sup> |

### Non-Regulatory Exposure Limit(s):

The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

| Hazardous Component | CAS - No. | ACGIH<br>TWA | ACGIH<br>STEL | ACGIH<br>Ceiling | OSHA<br>TWA<br>(Vacated) | OSHA<br>STEL<br>(Vacated) | OSHA Ceiling<br>(Vacated)    |
|---------------------|-----------|--------------|---------------|------------------|--------------------------|---------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | -----        | -----         | 2 ppm            | -----                    | -----                     | 5 ppm<br>7 mg/m <sup>3</sup> |

**ENGINEERING CONTROLS:** Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT:

**Eye Protection:** Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin and Body Protection:** Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots.

**Hand Protection:** Wear appropriate chemical resistant gloves

**Protective Material Types:** Nitrile, Neoprene, Butyl rubber, Polyvinyl chloride (PVC), Responder®, Trelchem®, Tychem®

| Hazardous Component | Immediately Dangerous to Life/ Health (IDLH) |
|---------------------|--|
| Hydrogen chloride   | 50 ppm IDLH                                  |

**Respiratory Protection:** A NIOSH approved full-face respirator equipped with acid gas cartridges (appropriate for hydrogen chloride) may be permissible under certain circumstances where airborne concentrations of hydrogen chloride are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. When the level may be above the IDLH, use an SCBA or pressure-demand supplied air with an auxiliary self-contained escape pack. Pressure-demand SCBA (self-contained breathing apparatus) must be used when there is a potential for uncontrolled release or unknown concentrations. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.



# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Physical State:</b>             | Liquid                             |
| <b>Appearance:</b>                 | Clear                              |
| <b>Color:</b>                      | Colorless                          |
| <b>Odor:</b>                       | Irritating, Pungent, Sharp         |
| <b>Odor Threshold</b>              | 0.3 ppm (causes olfactory fatigue) |
| <b>Molecular Weight:</b>           | 36.46                              |
| <b>Molecular Formula:</b>          | HCl                                |
| <b>Flash point:</b>                | Not flammable                      |
| <b>Boiling Point/Range:</b>        | 140 - 221°F (60 - 105 °C)          |
| <b>Freezing Point/Range:</b>       | -29 to 5 °F (-34 to -15 °C)        |
| <b>Vapor Pressure:</b>             | 14.6 - 80 mmHg @ 20°C              |
| <b>Vapor Density (air=1):</b>      | 1.3 @ 20°C                         |
| <b>Specific Gravity (water=1):</b> | 1.05 - 1.18                        |
| <b>Density:</b>                    | 8.75 - 9.83 lbs/gal                |
| <b>Water Solubility:</b>           | 100%                               |
| <b>pH:</b>                         | 2 (0.2% solution)                  |
| <b>Volatility:</b>                 | 9 - 36% by volume                  |
| <b>Evaporation Rate (ether=1):</b> | < 1.00 (butyl acetate=1)           |

## 10. STABILITY AND REACTIVITY

|   |   |
|---|---|
| <b>Reactivity/ Stability:</b>                 | Stable at normal temperatures and pressures.  |
| <b>Conditions to Avoid:</b>                   | Avoid heat, flames, sparks and other sources of ignition. Avoid contact with water. Will react with some metals forming flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Avoid contact with incompatible materials. |
| <b>Incompatibilities/ Materials to Avoid:</b> | Metals, Alkalis, Oxidizing agents, Mercuric sulfate, Perchloric acid, Carbides of calcium, cesium, rubidium, Acetylides of cesium and rubidium, Phosphides of calcium and uranium, Lithium silicide   |
| <b>Hazardous Decomposition Products:</b>      | Chlorine, Hydrogen chloride, Hydrogen gas   |
| <b>Hazardous Polymerization:</b>              | Will not occur  |

## 11. TOXICOLOGICAL INFORMATION

|                                |                 |
|--------------------------------|-----------------|
| <b>Standard Draize (Eye):</b>  | rabbit-eye mild |
| <b>Standard Draize (Skin):</b> | human-skin mild |

### TOXICITY DATA:

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

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## 11. TOXICOLOGICAL INFORMATION

| Hazardous Component | LD50 Oral                             | LC50 Inhalation     | LD50 Dermal         |
|---------------------|---------------------------------------|---------------------|---------------------|
| Hydrogen chloride   | 700 mg/kg (Rat)<br>900 mg/kg (Rabbit) | 3124 ppm (1 hr-Rat) | 5010 mg/kg (Rabbit) |

### **TOXICITY:**

Inhalation will cause severe irritation and possible burns with coughing and choking. If inhaled deeply, edema and hemorrhage of the lungs may occur. Prolonged exposure may cause discoloration and/or erosion of teeth. Contact with eyes causes immediate severe irritation with possible burns, permanent visual impairment, or total loss of sight. Skin contact with this material may cause severe irritation and corrosion of tissue. Ingestion may cause immediate burns of the mouth, esophagus, and stomach. Ingestion may cause intense pain, nausea, vomiting, bleeding, circulating collapse, shock and death.

**CARCINOGENICITY:** This product is not classified as a carcinogen by NTP, IARC or OSHA.

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## 12. ECOLOGICAL INFORMATION

### **ECOTOXICITY DATA:**

LC50 *Gambusia affinis*: 282 mg/L 96 h  
LC50 goldfish: 178 mg/L (1 to 2 hour survival time)  
LC50 bluegill: 3.6 mg/L 48 h  
LC50 shrimp: 100 – 330 mg/L

### **FATE AND TRANSPORT:**

**BIODEGRADATION:** This material is inorganic and not subject to biodegradation.

**PERSISTENCE:** This material is believed not to persist in the environment. This material is believed to exist in the disassociated state in the environment. If released to soil, hydrogen chloride will sink into the soil. The acid will dissolve some soil material (in particular, anything with a carbonate base) and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table. If released to water, it dissociates almost completely and will be neutralized by natural alkalinity and carbon dioxide.

**BIOCONCENTRATION:** This material is not expected to bioconcentrate in organisms.

**ADDITIONAL ECOLOGICAL INFORMATION:** This material has exhibited toxicity to terrestrial organisms. May decrease pH of waterways and adversely affect aquatic life.

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## 13. DISPOSAL CONSIDERATIONS

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# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

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## 13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D002

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## 14. TRANSPORT INFORMATION

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### U.S.DOT 49 CFR 172.101:

**PROPER SHIPPING NAME:** Hydrochloric acid solution  
**DOT UN NUMBER:** UN1789  
**HAZARD CLASS/ DIVISION:** 8  
**PACKING GROUP:** II  
**LABELING:** 8  
**REQUIREMENTS:**  
**DOT RQ (lbs):** RQ 5,000 Lbs. (Hydrochloric acid)

### CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

**SHIPPING NAME:** Hydrochloric acid solution  
**UN NUMBER:** UN1789  
**CLASS:** 8  
**PACKING/RISK GROUP:** II

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## 15. REGULATORY INFORMATION

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### U.S. REGULATIONS

#### OSHA REGULATORY STATUS:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

#### CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

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# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

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| Hazardous Component | CERCLA Reportable Quantities |
|---------------------|------------------------------|
| Hydrogen chloride   | 5000 lb (final RQ)           |

**EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):**

If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

| Hazardous Component | EPCRA RQs                   | Threshold Planning Quantity (TPQs) |
|---------------------|-----------------------------|------------------------------------|
| Hydrogen chloride   | 5000 lb (EPCRA RQ) (liquid) | 500 lb (TPQ) (gas only)            |

**EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):**

Acute Health Hazard, Reactive Hazard

**EPCRA SECTION 313 (40 CFR 372.65):**

The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements.

| Hazardous Component                   | Status                     |
|---------------------------------------|----------------------------|
| Hydrogen Chloride (Hydrochloric Acid) | Listed - Aerosol form only |

**OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):**

Not regulated

## NATIONAL INVENTORY STATUS

**U.S. INVENTORY STATUS (TSCA):** All components are listed or exempt

**TSCA 12(b):** This product is not subject to export notification

**CANADIAN DOMESTIC SUBSTANCE LIST (DSL/NDL):** All components are listed.

## STATE REGULATIONS

| Hazardous Component  | Hydrogen chloride           |
|--|-----------------------------|
| <b>California Proposition 65 Cancer WARNING:</b>                       | Not Listed                  |
| <b>California Proposition 65 CRT List - Male reproductive toxin:</b>   | Not Listed                  |
| <b>California Proposition 65 CRT List - Female reproductive toxin:</b> | Not Listed                  |
| <b>Massachusetts Right to Know Hazardous Substance List</b>            | Listed                      |
| <b>New Jersey Right to Know Hazardous Substance List</b>               | sn 1012; sn 2909 (gas only) |
| <b>New Jersey Special Health Hazards Substance List</b>                | corrosive                   |
| <b>New Jersey - Environmental Hazardous Substance List</b>             | Listed                      |
| <b>Pennsylvania Right to Know Hazardous Substance List</b>             | Listed                      |
| <b>Pennsylvania Right to Know Special Hazardous Substances</b>         | Not Listed                  |
| <b>Pennsylvania Right to Know Environmental Hazard List</b>            | Listed                      |
| <b>Rhode Island Right to Know Hazardous Substance List</b>             | Listed                      |

## CANADIAN REGULATIONS

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

|  |                   |
|--|-------------------|
| <b>Hazardous Component:</b>                            | Hydrogen chloride |
| <b>Canada - CEPA Schedule I - Toxic Substance list</b> | Not Listed        |
| <b>WHMIS Classification:</b>                           | E                 |

## 16. OTHER INFORMATION

### Disclaimer:

This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

**HMIS: (SCALE 0-4)** (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

**Health:** 3                      **Flammability:** 0                      **Reactivity:** 1

**NFPA 704 - Hazard Identification Ratings (SCALE 0-4)**

**Health:** 3                      **Flammability:** 0                      **Reactivity:** 1

### IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

**pHREEdom® 5200M**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : **pHREEdom® 5200M**

APPLICATION : SCALE CONTROL

COMPANY IDENTIFICATION : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

## NFPA 704M/HMIS RATING

HEALTH : 1 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

| Hazardous Substance(s)                     | CAS NO | % (w/w)     |
|--|--------|-------------|
| Sodium salt of phosphonomethylated diamine |        | 10.0 - 30.0 |

**3. HAZARDS IDENTIFICATION****\*\*EMERGENCY OVERVIEW\*\*****WARNING**

Irritating to eyes.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

## PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

## HUMAN HEALTH HAZARDS - ACUTE :

## EYE CONTACT :

Can cause moderate irritation.

## SKIN CONTACT :

May cause irritation with prolonged contact.

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**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****INGESTION :**

Not a likely route of exposure. No adverse effects expected.

**INHALATION :**

Not a likely route of exposure. No adverse effects expected.

**AGGRAVATION OF EXISTING CONDITIONS :**

A review of available data does not identify any worsening of existing conditions.

**HUMAN HEALTH HAZARDS - CHRONIC :**

No adverse effects expected other than those mentioned above.

**4. FIRST AID MEASURES****EYE CONTACT :**

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

**SKIN CONTACT :**

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

**INGESTION :**

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

**INHALATION :**

Remove to fresh air, treat symptomatically. Get medical attention.

**NOTE TO PHYSICIAN :**

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

**5. FIRE FIGHTING MEASURES****FLASH POINT :** > 200 F / > 93.3 C**EXTINGUISHING MEDIA :**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

**FIRE AND EXPLOSION HAZARD :**

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.



## MATERIAL SAFETY DATA SHEET

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**pHREEdom® 5200M**

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### 6. ACCIDENTAL RELEASE MEASURES

#### PERSONAL PRECAUTIONS :

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

#### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

#### ENVIRONMENTAL PRECAUTIONS :

Do not contaminate surface water.

### 7. HANDLING AND STORAGE

#### HANDLING :

Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

#### STORAGE CONDITIONS :

Store the containers tightly closed. Store in suitable labelled containers.

#### SUITABLE CONSTRUCTION MATERIAL :

HDPE (high density polyethylene), Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

#### ENGINEERING MEASURES :

General ventilation is recommended.

#### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed.

#### HAND PROTECTION :

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

#### SKIN PROTECTION :

Wear standard protective clothing.



**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****EYE PROTECTION :**

Wear chemical splash goggles.

**HYGIENE RECOMMENDATIONS :**

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                     |                             |
|---------------------|-----------------------------|
| PHYSICAL STATE      | Liquid                      |
| APPEARANCE          | Clear Light yellow          |
| ODOR                | Slight                      |
| SPECIFIC GRAVITY    | 1.17 - 1.21 @ 77 °F / 25 °C |
| DENSITY             | 9.7 - 10.1 lb/gal           |
| SOLUBILITY IN WATER | Complete                    |
| pH (100 %)          | 4.2 - 5.2                   |
| VISCOSITY           | 16 cps @ 40 °F / 4.4 °C     |
| VOC CONTENT         | 0 % Calculated              |

Note: These physical properties are typical values for this product and are subject to change.

**10. STABILITY AND REACTIVITY****STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur, Oxides of phosphorus

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.



# MATERIAL SAFETY DATA SHEET

## PRODUCT

**pHREEdom® 5200M**

## EMERGENCY TELEPHONE NUMBER(S)

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### SENSITIZATION :

This product is not expected to be a sensitizer.

### CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

## 12. ECOLOGICAL INFORMATION

### ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

#### ACUTE FISH RESULTS :

| Species        | Exposure | LC50         | Test Descriptor |
|----------------|----------|--------------|-----------------|
| Fathead Minnow | 96 hrs   | > 1,000 mg/l | Product         |

Rating : Essentially non-toxic

#### ACUTE INVERTEBRATE RESULTS :

| Species       | Exposure | LC50         | EC50 | Test Descriptor |
|---------------|----------|--------------|------|-----------------|
| Daphnia magna | 48 hrs   | > 1,000 mg/l |      | Product         |

Rating : Essentially non-toxic

### MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 30 - 50%      |

The portion in water is expected to be soluble or dispersible.

### BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

## 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.



## MATERIAL SAFETY DATA SHEET

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As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

### 14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

#### LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### 15. REGULATORY INFORMATION

#### NATIONAL REGULATIONS, USA :

##### OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium salt of phosphonomethylated diamine : Eye irritant

##### CERCLA/SUPERFUND, 40 CFR 117, 302 :

Notification of spills of this product is not required.

##### SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

##### SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

##### SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

None of the substances are specifically listed in the regulation.

**CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

None of the substances are specifically listed in the regulation.

**CALIFORNIA PROPOSITION 65 :**

This product does not contain substances which require warning under California Proposition 65.

**MICHIGAN CRITICAL MATERIALS :**

None of the substances are specifically listed in the regulation.

**STATE RIGHT TO KNOW LAWS :**

None of the substances are specifically listed in the regulation.

**NATIONAL REGULATIONS, CANADA :****WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS CLASSIFICATION :**

D2B - Materials Causing Other Toxic Effects - Toxic Material

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :**

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.



## MATERIAL SAFETY DATA SHEET

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**(800) 424-9300 (24 Hours) CHEMTREC**

### INTERNATIONAL CHEMICAL CONTROL LAWS

#### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

### 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

#### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department  
Date issued : 02/21/2004

**Nalco Company** 1601 W. Diehl Road • Naperville, Illinois 60563-1198

(630)305-1000

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**MATERIAL SAFETY DATA SHEET**

**PRODUCT**

**pHREEdom® 5200M**

**EMERGENCY TELEPHONE NUMBER(S)**

**(800) 424-9300 (24 Hours) CHEMTREC**

Version Number : 1.4

**Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198**

**(630)305-1000**

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**MATERIAL SAFETY DATA SHEET****TMT 15®**

|               |        |               |            |
|---------------|--------|---------------|------------|
| Material no.  |        | Version       | 1.8 / US   |
| Specification | 101001 | Revision date | 10/26/2007 |
| Order Number  |        | Print Date    | 11/08/2007 |
|               |        | Page          | 1 / 10     |

**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING****Product information**

Trade name : TMT 15®  
Use of the Substance / Preparation : For industrial use  
Function : Precipitant

Company : Evonik Degussa Corporation  
379 Interpace Parkway  
Parsippany, NJ 07054  
USA

Telephone : 973-541-8000  
Telefax : 973-541-8040

**US: CHEMTREC EMERGENCY NUMBER** : 800-424-9300

**CANADA: CANUTEC EMERGENCY NUMBER** : 613-996-6666

Product Regulatory Services : 973-541-8060

**2. HAZARDS IDENTIFICATION****\*\*\* EMERGENCY OVERVIEW \*\*\***

*Form-liquid    Color-colourless to yellowish    Odor-almost odourless*

Irritating to eyes.

**Eye contact**

irritating

**Skin Contact**

Slightly irritating.

**Inhalation**

No hazard expected in normal use.

**Ingestion**

No hazard expected in normal use.

**MATERIAL SAFETY DATA SHEET****TMT 15®**

|               |        |               |            |
|---------------|--------|---------------|------------|
| Material no.  |        | Version       | 1.8 / US   |
| Specification | 101001 | Revision date | 10/26/2007 |
| Order Number  |        | Print Date    | 11/08/2007 |
|               |        | Page          | 2 / 10     |

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Chemical nature**

Aqueous preparation  
Content min. 15 %

The preparation contains:

**Information on ingredients / Hazardous components**

1,3,5-triazine-2,4,6(1H,3H,5H)-trithione, trisodium salt  
CAS-No. 17766-26-6 Percent (Wt./ Wt.)

**Other information**

This material is classified as hazardous under OSHA regulations.

**4. FIRST AID MEASURES****General advice**

Remove victims from hazardous area.  
Observe self-protection (eye protection).

**Inhalation**

No particular measures required.  
If necessary: Provide with fresh air.

**Skin contact**

Upon skin contact, wash with plenty of water.  
Remove contaminated or saturated clothing.

**Eye contact**

Keeping eyelid open, immediately rinse thoroughly for at least 5 minutes using plenty of water or, if necessary, eye rinsing solution.  
Consult an ophthalmologist.

**Ingestion**

Do not induce vomiting.  
Have the mouth rinsed with water.  
Have patient drink plenty of water in small sips.  
Consult a physician.

**Notes to physician**

Specific therapy/antidote treatment: none known  
If required, therapy of irritative effect.  
If substance has been swallowed:  
Early endoscopy in order to assess mucosa lesions in the oesophagus and stomach which may appear.  
If necessary, aspirate leftover substance.

**5. FIRE-FIGHTING MEASURES**



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Flash point does not flash

Autoignition temperature not applicable

**Suitable extinguishing media**

water mist quenching powder foam

**Extinguishing media which must not be used for safety reasons**

None known

**Specific hazards during fire fighting**

In the case of fire, the following hazardous smoke fumes may be produced: nitric oxides, sulphur oxides.

**Special protective equipment for fire-fighters**

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

**Further information**

Standard procedure for chemical fires.

Ensure there are sufficient retaining facilities for water used to extinguish fire. Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Wear personal protective equipment; see section 8.

**Environmental precautions**

Observe regulations on prevention of water pollution (collect, dam up, cover up).

Do not allow the product into the following compartments:

surface water  
stretches of water

Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, rivers, groundwater or soil.

**Methods for cleaning up**

Absorb with liquid-binding material (e.g. inert absorbent or universal binder).

Dispose of absorbed material in accordance with the regulations.

see section 13.

Rinse away any residue with plenty of water.

**Additional advice**

Isolate and seal off defective containers immediately.

**7. HANDLING AND STORAGE****Handling****Safe handling advice**

Handle in accordance with good industrial hygiene and safety practices.

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Avoid contact with skin and eyes.  
Wear personal protective equipment.  
For personal protection see section 8.  
Immediately change moistened and saturated work clothes.

No eating, drinking, smoking, or snuffing tobacco at work.  
Wash hands before breaks and at the end of workday.  
preventive skin protection

**Advice on protection against fire and explosion**

The product is not combustible.

**Storage****Requirements for storage areas and containers**

clean, dry.  
Use shatterproof containers.  
Protect from frost.  
Transport and store container in upright position only.  
Always close container tightly after removal of product.

**Further information**

Use by date of the product: min. 2 years.  
Use alkali-resistant materials.

**Advice on common storage**

Store away from: oxidizing agents, acids.

---

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

Remarks                      No substance-specific limiting value being known.

**Component occupational exposure guidelines****Engineering measures**

No dangerous reactions are known to occur with correct handling and storage.

**Personal protective equipment****Respiratory protection**

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

**Hand protection**

|                    |  |
|--------------------|--|
| Glove material     | Polychloroprene (PCP), for example: Camapren 720, Kächele-Cama Latex GmbH (KCL), Germany |
| Material thickness | 0.65 mm  |
| Break through time | > 480 min  |
| Method             | DIN EN 374   |

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The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

**Eye protection**

wear basket-shaped glasses or safety goggles with side-shields.

**Skin and body protection**

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

**Hygiene measures**

No eating, drinking, smoking, or snuffing tobacco at work.

Wash face and/or hands before break and end of work.

Avoid contaminating clothes with product.

Immediately change moistened and saturated work clothes.

**Protective measures**

Avoid contact with skin and eyes.

Handle in accordance with good industrial hygiene and safety practices.

Wear suitable protective clothing, gloves and eye/face protection.

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

|       |                         |
|-------|-------------------------|
| Form  | liquid                  |
| Color | colourless to yellowish |
| Odor  | almost odourless        |

**Safety data**

|                           |                             |           |
|---------------------------|-----------------------------|-----------|
| pH                        | ca. 12.3                    | (22.5 °C) |
| Melting point/range       | -3 °C                       |           |
| Boiling point/range       | 101 °C                      |           |
| Flash point               | does not flash              |           |
| Flammability              | not applicable              |           |
| Autoignition temperature: | not applicable              |           |
| Autoinflammability        | not spontaneously flammable |           |
| Explosiveness             | not applicable              |           |
| Vapor pressure            | 22 mbar                     | (20 °C)   |
| Density                   | ca. 1.12 g/cm <sup>3</sup>  | (20 °C)   |

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|   |                                       |
|---|---------------------------------------|
| Partition coefficient (n-octanol/water) | log Pow: < -2<br>Method: (calculated) |
| Viscosity, dynamic                      | 1.6 mPa.s (20 °C)                     |
| conductivity                            | ca. 60 mS/cm (22 °C)                  |
| Molecular Weight                        | 243.22 g/Mol                          |

**Further information**

|                      |                     |
|----------------------|---------------------|
| Miscibility in water | completely miscible |
|----------------------|---------------------|

**10. STABILITY AND REACTIVITY**

|                                  |  |
|----------------------------------|--|
| Conditions to avoid              | frost.   |
| Materials to avoid               | strong oxidant, acids.   |
| Hazardous decomposition products | None known   |
| Thermal decomposition            | > 370 °C<br>solid<br>No decomposition if stored and applied as directed.                               |
| Hazardous reactions              | No dangerous reactions are known to occur with correct handling and storage.<br><br>product is stable. |

**11. TOXICOLOGICAL INFORMATION**

|                               |   |
|-------------------------------|---|
| Product Acute oral toxicity   | LD50 Rat: 7878 mg/kg<br>Method: analogy OECD-method<br>related to substance: TMT (15%)                    |
| Product Acute dermal toxicity | LD50 Rat: > 2000 mg/kg<br>Method: OECD Test Guideline 402<br>related to substance: TMT (55%)              |
| Product Skin irritation       | Rabbit / 4 h<br>slightly irritating<br>Method: OECD Test Guideline 404<br>related to substance: TMT (55%) |
| Product Eye irritation        | Rabbit<br>irritant<br>Method: OECD Test Guideline 405<br>related to substance: TMT (55%)                  |

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|                                |   |
|--------------------------------|---|
| Product Sensitization          | maximization test guinea pig: not sensitizing<br>Method: OECD Test Guideline 406<br>related to substance: TMT (55%)   |
| Product Repeated dose toxicity | Oral Rat<br>Testing period: 30 d<br>NOAEL: 526 mg/kg<br>target organ/effect: Erythrocytes<br>Method: OECD Test Guideline 407<br>related to substance: TMT (55%) |
| Product Genotoxicity in vitro  | Ames test S. typhimurium / E. coli<br>negative<br>Method: analogy OECD-method<br>related to substance: TMT (15%)  |
| Product Genotoxicity in vivo   | Micronucleus test mouse Oral<br>negative<br>Method: OECD TG 474<br>related to substance: TMT (15%)  |
| Product Human experience       | To date handling this product has not been known to cause any detrimental effects.  |

**12. ECOLOGICAL INFORMATION****Elimination Information (persistence and degradability)**

|                  |  |
|------------------|--|
| Biodegradability | aerobic<br>inoculum: Activated sludge<br>Not readily biodegradable.<br>0 %<br>Exposure time: 28 d<br>Method: OECD TG 302 B<br>related to substance: TMT (15%)        |
|                  | anaerobic<br>inoculum: Activated sludge<br>Not readily biodegradable.<br>0 %<br>Exposure time: 60 d<br>Method: CO2 Evolution Test<br>related to substance: TMT (15%) |

**Ecotoxicity effects**

|                  |   |
|------------------|---|
| Toxicity to fish | LC0 static test Leuciscus idus melanotus: 1000 mg/l / 96 h<br>Analytical monitoring: no<br>Method: DIN 38412 Teil 15<br>related to substance: TMT (acid form) |
|------------------|---|

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Page                 **8 / 10**LC0 static test *Leuciscus idus melanotus*: 1500 mg/l / 48 h  
Analytical monitoring: no  
Method: DIN 38412 Teil 15  
related to substance: TMT (acid form)LC50 semi-static test *Brachydanio rerio*: > 560 - 1000 mg/l / 96 h  
Analytical monitoring: no  
Method: OECD TG 203  
Noxious effect due to pH shift  
pH: 8 - 11  
related to substance: TMT (60%)Toxicity to daphnia       EC50 *Daphnia magna*: ca. 1056 mg/l / 24 h  
Method: OECD TG 202  
Noxious effect due to pH shift  
pH: 8 - 11  
related to substance: TMT (60%)Toxicity to algae        IC 50 *scenedesmus subspicatus*: 273 mg/l / 72 h  
End point: Biomass  
Analytical monitoring: no  
Method: OECD 201  
related to substance: TMT (15%)Toxicity to bacteria     EC50 Activated sludge: 1036 mg/l / 3 h  
Analytical monitoring: no  
Method: DEV L3 (TTC test)  
related to substance: TMT (60%)**Further information on ecology**Chemical Oxygen Demand (COD)   139800 mg/l  
Method: DEV H 4.1  
related to substance: TMT (15%)Biochemical Oxygen Demand (BOD)   0 mg/g  
Concentration: 16 mg/l (BOD5)  
Method: DEV H5/a2 (dilution method)  
related to substance: TMT (60%)

AOX                    The product does not contain any organically bonded halogen.

General Ecological Information   does not contain any heavy metals and compounds from EC directive 76/464:  
is adsorbed to activated sludge**13. DISPOSAL CONSIDERATIONS****WASTE DISPOSAL**

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Advice on disposal

Waste must be disposed of in accordance with local, state, provincial and federal laws and regulations. Empty containers must be handled with care due to product residue.

**14. TRANSPORT INFORMATION****Transport/further information**

Not classified as dangerous in the meaning of transport regulations.

**15. REGULATORY INFORMATION****US Federal Regulations****OSHA**

If listed below, chemical specific standards apply to the product or components:

- None listed

**Clean Air Act Section (112)**

If listed below, components present at or above the de minimus level are hazardous air pollutants:

- None listed

**CERCLA Reportable Quantities**

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- None listed

**SARA Title III Section 311/312 Hazard Categories**

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard

**SARA Title III Section 313 Reportable Substances**

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- None listed

**Toxic Substances Control Act (TSCA)**

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed

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**State Regulations****California Proposition 65**

A warning under the California Drinking Water Act is required only if listed below:

- None listed

**International Chemical Inventory Status**

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact Evonik Degussa Corporation Product Regulatory Services Department:

- |                          |                   |
|--------------------------|-------------------|
| • Europe (EINECS/ELINCS) | Listed/registered |
| • USA (TSCA)             | Listed/registered |
| • Canada (DSL)           | Listed/registered |
| • Australia (AICS)       | Listed/registered |
| • Japan (MITI)           | Listed/registered |
| • Korea (TCCL)           | Listed/registered |
| • Philippines (PICCS)    | Listed/registered |
| • China                  | Listed/registered |

**16. OTHER INFORMATION****HMIS Ratings**

|                   |   |
|-------------------|---|
| Health :          | 2 |
| Flammability :    | 0 |
| Physical Hazard : | 0 |

**Further information**

Data for the production of the safety data sheet from the studies available and from the literature. Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure .

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.



**SAFETY DATA SHEET**

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : **CORE SHELL® 71307**

APPLICATION : **SLUDGE DEWATERING AGENT FLOCCULANT**

COMPANY IDENTIFICATION : **Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198**

EMERGENCY TELEPHONE NUMBER(S) : **(800) 424-9300 (24 Hours) CHEMTREC**

## NFPA 704M/HMIS RATING

HEALTH : 1/1 FLAMMABILITY : 1/1 INSTABILITY : 0/0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Based on our hazard evaluation, none of the substances in this product are hazardous.

**3. HAZARDS IDENTIFICATION****\*\*EMERGENCY OVERVIEW\*\*****CAUTION**

May cause irritation with prolonged contact.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Protect product from freezing.  
Wear suitable protective clothing.  
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

## PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

## HUMAN HEALTH HAZARDS - ACUTE :

## EYE CONTACT :

Can cause mild irritation.

## SKIN CONTACT :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

## INGESTION :

Not a likely route of exposure. If swallowed a jelly mass may form which in digestion may cause blockage.

**Nalco Company** 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access

**SAFETY DATA SHEET**

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC****INHALATION :**

Not a likely route of exposure. No adverse effects expected.

**SYMPTOMS OF EXPOSURE :****Acute :**

A review of available data does not identify any symptoms from exposure not previously mentioned.

**Chronic :**

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

**AGGRAVATION OF EXISTING CONDITIONS :**

Skin contact may aggravate an existing dermatitis condition.

**HUMAN HEALTH HAZARDS - CHRONIC :**

No adverse effects expected other than those mentioned above.

**4. FIRST AID MEASURES****EYE CONTACT :**

Flush affected area with water. Get medical attention.

**SKIN CONTACT :**

Flush affected area with water. If symptoms develop, seek medical advice.

**INGESTION :**

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

**INHALATION :**

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

**NOTE TO PHYSICIAN :**

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

**5. FIRE FIGHTING MEASURES****FLASH POINT :** > 200 °F / > 93.3 °C ( PMCC )**EXTINGUISHING MEDIA :**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

**FIRE AND EXPLOSION HAZARD :**

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.



## SAFETY DATA SHEET

PRODUCT

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### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS :

Notify appropriate government, occupational health and safety and environmental authorities. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. Water in contact with the product will cause slippery floor conditions. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

### ENVIRONMENTAL PRECAUTIONS :

This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

## 7. HANDLING AND STORAGE

### HANDLING :

Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

### STORAGE CONDITIONS :

Protect product from freezing. Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

### UNSUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

### ENGINEERING MEASURES :

General ventilation is recommended.

### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. If significant mists, vapors or aerosols are generated an approved respirator is recommended. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.



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### HAND PROTECTION :

Neoprene gloves Nitrile gloves Butyl gloves PVC gloves

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                     |                                 |
|---------------------|---------------------------------|
| PHYSICAL STATE      | Emulsion                        |
| APPEARANCE          | Opaque Off-white Light brown    |
| ODOR                | Hydrocarbon                     |
| SPECIFIC GRAVITY    | 0.995 - 1.078 @ 77 °F / 25 °C   |
| DENSITY             | 8.30 - 9.00 lb/gal              |
| SOLUBILITY IN WATER | Emulsifiable                    |
| pH (100 %)          | 4.0 - 5.0                       |
| VISCOSITY           | 400 - 1,500 cps @ 72 °F / 22 °C |
| VOC CONTENT         | 28.7 % Calculated               |

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Avoid temperatures below 0 and above 93 degrees C which will cause polymer to precipitate. Avoid extremes of temperature.

### MATERIALS TO AVOID :

Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

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PRODUCT

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## HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.

## SENSITIZATION :

This product is not expected to be a sensitizer.

## CARCINOGENICITY :

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

## HUMAN HAZARD CHARACTERIZATION :

Based on our hazard characterization, the potential human hazard is: Low

**12. ECOLOGICAL INFORMATION**

## ECOTOXICOLOGICAL EFFECTS :

The tests for (products or similar products) were performed in clean water as set forth by USEPA (EPA/600/4-90/027). In order to evaluate the potential toxicity mitigation, the tests for (representative polymers) were performed in environmentally relevant water with dissolved organic carbon (DOC: 4.5 mg/l). The toxicity of this product is due to an external mode of action, e.g., suffocation or immobilization. In the presence of suspended material, e.g., DOC, the polymers are bound to suspended material and the bioavailability is substantially reduced. As a result, the toxicity is expected to be lower. Under normal use and discharge conditions, the LC50 values of the representative polymers tested in the presence of DOC are expected to apply to this product. However, for large spills, the clean water data is more applicable.

## ACUTE FISH RESULTS :

| Species           | Exposure | LC50        | Test Descriptor                                 |
|-------------------|----------|-------------|---|
| Zebra Danio       | 96 hrs   | 1 - 10 mg/l | Representative polymer tested in water with DOC |
| Inland Silverside | 96 hrs   | 185.14 mg/l | Product   |
| Rainbow Trout     | 96 hrs   | 0.51 mg/l   | Product   |

## ACUTE INVERTEBRATE RESULTS :

| Species                         | Exposure | LC50          | EC50 | Test Descriptor                                 |
|---------------------------------|----------|---------------|------|---|
| Daphnia magna                   | 48 hrs   | 10 - 100 mg/l |      | Representative polymer tested in water with DOC |
| Daphnia magna                   | 48 hrs   | 6.09 mg/l     |      | Product   |
| Mysid Shrimp (Mysidopsis bahia) | 96 hrs   | 3.38 mg/l     |      | Product   |

**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****CHRONIC FISH RESULTS :**

| Species        | Exposure | NOEC / LOEC          | End Point | Test Descriptor |
|----------------|----------|----------------------|-----------|-----------------|
| Topsmelt       | 7 Days   | 1 mg/l / > 10 mg/l   |           | Similar Product |
| Fathead Minnow | 7 Days   | 1.25 mg/l / 2.5 mg/l | Growth    | Similar Product |

**CHRONIC INVERTEBRATE RESULTS :**

| Species            | Test Type | NOEC / LOEC             | End Point    | Test Descriptor |
|--------------------|-----------|-------------------------|--------------|-----------------|
| Ceriodaphnia dubia | 3 Brood   | 0.156 mg/l / 0.313 mg/l | Reproduction | Similar Product |

**ADDITIONAL ECOLOGICAL DATA**

NOEC on earthworm: &gt; 1000 mg/l (representative polymer) AOX information: Product contains no organic halogens.

**MOBILITY :**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 10 - 30% | 70 - 90%      |

The portion in water is expected to be soluble or dispersible.

**BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

**ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**AIR TRANSPORT (ICAO/IATA) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**MARINE TRANSPORT (IMDG/IMO) :**

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.  
Technical Name(s) : Cationic polymer  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III

**15. REGULATORY INFORMATION**

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

**NATIONAL REGULATIONS, USA :**

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :  
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 302 :  
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :  
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :  
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.



**SAFETY DATA SHEET**

**PRODUCT**

**CORE SHELL® 71307**

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**(800) 424-9300 (24 Hours) CHEMTREC**

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s)  | Citations |
|---------------|-----------|
| • Adipic Acid | Sec. 311  |

**CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s) | Citations |
|--------------|-----------|
| • Acrylamide | Sec. 112  |

**CALIFORNIA PROPOSITION 65 :**

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels, which would require a warning under the statute.

**MICHIGAN CRITICAL MATERIALS :**

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

**STATE RIGHT TO KNOW LAWS :**

The following substances are disclosed for compliance with State Right to Know Laws:

Adipic Acid

124-04-9

**INTERNATIONAL CHEMICAL CONTROL LAWS :**





## SAFETY DATA SHEET

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

### EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

**Nalco Company** 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access

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**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,  
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department  
Date issued : 05/06/2010  
Version Number : 1.16



## Material Safety Data Sheet

### Ferric Chloride 32% to 45% Photo Etch Grade

#### General Information

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Company's Name: Borden & Remington  
Company's Street: 63 Water St.  
Company's City: Fall River  
Company's State: MA  
Company's Country: US  
Company's Zip Code: 02722  
Company's Emerg Ph #: 800-424-9300 (CHEMTREC)  
Company's Info Ph #: 508-675-0096  
Date MSDS Prepared: 24FEB93  
Safety Data Review Date: January 2010

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#### Ingredients/Identity Information

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Proprietary: NO  
Ingredient: FERRIC CHLORIDE  
Ingredient Sequence Number: 01  
Percent: 32-45  
NIOSH (RTECS) Number: LJ9100000  
CAS Number: 7705-08-0  
ACGIH TLV: 1 MG/CUM

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Proprietary: NO  
Ingredient: HYDROCHLORIC ACID, HYDROGEN CHLORIDE, MURIATIC ACID  
HYDROCHLORIDE  
Ingredient Sequence Number: 02  
Percent: <3  
NIOSH (RTECS) Number: MW4025000  
CAS Number: 7647-01-0  
OSHA PEL: 5 PPM  
ACGIH TLV: C 11 MG/CUM  
Other Recommended Limit: 7 PPM

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Proprietary: NO  
Ingredient: FERROUS CHLORIDE  
Ingredient Sequence Number: 03  
Percent: <0.5  
NIOSH (RTECS) Number: NO5400000  
CAS Number: 7758-94-3  
ACGIH TLV: 1 MG/CUM

-----  
Proprietary: NO  
Ingredient: WATER  
Ingredient Sequence Number: 04  
Percent: BALANCE  
NIOSH (RTECS) Number: ZC0110000  
CAS Number: 7732-18-5

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#### Physical/Chemical Characteristics

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Appearance And Odor: REDDISH BROWN LIQUID W/SLIGHT ODOR OF IRON/ACID  
Boiling Point: 230F  
Melting Point: -58F  
Vapor Pressure (MM Hg/70 F): NEGLIGIBLE  
Specific Gravity: 1.432  
Evaporation Rate And Ref: (BU AC=1): >1  
Solubility In Water: COMPLETE  
pH: <2

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#### Fire and Explosion Hazard Data

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Extinguishing Media: WATER SPRAY, FOG, FOAM, DRY CHEMICAL, CO2/OTHER AGENTS AS APPROPRIATE FOR SURROUNDING FIRE  
Special Fire Fighting Proc: WEAR SELF CONTAINED BREATHING APPARATUS & FULL PROTECTIVE CLOTHING AS APPROPRIATE FOR SURROUNDING FIRE. COOL EXTERIOR OF STORAGE TANKS.  
Unusual Fire And Expl Hazrds: NONE

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#### Reactivity Data

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Stability: YES  
Cond To Avoid (Stability): HEAT  
Materials To Avoid: STRONG ALKALIS & ALKALI METALS  
Hazardous Decomp Products: HYDROGEN CHLORIDE GAS  
Hazardous Poly Occur: NO

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### Health Hazard Data

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LD50-LC50 Mixture: ORAL LD50(RAT): 900 MG/KG(IRON TOXICITY)

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: NO although will cause serious chemical burns

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: INHALATION: RESPIRATORY TRACT IRRITANT. IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES: IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE

Signs/Symptoms Of Overexp: IRRITATION, BURNS, TEARING, TISSUE DISCOLORATION

Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE CPR. INGESTION: DRINK COPIOUS AMOUNTS OF WATER. DON'T INDUCE VOMITING. SKIN: FLUSH W/WATER FOR 15 MINS. EYES: FLUSH W/WATER FOR 15 MINS. FORCIBLY HOLD EYELIDS APART TO ENSURE COMPLETE IRRIGATION OF EYE/ LID TISSUE. OBTAIN MEDICAL ATTENTION IN ALL CASES.

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### Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: CONTAIN TO PREVENT CONTAMINATION OF WATER WAY. NEUTRALIZE W/LIME/SODA ASH. FLUSH W/WATER.

Waste Disposal Method: DISPOSE OF NEUTRALIZED/WASTE PRODUCT/CONTAMINATED SOIL & OTHER MATERIAL IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.

Precautions-Handling/Storing: KEEP CONTAINERS CLOSED & DRY. STORE AWAY FROM IGNITION SOURCES & STRONG ALKALIES & ALKALI METALS. PROTECT CONTAINER FROM PHYSICAL DAMAGE.

Other Precautions: USE HANDLING EQUIPMENT COMPATIBLE W/PRODUCT. EMPTIED COANTAINER MAY RETAIN VAPOR & PRODUCT RESIDUE. AVOID BREATHING FUMES.

MINIMIZE SKIN CONTACT W/PROTECTIVE CLOTHING. AVOID CONTACT W/BARE METALS.

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### Control Measures

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Respiratory Protection: USE NIOSH/MSHA APPROVED, FULL FACE RESPIRATOR AS APPROPRIATE.

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Ventilation: GOOD GENERAL ROOM VENTILATION TO MINIMIZE EXPOSURE TO VAPORS & MIST.

Protective Gloves: IMPERVIOUS RUBBER

Eye Protection: SPLASHPROOF CHEMICAL SAFETY GOGGLES

Other Protective Equipment: EYEWASH FOUNTAINS, PROTECTIVE CLOTHING, FULL FACE SHIELD, RUBBER FOOTWEAR, RESISTANT HOOD, FULL BODY SUIT, SAFETY SHOWER

Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING. DON'T WEAR CONTACT LENSES.

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Label Data

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Label Required: YES

Label Status: G

Common Name: FERRIC CHLORIDE SOLUTION

Special Hazard Precautions: INHALATION: RESPIRATORY TRACT IRRITANT. IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES: IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY. IRRITATION, BURNS, TEARING, TISSUE DISCOLORATION

Label Name: Borden & Remington

Label Street: 106 Ferry St.

Label City: Fall River

Label State: MA

Label Zip Code: 02722

Label Country: US

Label Emergency Number: 800-424-9300

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## MATERIAL SAFETY DATA SHEET

### Section 1. Chemical Product and Company Identification

**Product Name:** ChemTreat P813E  
**Product Use:** Water Clarification/Solids Conditioning Agent  
**Manufacturer's Name:** ChemTreat, Inc.  
**Emergency Telephone Number:** (800) 424-9300  
**Address (Corporate Headquarters):** 4461 Cox Road  
Glen Allen, VA 23060  
**Telephone Number for Information:** (800) 648-4579  
**Date of MSDS:** March 18, 2009

### Section 2. Hazard(s) Identification



**Signal Word:** WARNING!

**Hazard Statement(s):** May be harmful in contact with skin.  
May be harmful if inhaled.  
May be harmful if swallowed.

**Precautionary Statement(s):** No significant health risks are expected from exposures under normal conditions of use.

### Section 3. Composition/Hazardous Ingredients

| Component                               | CAS Registry # | WT-%  |
|---|----------------|-------|
| Petroleum distillate hydrotreated light | 64742-47-8     | 10-30 |

### Section 4. First Aid Measures

**Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

**Eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

**Skin:** Wash with plenty of soap and water. Call a poison center or doctor/physician if you feel unwell.

**Ingestion:** DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.



Notes to Physician: N/A

Additional First Aid Remarks: N/A

## ***Section 5. Fire Fighting Measures***

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**Flammability of the Product:** Not flammable.

**Suitable Extinguishing Media:** Use extinguishing media suitable to surrounding fire.

**Specific Hazards Arising from the Chemical:** Use water spray to keep containers cool.

**Protective Equipment:** If product is involved in a fire, wear full protective clothing including a positive-pressure, NIOSH approved, self-contained breathing apparatus.

## ***Section 6. Accidental Release Measures***

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**Personal Precautions:** Use appropriate Personal Protective Equipment (PPE).

**Environmental Precautions:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

**Methods for Cleaning up:** Contain and recover liquid when possible. Flush spill area with water spray.

**Other Statements:** None.

## ***Section 7. Handling and Storage***

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**Handling:** Wear appropriate Personal Protection Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust. Material is very slippery if spilled.

**Storage:** Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only. Do not store or handle in aluminum, zinc, copper, or their alloys. Protect from heat and sources of ignition.



## Section 8. Exposure Controls/Personal Protection

### Exposure Limits

| Component                               | Source | Exposure Limits |
|---|--------|-----------------|
| Petroleum distillate hydrotreated light |        | N/E             |

### Carcinogenicity Category

| Component                               | Source | Code | Brief Description |
|---|--------|------|-------------------|
| Petroleum distillate hydrotreated light |        |      | N/E               |

### Engineering Controls:

Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

### Personal Protection

- Eyes:** Wear chemical splash goggles or safety glasses with full-face shield. Maintain eyewash fountain in work area.
- Skin:** Maintain quick-drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.
- Respiratory:** If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

## Section 9. Physical and Chemical Properties

|                                       |                                |
|---------------------------------------|--------------------------------|
| <b>Physical State and Appearance:</b> | Liquid Emulsion, White, Opaque |
| <b>Specific Gravity:</b>              | 1.0800                         |
| <b>pH:</b>                            | N/A                            |
| <b>Freezing Point:</b>                | 0°F                            |
| <b>Flash Point:</b>                   | >200°F                         |
| <b>Odor:</b>                          | Mild                           |
| <b>Melting Point:</b>                 | N/A                            |
| <b>Boiling Point:</b>                 | 212 – 347°F                    |
| <b>Solubility in Water:</b>           | Limited by viscosity           |
| <b>Evaporation Rate:</b>              | <1                             |
| <b>Vapor Density:</b>                 | Similar to water               |
| <b>Molecular Weight:</b>              | N/D                            |
| <b>Viscosity:</b>                     | N/A                            |
| <b>Flammable Limits:</b>              | N/A                            |
| <b>Autoignition Temperature:</b>      | N/A                            |
| <b>Density:</b>                       | 9.01 lb/ga                     |
| <b>Vapor Pressure:</b>                | N/A                            |
| <b>% VOC</b>                          | 25                             |

## Section 10. Stability and Reactivity

|   |  |
|---|--|
| <b>Chemical Stability:</b>                      | Stable at normal temperatures and pressures.                 |
| <b>Incompatibility with Various Substances:</b> | Strong oxidizers, Strong bases                               |
| <b>Hazardous Decomposition Products:</b>        | Carbon dioxide, Carbon monoxide, Ammonia, Oxides of nitrogen |
| <b>Possibility of Hazardous Reactions:</b>      | None known.  |

## Section 11. Toxicological Information

| Chemical Name | Exposure | Type of Effect | Concentration | Species |
|---------------|----------|----------------|---------------|---------|
| N/D           |          |                |               |         |

**Comments:** None.

## Section 12. Ecological Information

| Species            | Duration | Type of Effect | Test Results |
|--------------------|----------|----------------|--------------|
| Bluegill Sunfish   | 96h      | LC50           | 84.4 mg/l    |
| Rainbow Trout      | 96h      | LC50           | 53.2 mg/l    |
| Ceriodaphnia dubia | 48h      | LC50           | 1.205 mg/l   |
| Daphnia pulex      | 48h      | LC50           | 7.3 mg/l     |
| Fathead Minnow     | 96h      | LC50           | 240 mg/l     |
|                    | 48h      | LC50           | 143 mg/l     |

**Comments:** None.

## Section 13. Disposal Considerations

Dispose of in accordance with local, state and federal regulations.



## Section 14. Transport Information

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### DOT Classification

**DOT Name:** COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID  
**Technical Name:** N/A  
**Hazard Class:** Not D.O.T. Regulated.  
**UN/NA#:** N/A  
**Packing Group:** N/A

## Section 15. Regulatory Information

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### Inventory Status

**United States (TSCA):** All ingredients listed.  
**Canada (DSL/NDSL):** All ingredients listed.

### Federal Regulations

#### SARA Title III Rules

##### Sections 311/312 Hazard Classes

**Fire Hazard:** No  
**Reactive Hazard:** No  
**Release of Pressure:** No  
**Acute Health Hazard:** Yes  
**Chronic Health Hazard:** No

#### Other Sections

| Component                               | Section 313<br>Toxic Chemical | Section 302 EHS<br>TPC | Section 307<br>SCLP/RC |
|---|-------------------------------|------------------------|------------------------|
| Petroleum distillate hydrotreated light | N/A                           | N/A                    | N/A                    |

### State Regulations

**California Proposition 65:** This product contains chemical(s) known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm.



### Special Regulations

| Component                               | States |
|---|--------|
| Petroleum distillate hydrotreated light | None   |

### International Regulations

#### Canada

WHMIS Classification: N/A

Controlled Product Regulations (CPR): N/A

## Section 16. Other Information

### HMIS Hazard Rating

Health: 1  
Flammability: 1  
Physical Hazard: 0  
PPE: X

**Notes:** The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.  
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha-numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end-user must determine if the code is appropriate for their use.

NSF: N/A

FDA: N/A

KOSHER: This product has not been evaluated for Kosher approval.

FIFRA: N/A

Other: None



## Abbreviations

| Abbreviation | Definition  |
|--------------|---|
| <            | Less Than   |
| >            | Greater Than  |
| ACGIH        | American Conference of Governmental Industrial Hygienists |
| EHS          | Environmental Health and Safety Dept                      |
| N/A          | Not Applicable  |
| N/D          | Not Determined  |
| N/E          | Not Established   |
| OSHA         | Occupational Health and Safety Dept                       |
| PEL          | Personal Exposure Limit                                   |
| STEL         | Short Term Exposure Limit                                 |
| TLV          | Threshold Limit Value                                     |
| TWA          | Time Weight Average                                       |
| UNK          | Unknown   |

Prepared by: Regulatory Affairs Department

## *Disclaimer*

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Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.





**Public Service  
of New Hampshire**

PSNH Energy Park  
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, NH 03105-0330  
(603) 669-4000  
www.psnh.com

May 11, 2011

The Northeast Utilities System

Mr. Thomas Neforas  
Laboratory Manager  
City of Concord  
125 Hall Street  
Concord, New Hampshire 03301

Re: Industrial User Permit Application  
Public Service of New Hampshire (PSNH)

Dear Mr. Neforas:

Based on your previous discussions with Allan Palmer of PSNH and Ron Breton of GZA GeoEnvironmental, Inc., our consulting engineer, PSNH is requesting that the City of Concord consider our request to accept treated wastewater from our wet flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the approval from the New Hampshire Department of Environmental Services (NHDES) and issuance of a permit and/or a contract outlining the terms of service and financial compensation by the City, it is our intention to transport treated wastewater by tanker truck from our power station in Bow to your Hall Street facility or to some other designated discharge location.

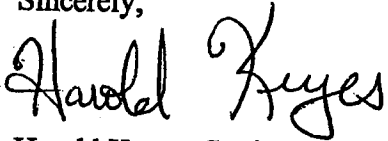
As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are adding post-treatment systems that can be operated to reduce the volume of the treated wastestream from roughly 100,000 gallons per day (gpd) to as small a volume as 5,000 gpd. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all of the wastewater we generate at your facility, we recognize that there may be restrictions and that only a portion of the total discharge may be accepted. This scenario has been considered in our overall wastewater management strategy.

During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We have also forwarded a copy of the NHDES Industrial Wastewater Indirect Discharge Request Application directly to Mr. George Carlson along with the required design review fee of \$1,000.00.

We trust that this submittal adequately addresses your informational needs. Should you have any questions, please contact Ron Breton at 232-8744 or me at 224-4081, extension 4130.

Sincerely,

A handwritten signature in cursive script that reads "Harold Keyes". The signature is written in black ink and is positioned above the typed name.

Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

Attachment(s)

cc: George Carlson, P.E., NHDES



**CITY OF CONCORD  
DEPARTMENT OF GENERAL SERVICES  
WASTEWATER TREATMENT FACILITY**

**INDUSTRIAL USER PERMIT APPLICATION  
TRANSPORTED WASTE**

**SECTION A – GENERAL INFORMATION**

1. Facility Name: PSNH Merrimack Station

a. Operators Name: PSNH

b. Is the Operator identified in 1a. the owner of the facility?  
( X ) Yes ( ) No

If no, provide the name and address of the owner.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

2. Facility Address:

Street: 97 River Road

City: Bow State: NH Zip: 03304

3. Business Mailing Address:

Street: 780 North Commercial Street

City: Manchester State NH Zip: 03101

4. Designated Signatory Authority of the facility:

(Attach similar information for each authorized representative):

Name: Harold Keyes

Title: Station Manager

Address: 97 River Road

City: Bow State: NH Zip: 03304

Phone: (603) 224-4081 Fax: \_\_\_\_\_

5. Designated Facility Contact:

Name: Allan Palmer

Title: Senior Engineer

Phone: (603) 634-2439 Fax: (603) 634-3283

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## SECTION B – BUSINESS ACTIVITY

1. If your facility employs or will be employing processes in any of the industrial categories or business activities listed below (regardless of whether they generate wastewater, waste sludge, or hazardous wastes), place a check beside the category of business activity (check all that apply).

### Industrial Categories \*

- Aluminum Forming
- Asbestos Manufacturing
- Battery Manufacturing
- Can Making
- Carbon Black
- Coil Coating
- Copper Forming
- Dairy Products Processor
- Electric and Electronic Components Manufacturing
- Electroplating
- Etching (Ferrous and Non-ferrous Materials)
- Feedlots
- Fertilizer manufacturing
- Foundries (Metal Molding and Casting)
- Funeral Home
- Glass Manufacturing
- Grain Mills
- Hospital
- Inorganic and/or Organic Chemicals
- Iron and Steel
- Laundry
- Metal Finishing
- Non-ferrous Metals forming and/or Manufacturing
- Paint and/or Ink Formulating
- Paving and Roofing Manufacturing
- Pesticide Manufacturing
- Pharmaceutical Manufacturing
- Photographic Processing
- Plastic and Synthetic Materials Manufacturing
- Plastics Processing Manufacturing
- Porcelain Enamel
- Pulp, Paper, and fiberboard Manufacturing
- Rubber
- Soap and Detergent Manufacturing
- Steam Electric
- Sugar Processing
- Textile Mills
- Timber Products

\* A facility with the processes included in these business areas may be covered by Environmental Protection Agency's (EPA) "Categorical Pretreatment Standards.

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2. Give a brief description of all operations at this facility including primary products or services (attach additional sheets as necessary): Electric Utility
3. Indicate applicable Standard Industrial Classification (SIC) for all processes (if more than one applies list in descending order of importance):

- a. 4911
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_

4. Product Volume: **The wastewater source in not a manufacturing process so there are no products to report. The wastewater source is a flue gas desulfurization (FGD) system.**

| <u>Product</u><br>(Brand Name) | <u>Past Calendar Year</u><br>(Amounts Per Day)<br>(Daily Units)<br>average maximum | <u>Estimate This Year</u><br>(Amounts Per Day)<br>(Daily Units)<br>average maximum |
|--------------------------------|--|--|
|--------------------------------|--|--|

### SECTION C – WATER SUPPLY

1. Water Sources: (Check all that apply)
  - Private well
  - Surface water (On-site pond)
  - Municipal (Specify City):
  - Other (Specify):

2. Water billed to:

Name: N/A  
 Street: N/A  
 City: N/A State: N/A Zip: N/A

3. Water Service Account Number: N/A

4. List average water usage: 1 million gallons per day (MGD)

Type Ave. Consumption Estimate or Actual (gallons per day) (E) (A)

- a. Contact Cooling Water
- b. Non-Contact Cooling Water
- c. Boiler Feed
- d. Process
- e. Sanitary
- f. Air Pollution Control: **1MGD**
- g. Contained in Product
- h. Plant & Equipment Washdown
- i. Irrigation & Lawns
- j. Other:

**TOTALS: 1MGD**

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**SECTION D – SEWER INFORMATION**

1. a. Existing Business: **PSNH**

Is the facility presently connected to the public sewer?

( ) Yes: Sewer Account Number:

(X) No:

Have you applied for a sanitary sewer connection? ( ) Yes (X) No

b. New Business:

Will the business be occupying an existing vacant building? ( ) Yes (X) No

Have you applied for a building permit for a new facility? (X) Yes ( ) No

Will the facility be connected to the public sewer system? ( ) Yes (X) No

2. List size, location, and average flow of each facility sewer connection to the public sewer (outfall). Sewer size, Location, Average Flow (gallons per day) N/A, the proposed discharge will be trucked to a designated discharge

location.

**SECTION E – WASTEWATER DISCHARGE INFORMATION**

1. Does (or will) this facility discharge any wastewater other sanitary to the public sewer?

(X) Yes If yes, complete the remainder of this form.

( ) No If no, skip to SECTION I.

2. If continuous discharge, provide the following information (or estimate).

**The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year. However, the wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.**

a. Total Hours/Day of discharge:

M \_\_\_\_\_ T \_\_\_\_\_ W \_\_\_\_\_ Th \_\_\_\_\_ F \_\_\_\_\_ Sat \_\_\_\_\_ Sun \_\_\_\_\_

b. Hours of Discharge (e.g. 9 A.M. to 5 P.M.):

M \_\_\_\_\_ T \_\_\_\_\_ W \_\_\_\_\_ Th \_\_\_\_\_ F \_\_\_\_\_ Sat \_\_\_\_\_ Sun \_\_\_\_\_

c. Peak Hourly Flowrate: 100,000 gpd

d. Maximum Daily Flowrate: 100,000 gpd

e. Average Daily Flowrate: 100,000 gpd

**\* Proposed to concentrate wastewater to reduce volume required to transport.**

3. If batch discharge, provide the following information (or estimate).

a. Days of discharge:

M X T X W X Th X F X Sat X Sun X

b. Hours of discharge (e.g. 9 A.M. to 5 P.M.):

M 12am-12am T 12am-12am W 12am-12am Th 12am-12am F 12am-12am  
Sat 12am-12am Sun 12am-12am

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c. Number of Discharges Per Day: **11 Max; Expected 1-6 (See note below E.2)**

d. Average Gallons Per Discharge: **9,000**

e. Discharge Flowrate: **variable**

f. Percent of Total Facility Discharge: **100%**

4. Schematic Flow Diagram: **SEE DRAWING # 3977-3-001-B, FIGURE 1**

a. For each activity in which process wastewater is or will be generated, provide a diagram of the flow of the material, products, waster and wastewater from the start of the activity to completion. Show all unit processes. Indicate use of estimation regarding flow information.

b. Indicate which processes use water and which generate wastestreams.

c. Number each unit process generating wastewater discharged to the public sewer. Use these numbers in subsequent sections of this form.

5. Provide the wastewater discharge flows for each process (or proposed process). Include the reference number from the process schematic that corresponds to each process.

No. Process Description, Av. Flow, Max Flow, and Type of Discharge

**Proposed FGD system will generate up to 100,000 gpd on a continuous basis. However, volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system. Average flow 100,000 gpd, Max 100,000 gpd. (See note below E.2).**

If the business contains "Categorical" Processes, please complete the following:

No. Regulated Process - Ave. Flow, Max Flow, Type of Discharge  
(continuous, batch, none)

**FGD system: Average flow 100,000 gpd, Max 100,000 gpd, continuous.**

No. Unregulated Process - Ave. Flow, Max Flow, Type of Discharge  
(continuous, batch, none) N/A

No. Dilution - Ave Flow, Max Flow, Type of Discharge  
(continuous, batch, none) N/A

6. Provide the following Total Toxic Organics (TTO) information:

a. Does (or will) this facility use any of the toxic organics that are listed under the TTO standard of the Categorical Pretreatment Standards published by the EPA? ( ) Yes (X) No

b. Has a "Baseline Monitoring Report" (BMR) been submitted which contains TTO information? () Yes ( ) No N/A

c. Has a "Toxic Organic Management Plan" (TOMP) been developed? If so, please include a copy. ( ) Yes ( ) No N/A

7. Does the facility have (or will it have) automatic sampling or wastewater flow metering equipment? **To be provided per the City of Concord's requirements.**

Current: Sampling ( ) Yes ( X) No

Metering ( ) Yes ( X) No

Future: Sampling (X) Yes ( ) No

10/11/2011 10:11:11 AM

Metering (X) Yes ( ) No

If so, please indicate location(s) of this equipment on the Schematic Diagram requested in paragraph 4 of this section, and describe the equipment below:

**Until specific guidance is provided by the City of Concord, PSNH intends to provide a final treated effluent holding tank with a flow meter, pH monitoring and a sample port to facilitate sample acquisition. SEE FIGURE 1.**

8. Are any process changes or expansions planned during the next two years that could alter wastewater volumes or characteristics? Consider processes that may affect the discharge. ( ) Yes (X) No

If yes, briefly describe these changes and their effects on the wastewater volume and characteristics (attach additional sheets as needed):

9. Are any materials or water reclamation systems in use or planned?

(X) Yes ( ) No

If yes, briefly describe recovery process, substance recovered, percent recovered, and the concentration in the spent solution. Submit a flow diagram for each process (attach additional sheets as needed):

**Source water for the proposed FGD system is recycled wastewater from an on-site treatment pond where nearly 1 MGD are recycled daily. PSNH will continue to evaluate options for on-site reuse of this treated waste stream.**

## **SECTION F – CHARACTERISTICS OF DISCHARGE**

1. All current Significant Industrial Users are required to submit monitoring data on all pollutants that are regulated specific to each process. Use the tables provided as attachments to this section to report the analytical results. **DO NOT LEAVE BLANKS.**
2. For all other (non-regulated) pollutants, indicate whether the pollutant is known to be present (P), suspected to be present (S), or known not to be present (O), by placing the appropriate letter in the column for average reported values. Indicate the sample location and type of analysis used (methods must conform to 40 CFR Part 136, if they do not, indicate what method was used).
3. New dischargers should use the table to indicate what pollutants will be present or are suspected to be present in wastewater by placing a P (expected to be present), S (may be present), or O (will not be present) under the "Average Reported Values". **SEE TABLE 1**

## **SECTION G – WASTEWATER TREATMENT**

1. Is any form of wastewater treatment (see list below) practiced at this facility?  
(x) Yes ( ) No
2. Is any form of wastewater treatment (or changes to existing wastewater

treatment) planned for this for this facility within the next three years?

Yes  No

If yes, please describe:

3. Wastewater treatment devices or processes used or proposed to be used for treating wastewater or sludge (check all that apply):

- Air Flotation
- Centrifuge
- Chemical precipitation
- Cyclone
- Filtration
- Flow Equalization
- Grease or Oil Separation (Type)
- Grease Trap
- Grinding
- Grit Removal
- Ion Exchange
- Neutralization, pH correction
- Ozonation
- Reverse Osmosis
- Screening
- Sedimentation
- Septic Tank
- Solvent Separation
- Spill Protection
- Sump
- Biological (type: )
- Rainwater diversion or collection
- Other Chemical Treatment (type: Crystalization)
- Other Physical Treatment (type: Evaporation)
- Other (type: )

4. Describe the pollutant loadings, flowrates, design capacity, physical size, and operating procedure of each treatment device or process checked above (attach additional sheets as needed): **SEE FIGURE 1 and ATTACHMENT 1**

5. Attach a process flow diagram for each existing treatment system. Include process equipment, by-products, by-product disposal method, waste and byproduct volumes, and design /operation conditions. **SEE FIGURE 1**

6. Describe any changes in treatment or disposal methods planned or under construction for the wastewater discharge to the public sewer. Please include estimated completion dates: Anticipated initial discharge date: **10/15/11**

**NOTE: The proposed discharge will be trucked to a designated discharge location.**

7. Does the facility have a wastewater treatment operator?  Yes  No

If yes: Operator Name: \_\_\_\_\_

Title: \_\_\_\_\_

Phone: \_\_\_\_\_

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Full Time (specify hours): \_\_\_\_\_  
Part Time (specify hours): \_\_\_\_\_

8. Please include a copy of the "Standard Operating Procedures" for the wastewater treatment equipment, if applicable. **SEE ATTACHMENT 1**
9. Does a written maintenance schedule for the wastewater treatment equipment exist? (X) Yes ( ) No

**IN DRAFT FORM—STILL BEING DEVELOPED**

## **SECTION H – FACILITY OPERATIONAL CHARACTERISTICS**

1. Shift Information:  
Work Days: (X) (X) (X) (X) (X) (X) (X)  
M T W TH F SAT SUN  
Shifts per Day : 2  
Employees per shift:  
Shift: 1: 76  
Shift: 2: 32  
Shift: 3: N/A
- Start and end times for each shift: 1: 6:30am-6:30pm 2: 6:30pm-6:30am 3:N/A
2. Indicate whether business is :  
(X) Continuous through the year  
( ) Seasonal (if seasonal, circle the months of the year during which the business operates)  
J F M A M J J A S O N D  
Comments:
3. Indicate whether the facility discharge is:  
(X) Continuous through the year  
( ) Seasonal (If seasonal, circle the months of the year during which discharge occurs)  
J F M A M J J A S O N D  
Comments:
4. Does the facility shut down for scheduled work stoppages? ( ) Yes (X) No  
If yes, indicate the reasons and period of shut down:
5. List types and amounts of raw materials used or planned to be used:

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Type: Amount: **The wastewater source is not a manufacturing process so there are no raw materials to report. The wastewater source is a flue gas desulfurization (FGD) system. Chemicals used in the FGD and subsequent treatment system are presented in TABLE 2**

6. List type and amount of chemicals used or planned to be used (include copies of appropriate Material Safety Data Sheets): **SEE TABLE 2**

Type: \_\_\_\_\_

Amount: \_\_\_\_\_

7. Building Layout Diagram:

a. Provide a scale drawing identifying location of each building on premises.

**SEE DRAWING MK-S-5605**

b. Show all water meters, storm drains, numbered unit processes, and each connection to public sewers. Number each existing or proposed sewer connection. **N/A; the facility will not be connected to the POTW via sewer**

**lines. Wastewater will be trucked to the POTW.**

c. A blueprint showing the above information may be substituted in lieu of a drawing.

## **SECTION I – SPILL PREVENTION**

**N/A, the facility will not be connected to the POTW via sewer lines. The FGD and treatment system are isolated from the rest of the facility.**

1. Does the facility have chemical storage containers, bins, or ponds?  
 Yes  No
  - a. If yes, please provide a description of their location, contents, size, type, and frequency and method of cleaning. Include proximity of these units to sewer or storm drains. Indicate if buried metal containers have cathodic protection.
  - b. If yes, could an accidental spill lead to discharge to (check all that apply):  
 an on-site disposal system  
 public sewer system (e.g. through a floor drain)  
 storm drain  
 to the ground  
 other (specify):  
 N/A- no possible discharge to any of the above routes
2. Does the facility have floor drains in the manufacturing and/or chemical storage areas?  Yes  No
  - a. If yes, where do the drains discharge?
3. Does the facility have an "Accidental Spill Prevention Plan" in affect?  
 Yes  No  
If yes, please submit a copy with this Application.

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4. Is there a history of spill events associated with this facility?  
 ( ) Yes ( ) No  
 If yes, please explain:

## SECTION J – NON-DISCHARGED WASTES

1. Are any liquid wastes or sludges generated, or anticipated, at this facility which are not disposed of via the public sewer? (x) Yes ( ) No  
 If yes, please complete remainder of this section.  
 If no, please skip remainder of this section.  
 Waste Quantity Disposal Method On Site ( ) (No)

2. Should any liquid waste or sludge be disposed of off-site, please provide appropriate supporting documentation (i.e. bills of lading, manifests etc.).

**Since the proposed system is not yet operational, there is no record of waste disposal or supporting documentation.**

3. Should any liquid waste or sludge be disposed of off-site, please provide the name, address, and Permit Number of the waste hauler. **PRESENTLY IN**

### CONTRACT NEGOTIATIONS

4. Has this facility been issued, or will it be issued, any Federal, State or Local environmental permits? (X) Yes ( ) No  
 If yes, please list:

- |                       |   |
|-----------------------|---|
| • TP-008:             | Flue Gas Desulfurization Unit                   |
| • FP-T-0054:          | Electric Generating Unit #1                     |
| • TP-B-0462:          | Electric Generating Unit #2                     |
| • TP-B-0490:          | Emergency Boiler                                |
| • PO-B-1788:          | Emergency Generator #1                          |
| • PO-BP-2416:         | Primary Coal Crusher                            |
| • PO-BP-2417:         | Secondary Coal Crusher                          |
| • PO-B-0034:          | Combustion Turbine #1                           |
| • PO-B-0035:          | Combustion Turbine #2                           |
| • TV-AR-01:           | Title V Operating Permit                        |
| • TV-AR-0055:         | Proposed Title V Operating Permit               |
| • TP-0068:            | Emergency Cooling Water Pump Engine             |
| • DPHS-SW-85-012:     | Solid Waste Facility                            |
| • GWP-19840065-B-004: | Ground Water Permit                             |
| • 11-026610:          | Permit to Operate Public Water System           |
| • DES-HW-LP-06-22:    | Hazardous Waste Limited Permit                  |
| • NH0001465:          | National Pollutant Discharge Elimination System |

## SECTION K – COMPLIANCE CERTIFICATION

1. Is this facility in compliance with all Federal, State or Local Pretreatment

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Standards? (x) Yes ( ) No

If no, please explain:

If no, please explain measures being taken to bring facility into compliance:

If no, please provide a schedule for bringing the facility into compliance. Include major events planned along with completion dates. Note that should the Control Authority issue a permit to the Applicant, it may establish a schedule for compliance different from the one submitted by the facility (attach additional sheets as needed):

### **AUTHORIZED REPRESENTATIVE 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 fines and imprisonment for knowing violations.

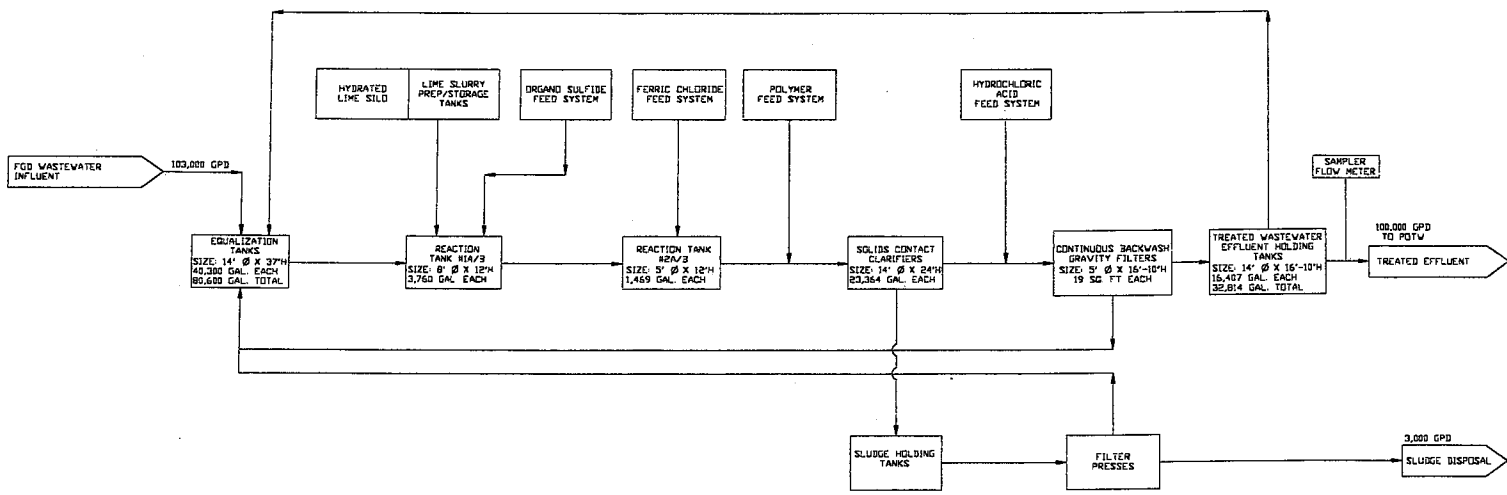
Name: Harold Keyes Title: Station Manager

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

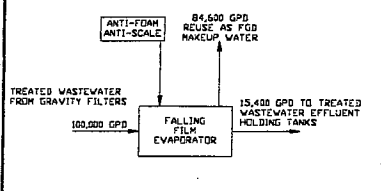
## **FIGURES**

NOTE:  
 1. THE WASTEWATER SYSTEM OPERATES TWO TREATMENT TRAINS IN PARALLEL.  
 2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

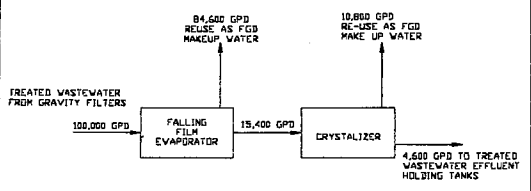
OPTION 1



OPTION 2



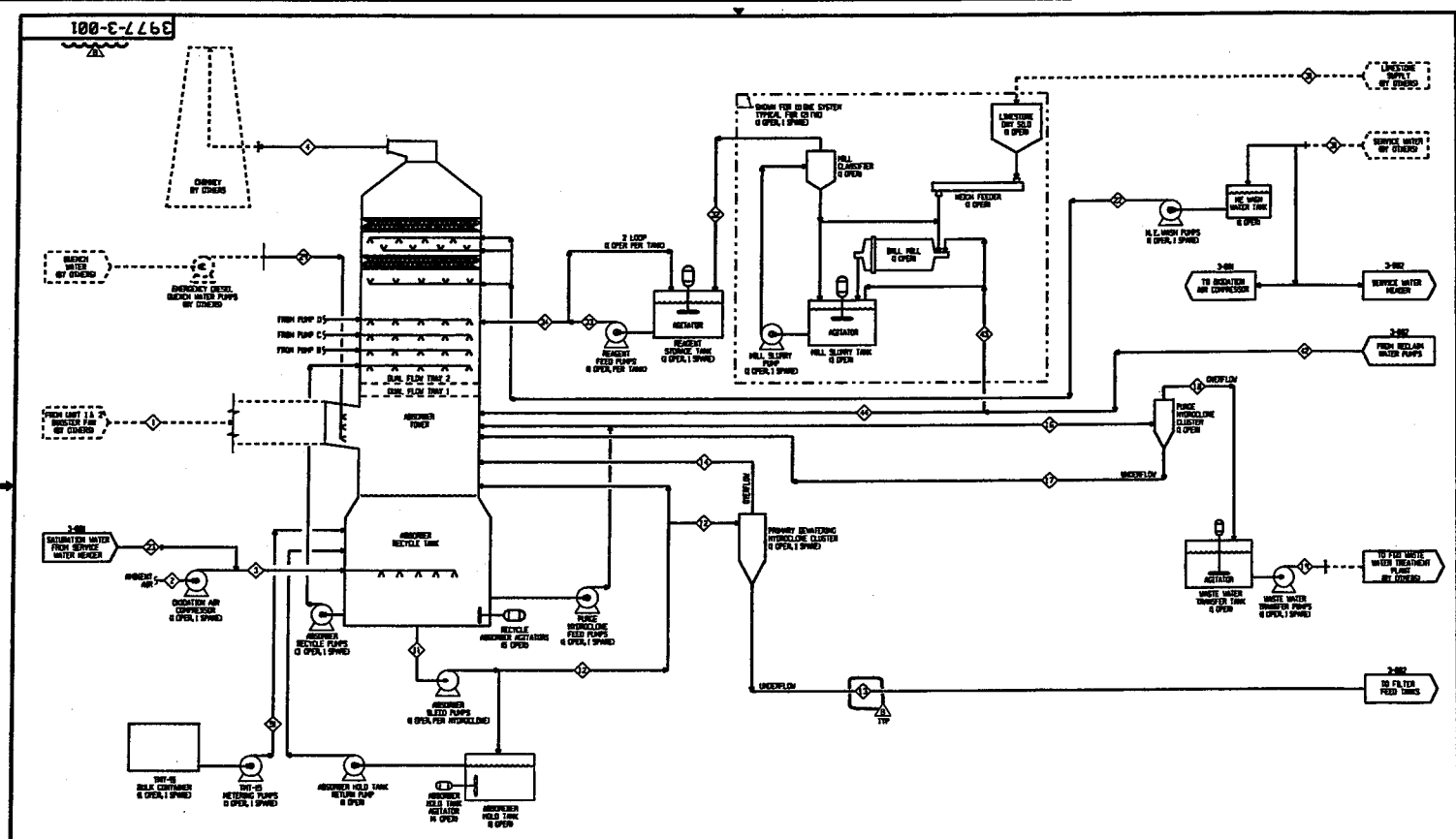
OPTION 3



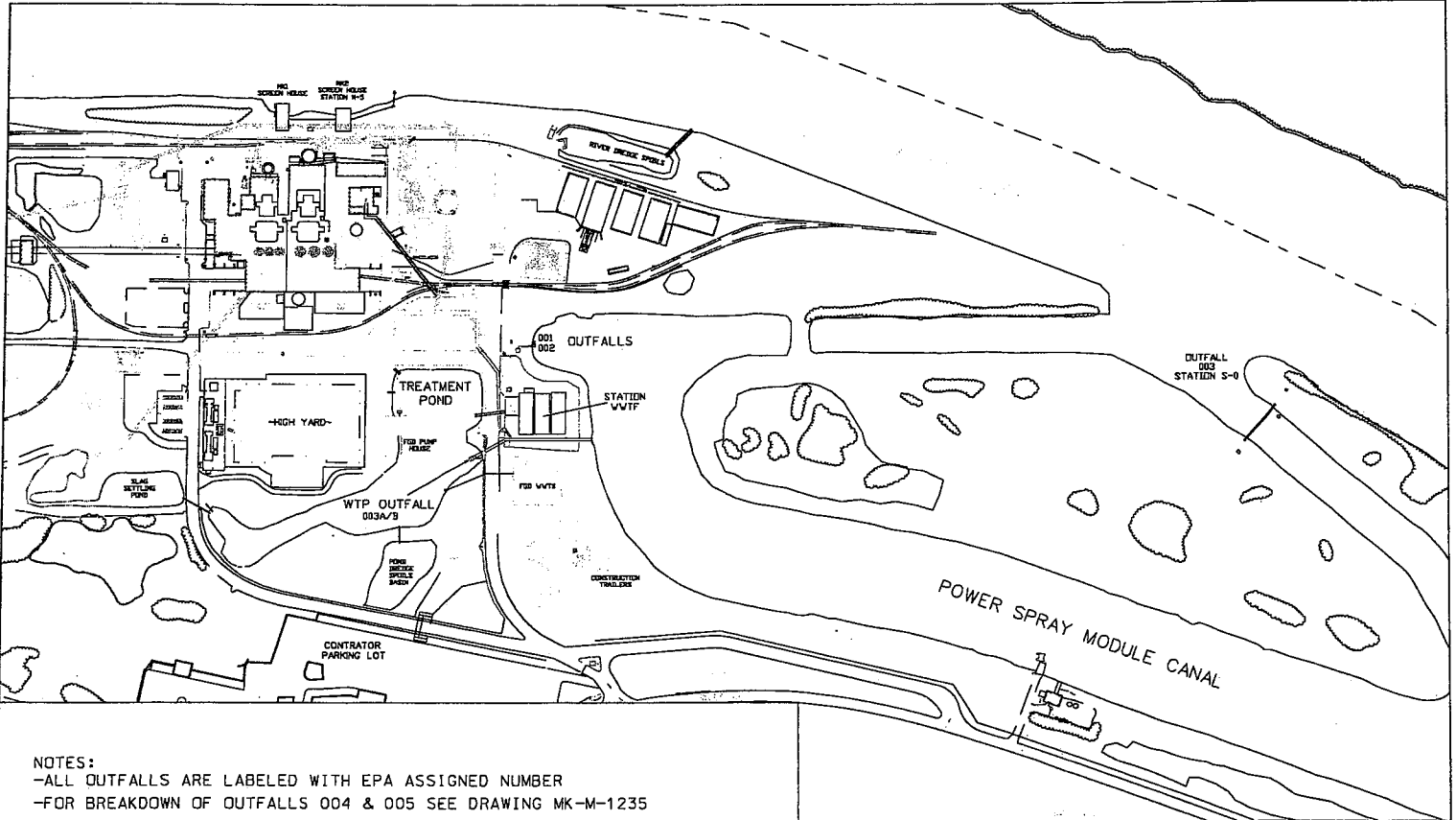
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF SEA CONSULTANTS, INC. NO PART OF THIS DRAWING OR THE CONTENTS HEREOF SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF SEA CONSULTANTS, INC. THE USER'S SOLE RESPONSIBILITY FOR THE ACCURACY OF THE DATA AND INFORMATION PROVIDED FOR THIS PROJECT AND THE DESIGN THEREOF SHALL BE THE USER'S. THE USER'S SOLE RESPONSIBILITY FOR THE ACCURACY OF THE DATA AND INFORMATION PROVIDED FOR THIS PROJECT AND THE DESIGN THEREOF SHALL BE THE USER'S. THE USER'S SOLE RESPONSIBILITY FOR THE ACCURACY OF THE DATA AND INFORMATION PROVIDED FOR THIS PROJECT AND THE DESIGN THEREOF SHALL BE THE USER'S.

| INDUSTRIAL WASTEWATER DISCHARGE PERMIT APPLICATION |   |                             |              |
|--|---|-----------------------------|--------------|
| PSNH<br>BOW, NEW HAMPSHIRE                         |   |                             |              |
| WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM           |   |                             |              |
| DESIGNED BY<br>SEA CONSULTANTS, INC.               | APPROVED FOR<br>PUBLIC SERVICE OF NEW HAMPSHIRE | DATE<br>MAY 2011            | FIGURE<br>1  |
| DRAWN BY<br>JTB                                    | CHECKED BY<br>JTB                               | PROJECT NO.<br>04-000007.00 | REVISION NO. |
| SCALE<br>AS SHOWN                                  | DATE<br>MAY 2011                                | PROJECT NO.<br>04-000007.00 | REVISION NO. |

100-3-001



|                         |                    |                           |   |
|-------------------------|--------------------|---------------------------|---|
|                         |                    | <p><b>PRELIMINARY</b></p> |   |
| <p>DATE: 11-12-2007</p> | <p>TIME: 11:25</p> | <p>BY: [Signature]</p>    | <p>PROJECT: PUBLIC SERVICE OF NEW HAMPSHIRE MERRIMACK STATION UNITS #2 BOW, NEW HAMPSHIRE</p> |
| <p>NO.:</p>             | <p>REV.:</p>       | <p>DATE:</p>              | <p>DESCRIPTION:</p>   |
| <p>1</p>                | <p>1</p>           | <p>11-12-2007</p>         | <p>PROCESS FLOW DIAGRAM</p>   |
| <p>100-3-001</p>        | <p>1</p>           | <p>11-12-2007</p>         | <p>3977-3-001</p>   |
| <p>100-3-001</p>        | <p>1</p>           | <p>11-12-2007</p>         | <p>3977-3-001</p>   |



NOTES:  
 -ALL OUTFALLS ARE LABELED WITH EPA ASSIGNED NUMBER  
 -FOR BREAKDOWN OF OUTFALLS 004 & 005 SEE DRAWING MK-M-1235

|  |  |  |
|--|--|--|
|  | State of New Hampshire<br>Department of Environmental Services<br>Wastewater Management Division | Project No. 100-100-100<br>Drawing No. 100-100-100 |
|  | Date: 10/1/00<br>Scale: 1" = 100'  | Author: J. Smith<br>Checker: A. Jones              |

## TABLES



**TABLE 1  
WASTEWATER CHARACTERISTICS**

FLOW: 100,000 gpd

| METALS    | WASTE STREAM CONCENTRATION (mg/L) |
|-----------|-----------------------------------|
| Aluminum  | 1                                 |
| Antimony  | 0.48                              |
| Arsenic   | 0.02                              |
| Barium    | 4.8                               |
| Beryllium | 0.1                               |
| Cadmium   | 0.05                              |
| Chromium  | 0.15                              |
| Copper    | 0.05                              |
| Iron      | 0.2                               |
| Lead      | 0.1                               |
| Manganese | 1                                 |
| Mercury   | 0.000014                          |
| Nickel    | 1                                 |
| Silver    | 0.05                              |
| Zinc      | 0.05                              |
| Selenium  | 3                                 |
| Thallium  | 0.57                              |

| POLLUTANT  | CONCENTRATION |
|------------|---------------|
| Alkalinity | 100-300 mg/L  |
| Calcium    | 4651 mg/L     |
| Chloride   | 10,000 mg/L   |
| Cyanide    | <0.02 mg/L    |
| Fluoride   | 118 mg/L      |
| O&G        | <5.0 mg/L     |
| pH         | 6.0 - 8.0 SU  |
| Silica     | 200 mg/L      |
| Sodium     | 200 mg/L      |
| Sulfate    | 1,117 mg/L    |
| TSS        | <30 mg/L      |

**NOTE:**

1. mg/L means milligrams per liter, SU means standard units.
2. Please note, several steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably below the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case waste water characteristics. All concentrations are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.
5. The concentrations of pollutants listed above represent the concentrations associated with a flow of 100,000 gallons per day.

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**TABLE 2  
CHEMICAL INVENTORY**

PSNH Merrimack Station  
Bow, New Hampshire

| REFERENCE # | RAW MATERIALS                     | AMOUNT USED PER YEAR |
|-------------|-----------------------------------|----------------------|
| 1           | Ferric chloride                   | 7614 lbs             |
| 2           | Hydrochloric acid (32%)           | 282,800 lbs          |
| 3           | Sodium Hydroxide (50%)            | 683,282 lbs          |
| 4           | Antifoam 1430                     | 7,008 lbs            |
| 5           | Antiscalant                       | 2,628 lbs            |
| 6           | Organosulfide (TMT 15)            | 219 tons             |
| 7           | Polymer (P813E / Coreshell 71307) | 761 lbs              |
| 8           | Limestone                         | 152,000 tons         |

Notes:

1. Values have been estimated by PSNH's treatment system design team.
2. It is not expected that significant amounts of chemicals will discharge to the sewer.

**ATTACHMENT 1**

**TREATMENT SYSTEM DETAILS**

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INDUSTRIAL USER PERMIT APPLICATION  
CITY OF CONCORD

PUBLIC SERVICE OF NEW HAMPSHIRE  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**TREATMENT SYSTEM DETAILS**

**ATTACHMENT 1**

The proposed wastewater treatment system (WWTS) represents a modification to the facility which will minimize the impact on air quality and water. The conceptual design and treatment chemistry were developed by PSNH's current treatment design team. Engineering design review and permitting services were provided by GZA. **FIGURE 1** depicts the WWTS process flow and unit process details for the proposed treatment system.

**Wastewater Treatment System Description**

**Provided by the treatment system design team in Philosophy/Sequence of Operation Revision 2, August 2, 2010**

The FGD purge stream is unsuitable for reuse by other power plant facilities and, therefore, must be treated separately and discharged. The characteristics of this wastewater stream require extensive treatment. A dedicated FGD wastewater treatment system offered for this application consists of two major sub-systems:

- Physical-Chemical Treatment; and
- Sludge Handling/Dewatering System.

The FGD purge stream is initially directed to the two 50 percent (%) equalization tanks (each has 50% of the total specified storage capacity) to partially attenuate any chemical or hydraulic fluctuations resulting from the FGD operations. In addition, the equalization tanks can receive flow from the treated wastewater effluent pumps and filtrate sump pumps, which consists of filtrate from the filter presses, backwash reject, building trench drains and tank overflow.

At a fairly constant rate, flow from the two 50% equalization tanks shall be pumped to the two 100% capacity reaction tanks (No. 1A and 1B). The wastewater will cascade by gravity through two 100% capacity reaction tanks (No. 2A and 2B), on to the two 100% capacity solids contact clarifiers (No. A and B), then to the two 100% capacity gravity filters and on to the two 50% capacity treated wastewater effluent tanks.

Reaction tanks No. 1A and 1B are chemical conditioning tanks where pH adjustment/gypsum "desaturation" is conducted. In the pH adjustment/gypsum "desaturation" phase, hydrated lime is added to elevate the pH to between 8.5 and 9.2 to provide "desaturation" of gypsum from the wastewater which has a tendency to be supersaturated when received from the FGD process. If not brought to equilibrium, this supersaturation can result in gypsum scale formation in the downstream wastewater treatment plant equipment. In order to achieve the "desupersaturation" operation in a controlled fashion via a crystal growth mechanism, sludge is recycled from the downstream solids contact clarifier to provide seed crystals for gypsum nucleation. The desired solids concentration within the reaction tanks is 3% – 5% by weight. The pH is also elevated to aid in the precipitation of soluble metals as insoluble hydroxides and oxyhydroxides. This operating pH range has been selected to achieve optimal metals reduction while minimizing the formation of magnesium hydroxide which can occur at higher pH.

In addition, an organosulfide reagent is added to reaction tanks No. 1A and 1B to form organosulfide heavy metal complexes which have very low solubility products, thus resulting in maximum heavy metal removal. Of particular importance for this project is the removal of mercury.

In reaction tanks No. 2A and 2B, ferric chloride is added to form a dense floc and enhance the settling characteristics of the precipitate. Additionally, the hydrolyzed form of this coagulant provides precipitation sites for co-precipitation of other metals. Polymer shall be injected into the clarifier influent line in order to form a denser floc which in turn will enhance the settling characteristics.

Two 100% capacity solids contact clarifiers will be provided for clarifying the chemically conditioned waste stream.

Overflow from the solids contact clarifiers will flow by gravity to a standpipe. HCl is dosed into the wastewater to reduce the pH to approximately 6.5 to 7.0 Standard Units. An in-line static mixer with a HCl injection port shall be provided ahead of the standpipe to enhance the chemical blending with the clarified effluent.

The pH adjusted clarifier effluent shall flow by gravity to the two 100% capacity continuous backwash gravity filters for further suspended solids reduction.

The filtered effluent from the continuous backwash gravity filters will flow by gravity to the two 50% treated wastewater effluent storage tanks and shall be subsequently conveyed to the point of discharge by the treated wastewater discharge pumps. During low flow conditions and/or if the treated wastewater is found to be out of compliance, the discharge pumps shall be used to recycle flow back to the equalization tanks for reprocessing.

Two volume reduction steps can be utilized to concentrate the waste stream as necessary. A Falling Film Evaporator will reduce the volume by up to 85% (1-10/65), from 100,000 gallons per day (gpd) to approximately 15,400 gpd. The volume of wastewater is reduced, concentrations of contaminants increase but the mass remains unchanged. Effluent from the Evaporator can be directed to a Crystallizer to reduce the volume by up to an additional 70% (1-3/10), from 15400 gpd to approximately 4,600 gpd. It should be noted that the concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.

Sludge from the solids contact clarifier is pumped via the sludge recycle/transfer pumps to the two 50% capacity sludge holding tanks. In addition, sludge is recycled to reaction tanks No. 1A and 1B. Dewatering is achieved by two 100% capacity recessed plate and frame filter presses. Filtrate from the dewatering operation, as well as any drain water from filter press drip trays, floor drains and floor trenches, is directed to the filtrate sump and pumped to the equalization tanks for subsequent treatment.

Overflows are routed to a floor trench collection system which discharges to the filtrate sump. Flows to the filtrate sump are recycled back to the equalization tank.

**ATTACHMENT 2**

**MATERIAL SAFETY DATA SHEETS**



Univar USA Inc Material Safety Data Sheet

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MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052  
(425) 889 3400

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Emergency Assistance

For emergency assistance involving chemicals call  
Chemtrec - (800) 424-9300

**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 1 of 8  
Version: 1.2  
Revision Date: 2010/11/29

**DOW CORNING(R) ANTIFOAM 1430**

**1. PRODUCT AND COMPANY IDENTIFICATION**

Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686

**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 01228480

Revision Date: 2010/11/29

Generic Description: Silicone emulsion  
Physical Form: Viscous Liquid  
Color: White  
Odor: Slight odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. HAZARDS IDENTIFICATION**

**POTENTIAL HEALTH EFFECTS**

**Acute Effects**

Eye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.

**Prolonged/Repeated Exposure Effects**

Skin: Repeated or prolonged exposure may cause irritation.  
Inhalation: No known applicable information.  
Oral: No known applicable information.

**Signs and Symptoms of Overexposure**

No known applicable information.

**Medical Conditions Aggravated by Exposure**

No known applicable information.



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The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**4. FIRST AID MEASURES**

Eye: If irritation occurs, flush eye(s) with lukewarm gently flowing water for 5 minutes. Obtain medical attention.

Skin: No health effects expected. If irritation does occur flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Inhalation: If symptoms are experienced remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.

Oral: If irritation or discomfort occur, obtain medical advice.

Notes to Physician: Treat according to person's condition and specifics of exposure.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.

Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

Unusual Fire Hazards: None.

**6. ACCIDENTAL RELEASE MEASURES**

**DOW CORNING**

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**DOW CORNING(R) ANTIFOAM 1430**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See Section 8 for Personal Protective Equipment for Spills. Call (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact. Avoid skin contact.

Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Suitable Gloves: Avoid skin contact by implementing good industrial hygiene practices and procedures. Select and use gloves and/or protective clothing to further minimize the potential for skin contact. Consult with your glove and/or personnel protective equipment manufacturer for selection of appropriate compatible materials.

Inhalation: No respiratory protection should be needed.



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**DOW CORNING(R) ANTIFOAM 1430**

Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Avoid skin contact. Use reasonable care.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions. For further information regarding aerosol inhalation toxicity, please refer to the guidance document regarding the use of silicone-based materials in aerosol applications that has been developed by the silicone industry ([www.SEHSC.com](http://www.SEHSC.com)) or contact the Dow Corning customer service group.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Viscous Liquid  
Color: White  
Odor: Slight odor  
Specific Gravity @ 25°C: 1.0  
Viscosity: 10000 cSt  
  
Freezing/Melting Point: Not determined.  
Boiling Point: > 35 °C  
Vapor Pressure @ 25°C: Not determined.  
Vapor Density: Not determined.  
Solubility in Water: Not determined.  
pH: Not determined.  
Volatile Content: Not determined.  
Flash Point: > 214 °F / > 101.1 °C (Closed Cup)  
Autoignition Temperature: Not determined.  
Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.  
  
Hazardous Polymerization: Hazardous polymerization will not occur.  
Conditions to Avoid: None.

**DOW CORNING**

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**DOW CORNING(R) ANTIFOAM 1430**

Materials to Avoid: Oxidizing material can cause a reaction.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde. Metal oxides.

**11. TOXICOLOGICAL INFORMATION**

Special Hazard Information on Components

No known applicable information.

**12. ECOLOGICAL INFORMATION**

Environmental Fate and Distribution

Complete information is not yet available.

Environmental Effects

Complete information is not yet available.

Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

Ecotoxicity Classification Criteria

| Hazard Parameters (LC50 or EC50) | High  | Medium           | Low   |
|----------------------------------|-------|------------------|-------|
| Acute Aquatic Toxicity (mg/L)    | <=1   | >1 and <=100     | >100  |
| Acute Terrestrial Toxicity       | <=100 | >100 and <= 2000 | >2000 |

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal. Call (989) 496-6315, if additional information is required.



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**DOW CORNING(R) ANTIFOAM 1430**

**14. TRANSPORT INFORMATION**

**DOT Road Shipment Information (49 CFR 172.101)**  
Not subject to DOT.

**Ocean Shipment (IMDG)**  
Not subject to IMDG code.

**Air Shipment (IATA)**  
Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Additional Regulatory Information: This product contains a component subject to a regulation other than TSCA.

**EPA SARA Title III Chemical Listings**

**Section 302 Extremely Hazardous Substances (40 CFR 355):**  
None.

**Section 304 CERCLA Hazardous Substances (40 CFR 302):**  
None.

**Section 311/312 Hazard Class (40 CFR 370):**  
Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals (40 CFR 372):**  
None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

**Supplemental State Compliance Information**

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**DOW CORNING(R) ANTIFOAM 1430**

**California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u> |
|-------------------|-------------|-----------------------|
| 7664-93-9         | <0.1        | Sulfuric acid         |

**New Jersey**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>          |
|-------------------|-------------|--------------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                          |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane           |
| None              | 3.0 - 7.0   | Treated amorphous silica       |
| 9005-08-7         | 1.0 - 5.0   | Polyethylene glycol distearate |

**Pennsylvania**

| <u>CAS Number</u> | <u>Wt %</u> | <u>Component Name</u>    |
|-------------------|-------------|--------------------------|
| 7732-18-5         | 55.0 - 75.0 | Water                    |
| 63148-62-9        | 15.0 - 35.0 | Polydimethylsiloxane     |
| None              | 3.0 - 7.0   | Treated amorphous silica |



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**DOW CORNING(R) ANTIFOAM 1430**

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

## Univar USA Inc Material Safety Data Sheet

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For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

### Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process





**Westlake CA&O  
Corporation**

P.O. Box 527  
Calvert City, KY 42029-0527

**MATERIAL SAFETY DATA SHEET**

**ISSUED: 06/01/06**

**SODIUM HYDROXIDE SOLUTION - 50%**

**REVISED: 06/01/06**

**SECTION I - PRODUCT IDENTIFICATION**

Westlake CA&O  
2468 Industrial Parkway  
P O Box 527  
Calvert City, KY 42029

Telephone No.: (270) 395-4151  
Transportation Emergency No.:  
CHEMTREC: (800) 424-9300  
Medical Emergency No.:  
POISON CENTER: (216) 379-8562

Chemical Family: Alkali

Chemical Name/Synonyms: Solutions of: Caustic, Caustic Soda, Lye, Sodium hydrate

Trade Mark: None

Formula: Mixture

C.A.S. Registry No.: 1310-73-2

TSCA Inventory Status: All ingredients are listed on the USEPA's TSCA inventory

Canadian Domestic Substances List Status: All ingredients have been nominated or are eligible for inclusion

Workplace Hazardous Materials Information System (WHMIS) Classification: E

Product Use: Caustic Applications

SARA 313 Information: Not Applicable

**SECTION II - HAZARDOUS INGREDIENTS**

Hazard Summary Statement: CAUTION! CORROSIVE LIQUID. Contact with skin results in severe burns with possible deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mists causes irritation of the nose, throat, mucous membranes and lungs.

| <u>Material</u>                     | <u>C.A.S. Number</u> | <u>Amount in Product</u> | <u>ACGIH TLV-TWA</u>           | <u>OSHA PEL-TWA</u> |
|-------------------------------------|----------------------|--------------------------|--------------------------------|---------------------|
| Sodium Hydroxide <sup>2,4,5,6</sup> | 1310-73-2            | 50%                      | 2 mg/m <sup>3</sup><br>Ceiling | 2 mg/m <sup>3</sup> |

**N.A. - Not Applicable**

**N.E. - Not Established**

## Legislative Footnotes

- <sup>1</sup> Ingredient listed on SARA Section 313 List of Toxic Chemicals.
- <sup>2</sup> Ingredient listed on the *Pennsylvania Hazardous Substances List*.
- <sup>3</sup> Ingredient listed on the California listing of *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*.
- <sup>4</sup> Ingredient listed on the *Massachusetts Substance List*.
- <sup>5</sup> *Workplace Hazardous Materials Information System* ingredient found on the Ingredient Disclosure List - Canada.
- <sup>6</sup> Ingredient listed on the *New Jersey Right to Know Hazardous Substance List*.

### **Notes**

**TLV-TWA** - Threshold Limit Value - Time Weighted Average guideline for concentration of the chemical substance in the ambient workplace air. American Conference of Governmental Industrial Hygienists (ACGIH).

**OSHA PEL** - OSHA Permissible Exposure Limit, 8-hour TWA. 29 CFR 1910.1000, Transitional Limits column, Table Z-1-A, Table Z-2 and Table Z-3.

### **SECTION III - PHYSICAL DATA**

Appearance: Colorless to gray,  
                  syropy liquid  
Odor: Mild, slightly pungent  
Percent Volatiles: 50%  
Solubility in Water: Soluble  
Physical State: Liquid

Specific Gravity: 1.49 @ 65.6°C (150°F)  
pH = 14 (strong alkali)  
Boiling Point: 148°C (298°F)  
Vapor Pressure: 19 mm Hg @ 65.5°C (150°F)  
Vapor Density: N.A.

### **SECTION IV - FIRE & EXPLOSION HAZARD DATA**

Flash Point: Not combustible.

Lower Explosive Limit (LEL): Not Applicable

Upper Explosive Limit (UEL): Not Applicable

Self-Ignition Temperature: Not Applicable

## **Notes**

**Flash Point** – The lowest initial temperature of air passing around the specimen at which sufficient combustible gas is evolved to be ignited by a small external pilot flame.

**Self-Ignition Temperature** – The lowest initial temperature of air passing around the specimen at which, in absence of an ignition source, ignition occurs of itself, as indicated by an explosion, flame or sustained glow.

**Extinguishing Media:** Although not combustible, should a fire involve the product, flood with water using care not to splash or splatter this material.

**Special Firefighting Procedures:** As with most fire conditions, it is proper to wear a positive pressure self-contained breathing apparatus (SCBA). Personnel not wearing suitable protection must be removed from the area. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

**Unusual Fire and Explosion Hazards:** In contact with moisture or water sufficient heat may be generated to ignite adjacent combustible materials. Sodium hydroxide solutions can react violently when in contact with chlorinated hydrocarbons and metals such as aluminum, zinc or materials galvanized with zinc with resultant generation of hydrogen.

## **SECTION V - REACTIVITY**

**Stability:** Stable

**Hazardous Polymerization:** Will not occur.

**Hazardous Decomposition Products:** Not combustible.

**Incompatibility (Materials to Avoid):** This product reacts with water generating heat. Do not add water to this product, always add caustic to water slowly and in small amounts to avoid boiling and spattering. This product reacts violently or explosively with chlorinated hydrocarbons. It attacks leather and wool resulting in destruction of those materials and possible chemical exposure to the individual. Caustic solutions can generate hydrogen gas on contact with aluminum, zinc or materials galvanized with zinc.

## **SECTION VI - HEALTH HAZARD DATA**

**Threshold Limit Value:** 2 mg/m<sup>3</sup> - Ceiling.

**Permissible Exposure Limit (PEL):** 2 mg/m<sup>3</sup>

**Primary Routes of Exposure:** Inhalation, skin and eye contact.

Effects of Overexposure: This material is extremely corrosive to all body tissue. Skin contact will result in severe burns and frequently with deep ulceration. Eye contact will produce severe and painful injury. Inhalation of mist will cause irritation and may even cause damage to the entire respiratory tract varying from mild irritation of mucous membranes to severe pneumonitis. Symptoms may not be immediately painful or visible. Swallowing usually results in severe injury.

Emergency and First Aid Procedures:

Inhalation: Remove affected individual to fresh air. Obtain medical attention immediately.

Eye Contact: Immediately flush eyes with lukewarm water for at least 15 minutes while lifting upper and lower eyelids. Continue to flush the eyes if there is any indication of residual chemical. Seek medical attention immediately.

Skin Contact: Immediately remove contaminated clothing, and flush exposed area with lukewarm water for at least 15 minutes. Continue to flush skin if there is any indication of residual chemical. Seek medical attention immediately.

Ingestion: DO NOT INDUCE VOMITING! Immediately dilute by drinking water or milk, then neutralize with diluted vinegar or fruit juice.

**SECTION VII - SPILL & LEAK PROCEDURE**

Steps to be taken in case material is released or spilled: Issue a warning: CORROSIVE MATERIAL. Keep non-essential personnel away from spill area. Wear rubber protective clothing, e.g., gloves, boots, aprons, and chemical splash goggles and face shield. Do not touch spilled material. Contain the spill and use absorbents and pumps to remove "ponded" liquid. Transfer the spilled material to caustic resistant containers labeled: CORROSIVE. Avoid flushing chemical into public sewers or water system. With careful handling, dilute acid, preferable acetic acid, may be used to neutralize final traces of caustic. Flush the cleaned area with water.

Waste Disposal Method: HAZARDOUS WASTE. EPA Hazardous Waste Number: D002 (if pH is greater than 12.5). Dispose of in a licensed hazardous waste disposal facility in accordance with all applicable Federal, State and Local health and pollution laws and regulations. (See 40 CFR 261).

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

Ventilation: Ventilation should always be provided to draw mists and vapors away from workers to prevent routine inhalation. Ventilation should be adequate to maintain the ambient workplace atmosphere below the limits listed in Section II.

Respiratory Protection: Wear a NIOSH/MSHA-approved, airline or self-contained respirator whenever exposures exceed the limits listed in Section II. Use in accordance with the manufacturers use limitations and OSHA Standard 1910.134 (29 CFR).

Eye/Face Protection: Chemical goggles with full face shield.

Protective Equipment: Wear impervious (e.g. rubber) gloves, boots or shoes, coveralls or other protective clothing as appropriate to prevent contact with liquid. Check with glove/clothing manufacturers to determine materials resistant to the chemicals shown in Section II.

Additional: *Do not smoke or consume food or beverage in the work areas. Wash thoroughly after handling the product.*

## **SECTION IX - SPECIAL PRECAUTIONS**

Material Handling: Do not breathe mists or vapors. Avoid skin and eye contact. Use under well-ventilated conditions. Utilize good personal hygiene practices, e.g., thoroughly washing after handling the product. Remove contaminated clothing and shower at once. Wash contaminated clothing before reuse. (Discard leather shoes.) **PROVIDE A SAFETY SHOWER AND EYEWASH STATION IN THE WORK AND HANDLING AREAS.**

Storage: Store in water-tight containers in a cool, dry place separate from the normal work area and away from materials that react with sodium hydroxide. Use corrosion resistant structural materials and lighting and ventilation systems in the storage area. Store in suitable, labeled containers and maintain in a tightly closed condition when not in use. Protect containers from physical damage. Post appropriate warning signs.

## **SECTION X - HAZARD CODES**

### NFPA (2002)

(National Fire Protection Association)

Health: 3  
Flammability: 0  
Reactivity: 1  
Special: Corrosive

### HMIS

(Hazardous Materials Identification System)

Health: 3  
Flammability: 0  
Reactivity: 1  
Personal Protection: X\*

### Key:

0 = Insignificant  
1 = Slight  
2 = Moderate  
3 = High  
4 = Extreme

\* See MSDS for specified protection

## **USER'S RESPONSIBILITY**

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this bulletin should be provided to the user's employees or customers. Westlake CA&O Corporation must rely upon the user to utilize this information to develop appropriate work practice guidelines and employee instructional programs for his or her operation.

## **DISCLAIMER OF LIABILITY**

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding the accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

## **SHIPPING INFORMATION**

## IDENTIFICATION - DOMESTIC TRANSPORTATION

Proper Shipping Name (172.101(c)): SODIUM HYDROXIDE SOLUTION

(Technical Name(s)) 172.203(k): (Contains 50% Sodium Hydroxide)

Hazard Class 172.101(d): 8

UN/NA# 172.101(e): UN 1824

Haz. Substance 171.8: Sodium Hydroxide

Reportable Quantity: 1,000 Lbs

Inhalation Hazard 172.2a(b): N/A

Package Code 172.101(f): PG II

Placarded: CORROSIVE

## PACKAGING (Part 173)

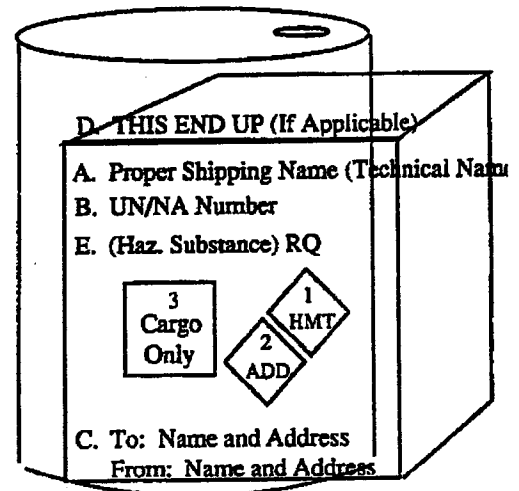
- ◆ Packaging Section (172.101(i)) –(Col. 8(A): 173.154)(Col. 8(B): 173.202)(Col. 8(C): 173.242)
- ◆ General Packaging Section - General 173.24 Hazard Class: CORROSIVE

## MARKING

- A. Proper Shipping Name (172.301(a)) (Technical Name) (172.301(b))
- B. UN/NA Number (172.301(a))
- C. Name & Address (172.301(d))
- D. THIS END UP (172.312(a))
- E. Hazardous Substance RQ (Name) (172.324)  
ORM Designation (172.316(a))  
Inhalation Hazard (172.313(a))

## DOMESTIC LABELING

1. HMT LABELS (172.400)
2. Additional Subsidiary Hazard (172.402(a))



## IATA 2005 Edition

Proper Shipping Name (Col. B): Sodium Hydroxide Solution

Class/Division (Col. C): 8

Subsidiary Risk (Col. D): N/A

UN/ID# (Col. A): UN 1824

Carrier Special Provisions (Col. M): A3

## PACKAGING

- ◆ Max. Qty. Per Pkg. (Cols. H/J) - Passenger: 1 Liter
- ◆ Packaging Instructions (Cols. G/I) - Passenger: 809

Cargo: 30 Liters

Cargo: 813



P.O. Box 160  
Corner Brook  
Newfoundland  
Canada  
A2H 6C7

## MATERIAL SAFETY DATA SHEET

### LIMESTONE

#### 1. Product Information:

Limestone is a naturally occurring mineral. It is used in the manufacture of quicklime and hydrated lime, steel production, as a soil sweetener, mineral filler and construction aggregate.

Producer: ATLANTIC MINERALS LIMITED  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

#### 2. Chemical Components:

|                                       | <u>%</u> | <u>CAS #</u> |
|---------------------------------------|----------|--------------|
| Calcium Carbonate                     | 95 - 100 | 1317-65-3    |
| Magnesium Carbonate                   | 0 - 1    | 546-93-0     |
| Clay Minerals<br>(Aluminum Silicates) | 0 - 3    | 1302-65-3    |
| Amorphous Silica                      | trace    | 7631-86-9    |
| Crystalline Silica                    | trace    | 14808-60-7   |
| Iron Oxide                            | trace    | 1309-37-1    |

Exposure Limit - classed as nuisance dust  
- TWAEV (time weighted average exposure value) = 10mg/m<sup>3</sup> (total dust)

#### 3. Physical Data:

Solid - white to grey  
Specific Gravity - 2.6 - 2.8  
Solubility in water - negligible  
pH in water - neutral

4. Fire or Explosive Hazards: Not applicable

#### 5. Reactivity Data:

Reacts vigorously with mineral acids producing carbon dioxide.  
Decomposes at >850 °C to quicklime and carbon dioxide.

6. Toxicological Properties: Classified as nuisance dust.

Route of entry: skin contact, eye contact, inhalation, ingestion.

---

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:  
Quarry Site:

Tel: (709) 634-8255  
Tel: (709) 644-2447

Fax: (709) 634-3939  
Fax: (709) 644-2449

**CONFIDENTIAL**





# MATERIAL SAFETY DATA SHEET

## LIMESTONE

**Acute Exposure:** Inhalation may cause nose, throat, or lung irritation and choking depending on the degree of exposure. May cause eye irritation and damage to cornea. May cause dry skin or skin irritation. Ingestion of large quantities may cause intestinal distress.

**Chronic Exposure:** Prolonged or repeated exposure may cause lung injury.

**Exposure Limit:** TWAEV (time weighted average exposure limit value)  
= 10 mg/m<sup>3</sup> (total dust)

### 7. Preventative Measures:

**Skin Contact -** Use protective clothing to prevent skin contact.

**Eye Protection -** Use safety glasses or goggles to prevent eye contact.

**Respiratory Protection -** Not required under ordinary conditions but an approved respiratory is necessary when exposed to dust above exposure limits.

**Waste Disposal -** Dispose as a common waste.

### 8. First Aid Measures:

**Inhalation -** Move to fresh air. Seek medical attention for discomfort.

**Eye contact -** Rinse thoroughly with water. Seek medical attention for abrasion.

**Skin Contact -** Wash with soap and water.

**Ingestion -** Do not induce vomiting but drink plenty of water. Seek medical attention for discomfort.

### 9. Preparation Information:

MSDS prepared by: **ATLANTIC MINERALS LIMITED**  
P.O. Box 160  
Corner Brook, NL  
Canada A2H 6C7

Phone: (709) 634-8255

Preparation Date: June 2009.

**PRODUCERS OF HIGH CALCIUM LIMESTONE, DOLOMITE AND CONSTRUCTION AGGREGATES**

Head Office:  
Quarry Site:

Tel: (709) 634-8255  
Tel: (709) 644-2447

Fax: (709) 634-3939  
Fax: (709) 644-2449

**CONFIDENTIAL**

# SAFETY DATA SHEET

# OxyChem<sup>®</sup>



## Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Company Identification:** Occidental Chemical Corporation  
5005 LBJ Freeway  
P.O. Box 809050  
Dallas, Tx 75380-9050

**24 Hour Emergency Telephone Number:** 1-800-733-3665 or 1-972-404-3228 (U.S.); 32.3.575.55.55 (Europe); 1800-033-111 (Australia)

**To Request an MSDS: Customer Service:** MSDS@oxy.com or 1-972-404-3245  
1-800-752-5151 or 1-972-404-3700

**Trade Name:** Hydrochloric Acid (HCl)

**Synonyms:**

- Muriatic Acid
- HCl Solution
- Aqueous hydrogen chloride

**Product Use:** Process chemical, Metal cleaning, Water purification, Petroleum industry

### 2. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW:

**Color:** Colorless  
**Physical State:** Liquid  
**Appearance:** Clear  
**Odor:** Irritating, Pungent, Sharp  
**Signal Word:** Danger

**MAJOR HEALTH HAZARDS:** CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN AND EYES. CAUSES PERMANENT EYE DAMAGE. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

**PHYSICAL HAZARDS:** May spatter or generate heat when mixed with water. Contact with metals may evolve flammable hydrogen gas.

**PRECAUTIONARY STATEMENTS:** Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling. Use only with adequate ventilation.

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

## 2. HAZARDS IDENTIFICATION

### POTENTIAL HEALTH EFFECTS:

**Inhalation:** May cause irritation (possibly severe), chemical burns, and pulmonary edema.

**Skin contact:** May cause irritation (possibly severe) and chemical burns.

**Eye contact:** May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

**Ingestion:** Not a likely route of exposure.

**Target Organs Effected:** Respiratory System, Skin, Eye

**Chronic Effects:** Repeated or prolonged exposure to dilute solutions may result in dermatitis. Discoloration of the teeth may occur as a result of long term exposure.

**Interaction with Other Chemicals Which Enhance Toxicity:** None known

**Medical Conditions Aggravated by Exposure:** None known

See Section 11: TOXICOLOGICAL INFORMATION

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Component | Concentration (by weight %) | CAS - No. |
|---------------------|-----------------------------|-----------|
| Water               | 63 - 91                     | 7732-18-5 |
| Hydrogen chloride   | 9 - 36                      | 7647-01-0 |

## 4. FIRST AID MEASURES

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

**SKIN CONTACT:** Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

**EYE CONTACT:** Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

**INGESTION:** Not a likely route of exposure.

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.: 05

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## 4. FIRST AID MEASURES

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## 5. FIRE-FIGHTING MEASURES

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**Fire Hazard:** Negligible fire hazard.

**Extinguishing Media:** Use media appropriate for surrounding fire

**Fire Fighting:** Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

**Sensitivity to Mechanical Impact:** Not sensitive.

**Sensitivity to Static Discharge:** Not sensitive.

**Flash point:** Not flammable

**Hazardous Combustion Products:** Hydrogen chloride, Chlorine, Hydrogen gas

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## 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:**

Remove sources of ignition. Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Stop leak if possible without personal risk. Consider evacuation of personnel located downwind if material is leaking. Shut off ventilation system if needed. Completely contain spilled material with dikes, sandbags, etc. Neutralize with soda ash or dilute caustic soda. Collect with appropriate absorbent and place into suitable container. Liquid material may be removed with a properly rated vacuum truck. Keep out of water supplies and sewers. This material is acidic and may lower the pH of the surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

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## 7. HANDLING AND STORAGE

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**Storage Conditions:** Store and handle in accordance with all current regulations and standards. Store in rubber-lined steel, acid-resistant plastic or glass containers. Keep container tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Keep away from heat, sparks and open flames. Keep separated from incompatible substances. Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from physical damage. Dike and vent storage tanks.

**Handling Procedures:** Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

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# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

Rev. Date: 2010-Feb-01

Rev. Num.:05

## 7. HANDLING AND STORAGE

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### OSHA Regulatory Exposure limit(s):

| Hazardous Component | CAS - No. | OSHA Final PEL<br>TWA | OSHA Final PEL<br>STEL | OSHA Final PEL<br>Ceiling    |
|---------------------|-----------|-----------------------|------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | -----                 | -----                  | 5 ppm<br>7 mg/m <sup>3</sup> |

### Non-Regulatory Exposure Limit(s):

The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

| Hazardous Component | CAS - No. | ACGIH<br>TWA | ACGIH<br>STEL | ACGIH<br>Ceiling | OSHA<br>TWA<br>(Vacated) | OSHA<br>STEL<br>(Vacated) | OSHA Ceiling<br>(Vacated)    |
|---------------------|-----------|--------------|---------------|------------------|--------------------------|---------------------------|------------------------------|
| Hydrogen chloride   | 7647-01-0 | -----        | -----         | 2 ppm            | -----                    | -----                     | 5 ppm<br>7 mg/m <sup>3</sup> |

**ENGINEERING CONTROLS:** Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT:

**Eye Protection:** Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin and Body Protection:** Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots.

**Hand Protection:** Wear appropriate chemical resistant gloves

**Protective Material Types:** Nitrile, Neoprene, Butyl rubber, Polyvinyl chloride (PVC), Responder®, Trelchem®, Tychem®

| Hazardous Component | Immediately Dangerous to Life/ Health (IDLH) |
|---------------------|--|
| Hydrogen chloride   | 50 ppm IDLH                                  |

**Respiratory Protection:** A NIOSH approved full-face respirator equipped with acid gas cartridges (appropriate for hydrogen chloride) may be permissible under certain circumstances where airborne concentrations of hydrogen chloride are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. When the level may be above the IDLH, use an SCBA or pressure-demand supplied air with an auxiliary self-contained escape pack. Pressure-demand SCBA (self-contained breathing apparatus) must be used when there is a potential for uncontrolled release or unknown concentrations. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

# Hydrochloric Acid (HCl) (All Grades)

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Physical State:</b>             | Liquid                             |
| <b>Appearance:</b>                 | Clear                              |
| <b>Color:</b>                      | Colorless                          |
| <b>Odor:</b>                       | Irritating, Pungent, Sharp         |
| <b>Odor Threshold</b>              | 0.3 ppm (causes olfactory fatigue) |
| <b>Molecular Weight:</b>           | 36.46                              |
| <b>Molecular Formula:</b>          | HCl                                |
| <b>Flash point:</b>                | Not flammable                      |
| <b>Boiling Point/Range:</b>        | 140 - 221°F (60 - 105 °C)          |
| <b>Freezing Point/Range:</b>       | -29 to 5 °F (-34 to -15 °C)        |
| <b>Vapor Pressure:</b>             | 14.6 - 80 mmHg @ 20°C              |
| <b>Vapor Density (air=1):</b>      | 1.3 @ 20°C                         |
| <b>Specific Gravity (water=1):</b> | 1.05 - 1.18                        |
| <b>Density:</b>                    | 8.75 - 9.83 lbs/gal                |
| <b>Water Solubility:</b>           | 100%                               |
| <b>pH:</b>                         | 2 (0.2% solution)                  |
| <b>Volatility:</b>                 | 9 - 36% by volume                  |
| <b>Evaporation Rate (ether=1):</b> | < 1.00 (butyl acetate=1)           |

## 10. STABILITY AND REACTIVITY

|   |   |
|---|---|
| <b>Reactivity/ Stability:</b>                 | Stable at normal temperatures and pressures.  |
| <b>Conditions to Avoid:</b>                   | Avoid heat, flames, sparks and other sources of ignition. Avoid contact with water. Will react with some metals forming flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Avoid contact with incompatible materials. |
| <b>Incompatibilities/ Materials to Avoid:</b> | Metals, Alkalis, Oxidizing agents, Mercuric sulfate, Perchloric acid, Carbides of calcium, cesium, rubidium, Acetylides of cesium and rubidium, Phosphides of calcium and uranium, Lithium silicide   |
| <b>Hazardous Decomposition Products:</b>      | Chlorine, Hydrogen chloride, Hydrogen gas   |
| <b>Hazardous Polymerization:</b>              | Will not occur  |

## 11. TOXICOLOGICAL INFORMATION

|                                |                 |
|--------------------------------|-----------------|
| <b>Standard Draize (Eye):</b>  | rabbit-eye mild |
| <b>Standard Draize (Skin):</b> | human-skin mild |

### TOXICITY DATA:

# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

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## 11. TOXICOLOGICAL INFORMATION

| Hazardous Component | LD50 Oral                             | LC50 Inhalation     | LD50 Dermal         |
|---------------------|---------------------------------------|---------------------|---------------------|
| Hydrogen chloride   | 700 mg/kg (Rat)<br>900 mg/kg (Rabbit) | 3124 ppm (1 hr-Rat) | 5010 mg/kg (Rabbit) |

### TOXICITY:

Inhalation will cause severe irritation and possible burns with coughing and choking. If inhaled deeply, edema and hemorrhage of the lungs may occur. Prolonged exposure may cause discoloration and/or erosion of teeth. Contact with eyes causes immediate severe irritation with possible burns, permanent visual impairment, or total loss of sight. Skin contact with this material may cause severe irritation and corrosion of tissue. Ingestion may cause immediate burns of the mouth, esophagus, and stomach. Ingestion may cause intense pain, nausea, vomiting, bleeding, circulating collapse, shock and death.

**CARCINOGENICITY:** This product is not classified as a carcinogen by NTP, IARC or OSHA.

## 12. ECOLOGICAL INFORMATION

### ECOTOXICITY DATA:

LC50 Gambusia affinis: 282 mg/L 96 h  
LC50 goldfish: 178 mg/L (1 to 2 hour survival time)  
LC50 bluegill: 3.6 mg/L 48 h  
LC50 shrimp: 100 – 330 mg/L

### FATE AND TRANSPORT:

**BIODEGRADATION:** This material is inorganic and not subject to biodegradation.

**PERSISTENCE:** This material is believed not to persist in the environment. This material is believed to exist in the disassociated state in the environment. If released to soil, hydrogen chloride will sink into the soil. The acid will dissolve some soil material (in particular, anything with a carbonate base) and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table. If released to water, it dissociates almost completely and will be neutralized by natural alkalinity and carbon dioxide.

**BIOCONCENTRATION:** This material is not expected to bioconcentrate in organisms.

**ADDITIONAL ECOLOGICAL INFORMATION:** This material has exhibited toxicity to terrestrial organisms. May decrease pH of waterways and adversely affect aquatic life.

## 13. DISPOSAL CONSIDERATIONS

## Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

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### 13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261. Hazardous Waste Number(s): D002

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### 14. TRANSPORT INFORMATION

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#### U.S.DOT 49 CFR 172.101:

**PROPER SHIPPING NAME:** Hydrochloric acid solution  
**DOT UN NUMBER:** UN1789  
**HAZARD CLASS/ DIVISION:** 8  
**PACKING GROUP:** II  
**LABELING** 8  
**REQUIREMENTS:**  
**DOT RQ (lbs):** RQ 5,000 Lbs. (Hydrochloric acid)

#### CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

**SHIPPING NAME:** Hydrochloric acid solution  
**UN NUMBER:** UN1789  
**CLASS:** 8  
**PACKING/RISK GROUP:** II

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### 15. REGULATORY INFORMATION

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#### U.S. REGULATIONS

##### OSHA REGULATORY STATUS:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

##### CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.



# Hydrochloric Acid (HCl) (All Grades)

MSDS No.: M34514

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| Hazardous Component | CERCLA Reportable Quantities |
|---------------------|------------------------------|
| Hydrogen chloride   | 5000 lb (final RQ)           |

**EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):**

If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

| Hazardous Component | EPCRA RQs                   | Threshold Planning Quantity (TPQs) |
|---------------------|-----------------------------|------------------------------------|
| Hydrogen chloride   | 5000 lb (EPCRA RQ) (liquid) | 500 lb (TPQ) (gas only)            |

**EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):**

Acute Health Hazard, Reactive Hazard

**EPCRA SECTION 313 (40 CFR 372.65):**

The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements.

| Hazardous Component                   | Status                     |
|---------------------------------------|----------------------------|
| Hydrogen Chloride (Hydrochloric Acid) | Listed - Aerosol form only |

**OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):**

Not regulated

**NATIONAL INVENTORY STATUS**

**U.S. INVENTORY STATUS (TSCA):** All components are listed or exempt

**TSCA 12(b):** This product is not subject to export notification

**CANADIAN DOMESTIC SUBSTANCE LIST (DSL/NDL):** All components are listed.

**STATE REGULATIONS**

| Hazardous Component   | Hydrogen chloride           |
|---|-----------------------------|
| California Proposition 65 Cancer WARNING:                       | Not Listed                  |
| California Proposition 65 CRT List - Male reproductive toxin:   | Not Listed                  |
| California Proposition 65 CRT List - Female reproductive toxin: | Not Listed                  |
| Massachusetts Right to Know Hazardous Substance List            | Listed                      |
| New Jersey Right to Know Hazardous Substance List               | sn 1012; sn 2909 (gas only) |
| New Jersey Special Health Hazards Substance List                | corrosive                   |
| New Jersey - Environmental Hazardous Substance List             | Listed                      |
| Pennsylvania Right to Know Hazardous Substance List             | Listed                      |
| Pennsylvania Right to Know Special Hazardous Substances         | Not Listed                  |
| Pennsylvania Right to Know Environmental Hazard List            | Listed                      |
| Rhode Island Right to Know Hazardous Substance List             | Listed                      |

**CANADIAN REGULATIONS**

# Hydrochloric Acid (HCl) (All Grades)

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This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

|  |                   |
|--|-------------------|
| <b>Hazardous Component</b>                             | Hydrogen chloride |
| <b>Canada - CEPA Schedule I - Toxic Substance list</b> | Not Listed        |
| <b>WHMIS Classification:</b>                           | E                 |

## 16. OTHER INFORMATION

### Disclaimer:

This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

Health: 3      Flammability: 0      Reactivity: 1

NFPA 704 - Hazard Identification Ratings (SCALE 0-4)

Health: 3      Flammability: 0      Reactivity: 1

### IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

**MATERIAL SAFETY DATA SHEET**

PRODUCT

**pHREEdom® 5200M**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME : pHREEdom® 5200M

APPLICATION : SCALE CONTROL

COMPANY IDENTIFICATION :  
Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 1 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

| Hazardous Substance(s)                     | CAS NO | % (w/w)     |
|--|--------|-------------|
| Sodium salt of phosphonomethylated diamine |        | 10.0 - 30.0 |

**3. HAZARDS IDENTIFICATION****\*\*EMERGENCY OVERVIEW\*\*****WARNING**

Irritating to eyes.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.

Wear suitable protective clothing.

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :

Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :

Can cause moderate irritation.

SKIN CONTACT :

May cause irritation with prolonged contact.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198

(630)305-1000

1 / 9

**MATERIAL SAFETY DATA SHEET**

PRODUCT

**pHREEdom® 5200M**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC****INGESTION :**

Not a likely route of exposure. No adverse effects expected.

**INHALATION :**

Not a likely route of exposure. No adverse effects expected.

**AGGRAVATION OF EXISTING CONDITIONS :**

A review of available data does not identify any worsening of existing conditions.

**HUMAN HEALTH HAZARDS - CHRONIC :**

No adverse effects expected other than those mentioned above.

**4. FIRST AID MEASURES****EYE CONTACT :**

Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get immediate medical attention.

**SKIN CONTACT :**

Immediately flush with plenty of water for at least 15 minutes. If symptoms persist, call a physician.

**INGESTION :**

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

**INHALATION :**

Remove to fresh air, treat symptomatically. Get medical attention.

**NOTE TO PHYSICIAN :**

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

**5. FIRE FIGHTING MEASURES****FLASH POINT :** > 200 F / > 93.3 C**EXTINGUISHING MEDIA :**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

**FIRE AND EXPLOSION HAZARD :**

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. May evolve oxides of phosphorus (POx) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****6. ACCIDENTAL RELEASE MEASURES****PERSONAL PRECAUTIONS :**

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

**METHODS FOR CLEANING UP :**

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

**ENVIRONMENTAL PRECAUTIONS :**

Do not contaminate surface water.

**7. HANDLING AND STORAGE****HANDLING :**

Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Use with adequate ventilation.

**STORAGE CONDITIONS :**

Store the containers tightly closed. Store in suitable labelled containers.

**SUITABLE CONSTRUCTION MATERIAL :**

HDPE (high density polyethylene), Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****OCCUPATIONAL EXPOSURE LIMITS :**

This product does not contain any substance that has an established exposure limit.

**ENGINEERING MEASURES :**

General ventilation is recommended.

**RESPIRATORY PROTECTION :**

Respiratory protection is not normally needed.

**HAND PROTECTION :**

Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

**SKIN PROTECTION :**

Wear standard protective clothing.

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****EYE PROTECTION :**

Wear chemical splash goggles.

**HYGIENE RECOMMENDATIONS :**

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                     |                             |
|---------------------|-----------------------------|
| PHYSICAL STATE      | Liquid                      |
| APPEARANCE          | Clear Light yellow          |
| ODOR                | Slight                      |
| SPECIFIC GRAVITY    | 1.17 - 1.21 @ 77 °F / 25 °C |
| DENSITY             | 9.7 - 10.1 lb/gal           |
| SOLUBILITY IN WATER | Complete                    |
| pH (100 %)          | 4.2 - 5.2                   |
| VISCOSITY           | 16 cps @ 40 °F / 4.4 °C     |
| VOC CONTENT         | 0 % Calculated              |

Note: These physical properties are typical values for this product and are subject to change.

**10. STABILITY AND REACTIVITY****STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur, Oxides of phosphorus

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**12. ECOLOGICAL INFORMATION****ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product.

**ACUTE FISH RESULTS :**

| Species        | Exposure | LC50         | Test Descriptor |
|----------------|----------|--------------|-----------------|
| Fathead Minnow | 96 hrs   | > 1,000 mg/l | Product         |

Rating : Essentially non-toxic

**ACUTE INVERTEBRATE RESULTS :**

| Species       | Exposure | LC50         | EC50 | Test Descriptor |
|---------------|----------|--------------|------|-----------------|
| Daphnia magna | 48 hrs   | > 1,000 mg/l |      | Product         |

Rating : Essentially non-toxic

**MOBILITY :**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 30 - 50%      |

The portion in water is expected to be soluble or dispersible.

**BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**AIR TRANSPORT (ICAO/IATA) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**MARINE TRANSPORT (IMDG/IMO) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**15. REGULATORY INFORMATION****NATIONAL REGULATIONS, USA :****OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium salt of phosphonomethylated diamine : Eye irritant

**CERCLA/SUPERFUND, 40 CFR 117, 302 :**

Notification of spills of this product is not required.

**SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :****SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

**SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :**

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:



**MATERIAL SAFETY DATA SHEET****PRODUCT****pHREEdom® 5200M****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC**

- X Immediate (Acute) Health Hazard
- Delayed (Chronic) Health Hazard
- Fire Hazard
- Sudden Release of Pressure Hazard
- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

None of the substances are specifically listed in the regulation.

**CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

None of the substances are specifically listed in the regulation.

**CALIFORNIA PROPOSITION 65 :**

This product does not contain substances which require warning under California Proposition 65.

**MICHIGAN CRITICAL MATERIALS :**

None of the substances are specifically listed in the regulation.

**STATE RIGHT TO KNOW LAWS :**

None of the substances are specifically listed in the regulation.

**NATIONAL REGULATIONS, CANADA :****WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS CLASSIFICATION :**

D2B - Materials Causing Other Toxic Effects - Toxic Material

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :**

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.



## MATERIAL SAFETY DATA SHEET

PRODUCT

**pHREEdom® 5200M**

EMERGENCY TELEPHONE NUMBER(S)

**(800) 424-9300 (24 Hours) CHEMTREC**

### INTERNATIONAL CHEMICAL CONTROL LAWS

#### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

### 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

#### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department  
Date issued : 02/21/2004

**Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198**

**(630)305-1000**

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**MATERIAL SAFETY DATA SHEET**

**PRODUCT**

**pHREEdom® 5200M**

**EMERGENCY TELEPHONE NUMBER(S)**

**(800) 424-9300 (24 Hours) CHEMTREC**

Version Number : 1.4

**MATERIAL SAFETY DATA SHEET****TMT 15®**

Material no.

101001

Version

1.8 / US

Specification

Revision date

10/26/2007

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**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING****Product information**

Trade name : TMT 15®  
Use of the Substance / Preparation : For industrial use  
Function : Precipitant

Company : Evonik Degussa Corporation  
379 Interpace Parkway  
Parsippany, NJ 07054  
USA

Telephone : 973-541-8000  
Telefax : 973-541-8040

**US: CHEMTREC EMERGENCY NUMBER** : 800-424-9300

**CANADA: CANUTEC EMERGENCY NUMBER** : 613-996-6666

Product Regulatory Services : 973-541-8060

**2. HAZARDS IDENTIFICATION****\*\*\* EMERGENCY OVERVIEW \*\*\***

*Form-liquid    Color-colourless to yellowish    Odor-almost odourless*

Irritating to eyes.

**Eye contact**

irritating

**Skin Contact**

Slightly irritating.

**Inhalation**

No hazard expected in normal use.

**Ingestion**

No hazard expected in normal use.

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**MATERIAL SAFETY DATA SHEET****TMT 15®**

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**3. COMPOSITION/INFORMATION ON INGREDIENTS****Chemical nature**

Aqueous preparation  
Content min. 15 %

The preparation contains:

**Information on ingredients / Hazardous components**

|  |            |                    |
|--|------------|--------------------|
| 1,3,5-triazine-2,4,6(1H,3H,5H)-trithione, trisodium salt |            |                    |
| CAS-No.  | 17766-26-6 | Percent (W/L/ Wt.) |

**Other information**

This material is classified as hazardous under OSHA regulations.

**4. FIRST AID MEASURES****General advice**

Remove victims from hazardous area.  
Observe self-protection (eye protection).

**Inhalation**

No particular measures required.  
If necessary: Provide with fresh air.

**Skin contact**

Upon skin contact, wash with plenty of water.  
Remove contaminated or saturated clothing.

**Eye contact**

Keeping eyelid open, immediately rinse thoroughly for at least 5 minutes using plenty of water or, if necessary, eye rinsing solution.  
Consult an ophthalmologist.

**Ingestion**

Do not induce vomiting.  
Have the mouth rinsed with water.  
Have patient drink plenty of water in small sips.  
Consult a physician.

**Notes to physician**

Specific therapy/antidote treatment: none known  
If required, therapy of irritative effect.  
If substance has been swallowed:  
Early endoscopy in order to assess mucosa lesions in the oesophagus and stomach which may appear.  
If necessary, aspirate leftover substance.

**5. FIRE-FIGHTING MEASURES**

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Flash point does not flash

Autoignition temperature not applicable

**Suitable extinguishing media**

water mist quenching powder foam

**Extinguishing media which must not be used for safety reasons**

None known

**Specific hazards during fire fighting**

In the case of fire, the following hazardous smoke fumes may be produced: nitric oxides, sulphur oxides.

**Special protective equipment for fire-fighters**

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

**Further information**

Standard procedure for chemical fires.

Ensure there are sufficient retaining facilities for water used to extinguish fire. Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Wear personal protective equipment; see section 8.

**Environmental precautions**

Observe regulations on prevention of water pollution (collect, dam up, cover up).

Do not allow the product into the following compartments:

surface water

stretches of water

Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, rivers, groundwater or soil.

**Methods for cleaning up**

Absorb with liquid-binding material (e.g. inert absorbent or universal binder).

Dispose of absorbed material in accordance with the regulations.

see section 13.

Rinse away any residue with plenty of water.

**Additional advice**

Isolate and seal off defective containers immediately.

**7. HANDLING AND STORAGE****Handling****Safe handling advice**

Handle in accordance with good industrial hygiene and safety practices.

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Avoid contact with skin and eyes.

Wear personal protective equipment.

For personal protection see section 8.

Immediately change moistened and saturated work clothes.

No eating, drinking, smoking, or snuffing tobacco at work.

Wash hands before breaks and at the end of workday.

preventive skin protection

**Advice on protection against fire and explosion**

The product is not combustible.

**Storage****Requirements for storage areas and containers**

clean, dry.

Use shatterproof containers.

Protect from frost.

Transport and store container in upright position only.

Always close container tightly after removal of product.

**Further information**

Use by date of the product: min. 2 years.

Use alkaliresistant materials.

**Advice on common storage**

Store away from: oxidizing agents, acids.

---

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

Remarks

No substance-specific limiting value being known.

**Component occupational exposure guidelines****Engineering measures**

No dangerous reactions are known to occur with correct handling and storage.

**Personal protective equipment****Respiratory protection**

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

**Hand protection**

Glove material

Polychloroprene (PCP), for example: Camapren 720, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness

0.65 mm

Break through time

&gt; 480 min

Method

DIN EN 374

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The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

**Eye protection**

wear basket-shaped glasses or safety goggles with side-shields.

**Skin and body protection**

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

**Hygiene measures**

No eating, drinking, smoking, or snuffing tobacco at work.

Wash face and/or hands before break and end of work.

Avoid contaminating clothes with product.

Immediately change moistened and saturated work clothes.

**Protective measures**

Avoid contact with skin and eyes.

Handle in accordance with good industrial hygiene and safety practices.

Wear suitable protective clothing, gloves and eye/face protection.

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

|       |                         |
|-------|-------------------------|
| Form  | liquid                  |
| Color | colourless to yellowish |
| Odor  | almost odourless        |

**Safety data**

|                           |                             |           |
|---------------------------|-----------------------------|-----------|
| pH                        | ca. 12.3                    | (22.5 °C) |
| Melting point/range       | -3 °C                       |           |
| Boiling point/range       | 101 °C                      |           |
| Flash point               | does not flash              |           |
| Flammability              | not applicable              |           |
| Autoignition temperature: | not applicable              |           |
| Autoinflammability        | not spontaneously flammable |           |
| Explosiveness             | not applicable              |           |
| Vapor pressure            | 22 mbar                     | (20 °C)   |
| Density                   | ca. 1.12 g/cm <sup>3</sup>  | (20 °C)   |



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|   |                                       |
|---|---------------------------------------|
| Partition coefficient (n-octanol/water) | log Pow: < -2<br>Method: (calculated) |
| Viscosity, dynamic                      | 1.6 mPa.s (20 °C)                     |
| conductivity                            | ca. 60 mS/cm (22 °C)                  |
| Molecular Weight                        | 243.22 g/Mol                          |

**Further information**

|                      |                     |
|----------------------|---------------------|
| Miscibility in water | completely miscible |
|----------------------|---------------------|

**10. STABILITY AND REACTIVITY**

|                                  |  |
|----------------------------------|--|
| Conditions to avoid              | frost.   |
| Materials to avoid               | strong oxidant, acids.   |
| Hazardous decomposition products | None known   |
| Thermal decomposition            | > 370 °C<br>solid<br>No decomposition if stored and applied as directed.                               |
| Hazardous reactions              | No dangerous reactions are known to occur with correct handling and storage.<br><br>product is stable. |

**11. TOXICOLOGICAL INFORMATION**

|                               |   |
|-------------------------------|---|
| Product Acute oral toxicity   | LD50 Rat: 7878 mg/kg<br>Method: analogy OECD-method<br>related to substance: TMT (15%)                    |
| Product Acute dermal toxicity | LD50 Rat: > 2000 mg/kg<br>Method: OECD Test Guideline 402<br>related to substance: TMT (55%)              |
| Product Skin irritation       | Rabbit / 4 h<br>slightly irritating<br>Method: OECD Test Guideline 404<br>related to substance: TMT (55%) |
| Product Eye irritation        | Rabbit<br>irritant<br>Method: OECD Test Guideline 405<br>related to substance: TMT (55%)                  |

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|                                |   |
|--------------------------------|---|
| Product Sensitization          | maximization test guinea pig: not sensitizing<br>Method: OECD Test Guideline 406<br>related to substance: TMT (55%)   |
| Product Repeated dose toxicity | Oral Rat<br>Testing period: 30 d<br>NOAEL: 526 mg/kg<br>target organ/effect: Erythrocytes<br>Method: OECD Test Guideline 407<br>related to substance: TMT (55%) |
| Product Genotoxicity in vitro  | Ames test S. typhimurium / E. coli<br>negative<br>Method: analogy OECD-method<br>related to substance: TMT (15%)  |
| Product Genotoxicity in vivo   | Micronucleus test mouse Oral<br>negative<br>Method: OECD TG 474<br>related to substance: TMT (15%)  |
| Product Human experience       | To date handling this product has not been known to cause any detrimental effects.  |

**12. ECOLOGICAL INFORMATION****Elimination information (persistence and degradability)****Biodegradability**

aerobic

inoculum: Activated sludge

Not readily biodegradable.

0 %

Exposure time: 28 d

Method: OECD TG 302 B

related to substance: TMT (15%)

anaerobic

inoculum: Activated sludge

Not readily biodegradable.

0 %

Exposure time: 60 d

Method: CO2 Evolution Test

related to substance: TMT (15%)

**Ecotoxicity effects****Toxicity to fish**

LC0 static test Leuciscus idus melanotus: 1000 mg/l / 96 h

Analytical monitoring: no

Method: DIN 38412 Teil 15

related to substance: TMT (acid form)

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**8 / 10**LC0 static test *Leuciscus idus melanotus*: 1500 mg/l / 48 hAnalytical monitoring: no  
Method: DIN 38412 Teil 15  
related to substance: TMT (acid form)LC50 semi-static test *Brachydanio rerio*: > 560 - 1000 mg/l / 96 hAnalytical monitoring: no  
Method: OECD TG 203  
Noxious effect due to pH shift  
pH: 8 - 11  
related to substance: TMT (60%)

## Toxicity to daphnia

EC50 *Daphnia magna*: ca. 1056 mg/l / 24 h  
Method: OECD TG 202  
Noxious effect due to pH shift  
pH: 8 - 11  
related to substance: TMT (60%)

## Toxicity to algae

IC 50 *scenedesmus subspicatus*: 273 mg/l / 72 h  
End point: Biomass  
Analytical monitoring: no  
Method: OECD 201  
related to substance: TMT (15%)

## Toxicity to bacteria

EC50 Activated sludge: 1036 mg/l / 3 h  
Analytical monitoring: no  
Method: DEV L3 (TTC test)  
related to substance: TMT (60%)**Further information on ecology**Chemical Oxygen Demand (COD) 139800 mg/l  
Method: DEV H 41  
related to substance: TMT (15%)Biochemical Oxygen Demand (BOD) 0 mg/g  
Concentration: 16 mg/l (BOD5)  
Method: DEV H5/a2 (dilution method)  
related to substance: TMT (60%)

AOX The product does not contain any organically bonded halogen.

General Ecological Information does not contain any heavy metals and compounds from EC directive 76/464:  
is adsorbed to activated sludge**13. DISPOSAL CONSIDERATIONS****WASTE DISPOSAL**

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Advice on disposal

Waste must be disposed of in accordance with local, state, provincial and federal laws and regulations. Empty containers must be handled with care due to product residue.

**14. TRANSPORT INFORMATION****Transport/further information**

Not classified as dangerous in the meaning of transport regulations.

**15. REGULATORY INFORMATION****US Federal Regulations****OSHA**

If listed below, chemical specific standards apply to the product or components:

- None listed

**Clean Air Act Section (112)**

If listed below, components present at or above the de minimus level are hazardous air pollutants:

- None listed

**CERCLA Reportable Quantities**

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- None listed

**SARA Title III Section 311/312 Hazard Categories**

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard

**SARA Title III Section 313 Reportable Substances**

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- None listed

**Toxic Substances Control Act (TSCA)**

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed

**MATERIAL SAFETY DATA SHEET****TMT 15®**

|               |        |               |            |
|---------------|--------|---------------|------------|
| Material no.  |        | Version       | 1.8 / US   |
| Specification | 101001 | Revision date | 10/26/2007 |
| Order Number  |        | Print Date    | 11/08/2007 |
|               |        | Page          | 10 / 10    |

**State Regulations****California Proposition 65**

A warning under the California Drinking Water Act is required only if listed below:

- None listed

**International Chemical Inventory Status**

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact Evonik Degussa Corporation Product Regulatory Services Department:

- |                          |                   |
|--------------------------|-------------------|
| • Europe (EINECS/ELINCS) | Listed/registered |
| • USA (TSCA)             | Listed/registered |
| • Canada (DSL)           | Listed/registered |
| • Australia (AICS)       | Listed/registered |
| • Japan (MITI)           | Listed/registered |
| • Korea (TCCL)           | Listed/registered |
| • Philippines (PICCS)    | Listed/registered |
| • China                  | Listed/registered |

**16. OTHER INFORMATION****HMIS Ratings**

|                   |   |
|-------------------|---|
| Health :          | 2 |
| Flammability :    | 0 |
| Physical Hazard : | 0 |

**Further information**

Data for the production of the safety data sheet from the studies available and from the literature. Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure .

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.



# SAFETY DATA SHEET

PRODUCT

**CORE SHELL® 71307**

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : CORE SHELL® 71307  
APPLICATION : SLUDGE DEWATERING AGENT FLOCCULANT  
COMPANY IDENTIFICATION : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois  
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH: 1/1 FLAMMABILITY: 1/1 INSTABILITY: 0/0 OTHER:  
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme \* = Chronic Health Hazard

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

## 3. HAZARDS IDENTIFICATION

### \*\*EMERGENCY OVERVIEW\*\*

#### CAUTION

May cause irritation with prolonged contact.  
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Protect product from freezing.  
Wear suitable protective clothing.  
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.

PRIMARY ROUTES OF EXPOSURE :  
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :  
Can cause mild irritation.

SKIN CONTACT :  
Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

INGESTION :  
Not a likely route of exposure. If swallowed a jelly mass may form which in digestion may cause blockage.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access



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### INHALATION :

Not a likely route of exposure. No adverse effects expected.

### SYMPTOMS OF EXPOSURE :

#### Acute :

A review of available data does not identify any symptoms from exposure not previously mentioned.

#### Chronic :

Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

### AGGRAVATION OF EXISTING CONDITIONS :

Skin contact may aggravate an existing dermatitis condition.

### HUMAN HEALTH HAZARDS - CHRONIC :

No adverse effects expected other than those mentioned above.

## 4. FIRST AID MEASURES

### EYE CONTACT :

Flush affected area with water. Get medical attention.

### SKIN CONTACT :

Flush affected area with water. If symptoms develop, seek medical advice.

### INGESTION :

Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

### INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

### NOTE TO PHYSICIAN :

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

## 5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93.3 °C ( PMCC )

### EXTINGUISHING MEDIA :

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

### FIRE AND EXPLOSION HAZARD :

May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Water in contact with the product will cause slippery floor conditions.



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PRODUCT

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### SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS :

Notify appropriate government, occupational health and safety and environmental authorities. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

### METHODS FOR CLEANING UP :

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. Water in contact with the product will cause slippery floor conditions. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

### ENVIRONMENTAL PRECAUTIONS :

This product is toxic to fish. It should not be directly discharged into lakes, ponds, streams, waterways or public water supplies.

## 7. HANDLING AND STORAGE

### HANDLING :

Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

### STORAGE CONDITIONS :

Protect product from freezing. Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers.

### UNSUITABLE CONSTRUCTION MATERIAL :

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### OCCUPATIONAL EXPOSURE LIMITS :

This product does not contain any substance that has an established exposure limit.

### ENGINEERING MEASURES :

General ventilation is recommended.

### RESPIRATORY PROTECTION :

Respiratory protection is not normally needed. If significant mists, vapors or aerosols are generated an approved respirator is recommended. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.





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### HAND PROTECTION :

Neoprene gloves Nitrile gloves Butyl gloves PVC gloves

### SKIN PROTECTION :

Wear standard protective clothing.

### EYE PROTECTION :

Wear chemical splash goggles.

### HYGIENE RECOMMENDATIONS :

Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

|                     |                                 |
|---------------------|---------------------------------|
| PHYSICAL STATE      | Emulsion                        |
| APPEARANCE          | Opaque Off-white Light brown    |
| ODOR                | Hydrocarbon                     |
| SPECIFIC GRAVITY    | 0.995 - 1.078 @ 77 °F / 25 °C   |
| DENSITY             | 8.30 - 9.00 lb/gal              |
| SOLUBILITY IN WATER | Emulsifiable                    |
| pH (100 %)          | 4.0 - 5.0                       |
| VISCOSITY           | 400 - 1,500 cps @ 72 °F / 22 °C |
| VOC CONTENT         | 28.7 % Calculated               |

Note: These physical properties are typical values for this product and are subject to change.

## 10. STABILITY AND REACTIVITY

### STABILITY :

Stable under normal conditions.

### HAZARDOUS POLYMERIZATION :

Hazardous polymerization will not occur.

### CONDITIONS TO AVOID :

Avoid temperatures below 0 and above 93 degrees C which will cause polymer to precipitate. Avoid extremes of temperature.

### MATERIALS TO AVOID :

Addition of water results in gelling. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

**11. TOXICOLOGICAL INFORMATION**

No toxicity studies have been conducted on this product.

**SENSITIZATION :**

This product is not expected to be a sensitizer.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: Low

**12. ECOLOGICAL INFORMATION****ECOTOXICOLOGICAL EFFECTS :**

The tests for (products or similar products) were performed in clean water as set forth by USEPA (EPA/600/4-90/027). In order to evaluate the potential toxicity mitigation, the tests for (representative polymers) were performed in environmentally relevant water with dissolved organic carbon (DOC: 4.5 mg/l). The toxicity of this product is due to an external mode of action, e.g., suffocation or immobilization. In the presence of suspended material, e.g., DOC, the polymers are bound to suspended material and the bioavailability is substantially reduced. As a result, the toxicity is expected to be lower. Under normal use and discharge conditions, the LC50 values of the representative polymers tested in the presence of DOC are expected to apply to this product. However, for large spills, the clean water data is more applicable.

**ACUTE FISH RESULTS :**

| Species           | Exposure | LC50        | Test Descriptor                                 |
|-------------------|----------|-------------|---|
| Zebra Danio       | 96 hrs   | 1 - 10 mg/l | Representative polymer tested in water with DOC |
| Inland Silverside | 96 hrs   | 185.14 mg/l | Product   |
| Rainbow Trout     | 96 hrs   | 0.51 mg/l   | Product   |

**ACUTE INVERTEBRATE RESULTS :**

| Species                         | Exposure | LC50          | EC50 | Test Descriptor                                 |
|---------------------------------|----------|---------------|------|---|
| Daphnia magna                   | 48 hrs   | 10 - 100 mg/l |      | Representative polymer tested in water with DOC |
| Daphnia magna                   | 48 hrs   | 6.09 mg/l     |      | Product   |
| Mysid Shrimp (Mysidopsis bahia) | 96 hrs   | 3.38 mg/l     |      | Product   |

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## CHRONIC FISH RESULTS :

| Species        | Exposure | NOEC / LOEC          | End Point | Test Descriptor |
|----------------|----------|----------------------|-----------|-----------------|
| Topsmelt       | 7 Days   | 1 mg/l / > 10 mg/l   |           | Similar Product |
| Fathead Minnow | 7 Days   | 1.25 mg/l / 2.5 mg/l | Growth    | Similar Product |

## CHRONIC INVERTEBRATE RESULTS :

| Species            | Test Type | NOEC / LOEC             | End Point    | Test Descriptor |
|--------------------|-----------|-------------------------|--------------|-----------------|
| Ceriodaphnia dubia | 3 Brood   | 0.156 mg/l / 0.313 mg/l | Reproduction | Similar Product |

## ADDITIONAL ECOLOGICAL DATA

NOEC on earthworm: &gt; 1000 mg/l (representative polymer) AOX information: Product contains no organic halogens.

## MOBILITY :

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 10 - 30% | 70 - 90%      |

The portion in water is expected to be soluble or dispersible.

## BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

## ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION

Based on our hazard characterization, the potential environmental hazard is: High

If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**SAFETY DATA SHEET****PRODUCT****CORE SHELL® 71307****EMERGENCY TELEPHONE NUMBER(S)****(800) 424-9300 (24 Hours) CHEMTREC****14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**AIR TRANSPORT (ICAO/IATA) :**

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

**MARINE TRANSPORT (IMDG/IMO) :**

Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.  
Technical Name(s) : Cationic polymer  
UN/ID No : UN 3082  
Hazard Class - Primary : 9  
Packing Group : III

**15. REGULATORY INFORMATION**

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

**NATIONAL REGULATIONS, USA :****OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :**

Based on our hazard evaluation, none of the substances in this product are hazardous.

**CERCLA/SUPERFUND, 40 CFR 302 :**

Notification of spills of this product is not required.

**SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :****SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :**

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

**SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :**

Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.



**SAFETY DATA SHEET**

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Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :**

This product does not contain substances on the List of Toxic Chemicals.

**TOXIC SUBSTANCES CONTROL ACT (TSCA) :**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s)  | Citations |
|---------------|-----------|
| • Adipic Acid | Sec. 311  |

**CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

| Substance(s) | Citations |
|--------------|-----------|
| • Acrylamide | Sec. 112  |

**CALIFORNIA PROPOSITION 65 :**

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels, which would require a warning under the statute.

**MICHIGAN CRITICAL MATERIALS :**

Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

**STATE RIGHT TO KNOW LAWS :**

The following substances are disclosed for compliance with State Right to Know Laws:

Adipic Acid

124-04-9

**INTERNATIONAL CHEMICAL CONTROL LAWS :**



## SAFETY DATA SHEET

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### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :

The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

### EUROPE

The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

### NEW ZEALAND

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

## 16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

### REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

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**(800) 424-9300 (24 Hours) CHEMTREC**

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),  
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

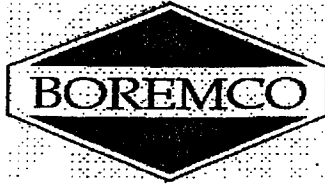
Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,  
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department  
Date issued : 05/06/2010  
Version Number : 1.16



## Material Safety Data Sheet

### Ferric Chloride 32% to 45% Photo Etch Grade

#### General Information

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Company's Name: Borden & Remington  
Company's Street: 63 Water St.  
Company's City: Fall River  
Company's State: MA  
Company's Country: US  
Company's Zip Code: 02722  
Company's Emerg Ph #: 800-424-9300 (CHEMTREC)  
Company's Info Ph #: 508-675-0096  
Date MSDS Prepared: 24FEB93  
Safety Data Review Date: January 2010

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#### Ingredients/Identity Information

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Proprietary: NO  
Ingredient: FERRIC CHLORIDE  
Ingredient Sequence Number: 01  
Percent: 32-45  
NIOSH (RTECS) Number: LJ9100000  
CAS Number: 7705-08-0  
ACGIH TLV: 1 MG/CUM

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Proprietary: NO  
Ingredient: HYDROCHLORIC ACID, HYDROGEN CHLORIDE, MURIATIC ACID  
HYDROCHLORIDE  
Ingredient Sequence Number: 02  
Percent: <3  
NIOSH (RTECS) Number: MW4025000  
CAS Number: 7647-01-0  
OSHA PEL: 5 PPM  
ACGIH TLV: C 11 MG/CUM  
Other Recommended Limit: 7 PPM

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Proprietary: NO  
Ingredient: FERROUS CHLORIDE  
Ingredient Sequence Number: 03  
Percent: <0.5  
NIOSH (RTECS) Number: NO5400000  
CAS Number: 7758-94-3  
ACGIH TLV: 1 MG/CUM

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Proprietary: NO  
Ingredient: WATER  
Ingredient Sequence Number: 04  
Percent: BALANCE  
NIOSH (RTECS) Number: ZC0110000  
CAS Number: 7732-18-5

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#### Physical/Chemical Characteristics

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Appearance And Odor: REDDISH BROWN LIQUID W/SLIGHT ODOR OF IRON/ACID  
Boiling Point: 230F  
Melting Point: -58F  
Vapor Pressure (MM Hg/70 F): NEGLIGIBLE  
Specific Gravity: 1.432  
Evaporation Rate And Ref: (BU AC=1): >1  
Solubility In Water: COMPLETE  
pH: <2

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#### Fire and Explosion Hazard Data

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Extinguishing Media: WATER SPRAY, FOG, FOAM, DRY CHEMICAL, CO2/OTHER AGENTS AS APPROPRIATE FOR SURROUNDING FIRE  
Special Fire Fighting Proc: WEAR SELF CONTAINED BREATHING APPARATUS & FULL PROTECTIVE CLOTHING AS APPROPRIATE FOR SURROUNDING FIRE. COOL EXTERIOR OF STORAGE TANKS.  
Unusual Fire And Expl Hazrds: NONE

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#### Reactivity Data

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Stability: YES  
Cond To Avoid (Stability): HEAT  
Materials To Avoid: STRONG ALKALIS & ALKALI METALS  
Hazardous Decomp Products: HYDROGEN CHLORIDE GAS  
Hazardous Poly Occur: NO

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### Health Hazard Data

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LD50-LC50 Mixture: ORAL LD50(RAT): 900 MG/KG(IRON TOXICITY)

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: NO although will cause serious chemical burns

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: INHALATION: RESPIRATORY TRACT IRRITANT. IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES: IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY.

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: NONE

Signs/Symptoms Of Overexp: IRRITATION, BURNS, TEARING, TISSUE DISCOLORATION

Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE CPR. INGESTION: DRINK COPIOUS AMOUNTS OF WATER. DON'T INDUCE VOMITING. SKIN: FLUSH W/WATER FOR 15 MINS. EYES: FLUSH W/WATER FOR 15 MINS. FORCIBLY HOLD EYELIDS APART TO ENSURE COMPLETE IRRIGATION OF EYE/ LID TISSUE. OBTAIN MEDICAL ATTENTION IN ALL CASES.

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### Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: CONTAIN TO PREVENT CONTAMINATION OF WATER WAY. NEUTRALIZE W/LIME/SODA ASH. FLUSH W/WATER.

Waste Disposal Method: DISPOSE OF NEUTRALIZED/WASTE PRODUCT/CONTAMINATED SOIL & OTHER MATERIAL IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.

Precautions-Handling/Storing: KEEP CONTAINERS CLOSED & DRY. STORE AWAY FROM IGNITION SOURCES & STRONG ALKALIES & ALKALI METALS. PROTECT CONTAINER FROM PHYSICAL DAMAGE.

Other Precautions: USE HANDLING EQUIPMENT COMPATIBLE W/PRODUCT. EMPTIED COANTAINER MAY RETAIN VAPOR & PRODUCT RESIDUE. AVOID BREATHING FUMES.

MINIMIZE SKIN CONTACT W/PROTECTIVE CLOTHING. AVOID CONTACT W/BARE METALS.

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### Control Measures

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Respiratory Protection: USE NIOSH/MSHA APPROVED, FULL FACE RESPIRATOR AS APPROPRIATE.

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Ventilation: GOOD GENERAL ROOM VENTILATION TO MINIMIZE EXPOSURE TO VAPORS & MIST.

Protective Gloves: IMPERVIOUS RUBBER

Eye Protection: SPLASHPROOF CHEMICAL SAFETY GOGGLES

Other Protective Equipment: EYEWASH FOUNTAINS, PROTECTIVE CLOTHING, FULL FACE SHIELD, RUBBER FOOTWEAR, RESISTANT HOOD, FULL BODY SUIT, SAFETY SHOWER

Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. WASH THOROUGHLY AFTER HANDLING. DON'T WEAR CONTACT LENSES.

---

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Label Data

---

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Label Required: YES

Label Status: G

Common Name: FERRIC CHLORIDE SOLUTION

Special Hazard Precautions: INHALATION: RESPIRATORY TRACT IRRITANT. IMMEDIATE IRRITATION/CORROSIVE BURNS TO HUMAN TISSUE. EYES: IRRITANT, MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY. IRRITATION, BURNS, TEARING, TISSUE DISCOLORATION

Label Name: Borden & Remington

Label Street: 106 Ferry St.

Label City: Fall River

Label State: MA

Label Zip Code: 02722

Label Country: US

Label Emergency Number: 800-424-9300

CONFIDENTIAL

## MATERIAL SAFETY DATA SHEET

### Section 1. Chemical Product and Company Identification

**Product Name:** ChemTreat P813E  
**Product Use:** Water Clarification/Solids Conditioning Agent  
**Manufacturer's Name:** ChemTreat, Inc.  
**Emergency Telephone Number:** (800) 424-9300  
**Address (Corporate Headquarters):** 4461 Cox Road  
Glen Allen, VA 23060  
**Telephone Number for Information:** (800) 648-4579  
**Date of MSDS:** March 18, 2009

### Section 2. Hazard(s) Identification



**Signal Word:** WARNING!

**Hazard Statement(s):** May be harmful in contact with skin.  
May be harmful if inhaled.  
May be harmful if swallowed.

**Precautionary Statement(s):** No significant health risks are expected from exposures under normal conditions of use.

### Section 3. Composition/Hazardous Ingredients

| Component                               | CAS Registry # | Wt. % |
|---|----------------|-------|
| Petroleum distillate hydrotreated light | 64742-47-8     | 10-30 |

### Section 4. First Aid Measures

**Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

**Eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.

**Skin:** Wash with plenty of soap and water. Call a poison center or doctor/physician if you feel unwell.

**Ingestion:** DO NOT INDUCE VOMITING. Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.

**Notes to Physician:** N/A

**Additional First Aid Remarks:** N/A

## ***Section 5. Fire Fighting Measures***

---

**Flammability of the Product:** Not flammable.

**Suitable Extinguishing Media:** Use extinguishing media suitable to surrounding fire.

**Specific Hazards Arising from the Chemical:** Use water spray to keep containers cool.

**Protective Equipment:** If product is involved in a fire, wear full protective clothing including a positive-pressure, NIOSH approved, self-contained breathing apparatus.

## ***Section 6. Accidental Release Measures***

---

**Personal Precautions:** Use appropriate Personal Protective Equipment (PPE).

**Environmental Precautions:** Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers.

**Methods for Cleaning up:** Contain and recover liquid when possible. Flush spill area with water spray.

**Other Statements:** None.

## ***Section 7. Handling and Storage***

---

**Handling:** Wear appropriate Personal Protection Equipment (PPE) when handling this product. Do not get in eyes, or on skin and clothing. Wash thoroughly after handling. Do not ingest. Avoid breathing vapors, mist or dust. Material is very slippery if spilled.

**Storage:** Store away from incompatible materials (see Section 10). Store at ambient temperatures. Keep container securely closed when not in use. Label precautions also apply to empty container. Recondition or dispose of empty containers in accordance with government regulations. For Industrial use only. Do not store or handle in aluminum, zinc, copper, or their alloys. Protect from heat and sources of ignition.

## Section 8. Exposure Controls/Personal Protection

### Exposure Limits

| Component                               | Source | Exposure Limits |
|---|--------|-----------------|
| Petroleum distillate hydrotreated light |        | N/E             |

### Carcinogenicity Category

| Component                               | Source | Code | Brief Description |
|---|--------|------|-------------------|
| Petroleum distillate hydrotreated light |        |      | N/E               |

### Engineering Controls:

Use only with adequate ventilation. The use of local ventilation is recommended to control emission near the source.

### Personal Protection

#### Eyes:

Wear chemical splash goggles or safety glasses with full-face shield. Maintain eyewash fountain in work area.

#### Skin:

Maintain quick-drench facilities in work area. Wear butyl rubber or neoprene gloves. Wash them after each use and replace as necessary. If conditions warrant, wear protective clothing such as boots, aprons, and coveralls to prevent skin contact.

#### Respiratory:

If misting occurs, use NIOSH approved organic vapor/acid gas dual cartridge respirator with a dust/mist prefilter in accordance with 29 CFR 1910.134.

## Section 9. Physical and Chemical Properties

|                                       |                                |
|---------------------------------------|--------------------------------|
| <b>Physical State and Appearance:</b> | Liquid Emulsion, White, Opaque |
| <b>Specific Gravity:</b>              | 1.0800                         |
| <b>pH:</b>                            | N/A                            |
| <b>Freezing Point:</b>                | 0°F                            |
| <b>Flash Point:</b>                   | >200°F                         |
| <b>Odor:</b>                          | Mild                           |
| <b>Melting Point:</b>                 | N/A                            |
| <b>Boiling Point:</b>                 | 212 – 347°F                    |
| <b>Solubility in Water:</b>           | Limited by viscosity           |
| <b>Evaporation Rate:</b>              | <1                             |
| <b>Vapor Density:</b>                 | Similar to water               |
| <b>Molecular Weight:</b>              | N/D                            |
| <b>Viscosity:</b>                     | N/A                            |
| <b>Flammable Limits:</b>              | N/A                            |
| <b>Autoignition Temperature:</b>      | N/A                            |
| <b>Density:</b>                       | 9.01 lb/ga                     |
| <b>Vapor Pressure:</b>                | N/A                            |
| <b>% VOC</b>                          | 25                             |

## ***Section 10. Stability and Reactivity***

**Chemical Stability:** Stable at normal temperatures and pressures.

**Incompatibility with Various Substances:** Strong oxidizers, Strong bases

**Hazardous Decomposition Products:** Carbon dioxide, Carbon monoxide, Ammonia, Oxides of nitrogen

**Possibility of Hazardous Reactions:** None known.

## ***Section 11. Toxicological Information***

| Chemical Name | Exposure | Type of Effect | Concentration | Species |
|---------------|----------|----------------|---------------|---------|
| N/D           |          |                |               |         |

**Comments:** None.

## ***Section 12. Ecological Information***

| Species            | Duration | Type of Effect | Test Results |
|--------------------|----------|----------------|--------------|
| Bluegill Sunfish   | 96h      | LC50           | 84.4 mg/l    |
| Rainbow Trout      | 96h      | LC50           | 53.2 mg/l    |
| Ceriodaphnia dubia | 48h      | LC50           | 1.205 mg/l   |
| Daphnia pulex      | 48h      | LC50           | 7.3 mg/l     |
| Fathead Minnow     | 96h      | LC50           | 240 mg/l     |
|                    | 48h      | LC50           | 143 mg/l     |

**Comments:** None.

## ***Section 13. Disposal Considerations***

Dispose of in accordance with local, state and federal regulations.

## Section 14. Transport Information

### DOT Classification

**DOT Name:** COMPOUND, INDUSTRIAL WATER TREATMENT, LIQUID  
**Technical Name:** N/A  
**Hazard Class:** Not D.O.T. Regulated.  
**UN/NA#:** N/A  
**Packing Group:** N/A

## Section 15. Regulatory Information

### Inventory Status

**United States (TSCA):** All ingredients listed.  
**Canada (DSL/NDSL):** All ingredients listed.

### Federal Regulations

#### SARA Title III Rules

#### Sections 311/312 Hazard Classes

**Fire Hazard:** No  
**Reactive Hazard:** No  
**Release of Pressure:** No  
**Acute Health Hazard:** Yes  
**Chronic Health Hazard:** No

#### Other Sections

| Component                               | Section 313<br>Toxic Chemical | Section 302 EHS<br>TPQ | CERCLA RC |
|---|-------------------------------|------------------------|-----------|
| Petroleum distillate hydrotreated light | N/A                           | N/A                    | N/A       |

### State Regulations

**California Proposition 65:** This product contains chemical(s) known to the State of California to cause cancer and/or to cause birth defects or other reproductive harm.





### Special Regulations

| Component                               | States |
|---|--------|
| Petroleum distillate hydrotreated light | None   |

### International Regulations

#### Canada

WHMIS Classification: N/A

Controlled Product Regulations (CPR): N/A

## Section 16. Other Information

### HMIS Hazard Rating

Health: 1  
Flammability: 1  
Physical Hazard: 0  
PPE: X

Notes: The PPE rating depends on circumstances of use. See Section 8 for recommended PPE.  
The Hazardous Material Information System (HMIS) is a voluntary, subjective alpha-numeric symbolic system for recommending hazard risk and personal protection equipment information. It is a subjective rating system based on the evaluator's understanding of the chemical associated risks. The end-user must determine if the code is appropriate for their use.

NSF: N/A

FDA: N/A

KOSHER: This product has not been evaluated for Kosher approval.

FIFRA: N/A

Other: None



## Abbreviations

| Abbreviation | Definition  |
|--------------|---|
| <            | Less Than   |
| >            | Greater Than  |
| ACGIH        | American Conference of Governmental Industrial Hygienists |
| EHS          | Environmental Health and Safety Dept                      |
| N/A          | Not Applicable  |
| N/D          | Not Determined  |
| N/E          | Not Established   |
| OSHA         | Occupational Health and Safety Dept                       |
| PEL          | Personal Exposure Limit                                   |
| STEL         | Short Term Exposure Limit                                 |
| TLV          | Threshold Limit Value                                     |
| TWA          | Time Weight Average                                       |
| UNK          | Unknown   |

Prepared by: Regulatory Affairs Department

## Disclaimer

Although the information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof, ChemTreat, Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will ChemTreat, Inc. be responsible for damages of any nature whatsoever resulting from the use or reliance upon information. No representation or warranties, either expressed or implied, of merchantability, fitness for a particular purpose, or of any other nature are made hereunder with respect to information or the product to which information refers.



July 11, 2011

Ms. Amy Daigneault  
Pretreatment Coordinator  
Lowell Regional Wastewater Utility  
451 First Street Boulevard  
Lowell, Massachusetts 01850

Re: Industrial Sewer User Permit Application  
Public Service of New Hampshire (PSNH)  
Bow, New Hampshire

Dear Ms. Daigneault:

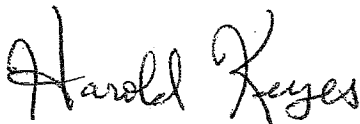
Based on your previous discussions with Mr. Ronald Breton (GZA GeoEnvironmental, Inc. [GZA]), our consulting engineer, PSNH is requesting that the City of Lowell (City) consider our request to accept treated wastewater from our flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the issuance of a permit and/or contract by the City outlining the terms of service and financial compensation, it is our intention to transport treated wastewater by tanker truck to the Lowell treatment facility seven days per week, over 24 hours each day.

As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are including post-treatment systems that can be used to reduce the volume of the treated waste stream from 70,000 gallons per day (gpd) to as small a volume as 5,000 gpd. These post-treatment systems are anticipated to be operational by January 1, 2012. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all the wastewater we generate, we recognize that there may be restrictions at your facility and that only a portion of the total discharge could be accepted. This scenario has been considered in our overall wastewater management strategy.

During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We trust that this submittal adequately address your informational needs. Should you have any questions, please contact Mr. Ronald Breton at 603-232-8744 or me at 603-224-4081 extension 4130.

Sincerely,



Harold Keyes, Station Manager  
PUBLIC SERVICE OF NEW HAMPSHIRE

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Attachment(s)

LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application

**{XI} Facility Site Plan:** *Submit a Facility Site Plan to the Utility* that depicts a building layout for the facility. Locate all manufacturing processes that generate industrial wastewater, all wastewater treatment processes, and all chemical / hazardous waste storage facilities. Include locations of all water supplies and all wastewater discharges. Number manufacturing processes and sewer outfalls to correlate with other information provided in this application.

**SEE DRAWING # MK-S-5605**

**{XII} Process Flow Diagram:** *Submit a Process Flow Diagram to the Utility* that illustrates the flow of industrial wastewater through the facility. Identify all manufacturing processes that generate industrial wastewater, and all wastewater treatment system components. Include component sizes and volumes, as well as system flow rates. Ensure that process flow inputs and outputs establish an accurate water balance for the facility.

**SEE DRAWING # 3977-3-001-B (FGD) and Figure 1 (WWTS)**

**{XIII} Authorized Signature List:** *Submit a Authorized Signature List to the Utility* that lists the Industry's designated employees who have the authority to sign the Chain of Custody Forms & our Industrial User Reports sent to the Lowell Regional Wastewater Utility. **SEE ATTACHMENT 1**

**{XIV} Permit Application Submittal:** All permit application submittals must include the following items:

1. *Permit Application* **Attached**
2. *Slug Control Plan* **A slug control plan is not required.**
3. *Baseline Monitoring Report* **A baseline monitoring report will be submitted upon system startup. However, an estimate of worst case wastewater characteristics has been included in Table 1.**
4. *Facility Site Plan* **Attached**
5. *Process Flow Diagram* **Attached**
6. *Authorized Signature list* **Attached as Attachment 1**
7. *\$50 Permit Application Fee* **Attached**

Submit to:

Pretreatment Coordinator  
Lowell Regional Wastewater Utility  
451 First Street Boulevard  
Lowell, MA 01850

**{XV} Certification:** An authorized representative of the facility shall sign below to indicate that all information provided herein is accurate and complete. The person who signs this application will be deemed the signatory authority for the facility.

Harold Keyes

Printed Name of Authorized Representative

Station Manager

Title

Harold Keyes

Signature of Authorized Representative

4/11/2011

Date

**LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application**

**{I} Facility Information:** Provide information for the facility.

Date: July 7, 2011

|                                 |  |  |                 |
|---------------------------------|--|--|-----------------|
| Company Name                    | PSNH   | Industrial Sewer User Permit No.       |                 |
| Facility Address                | 97 River Road, Bow NH 03304  |  |                 |
| Business Description            | Electric Utility   |  |                 |
| Operations Schedule             | 24/7/365   | Initial Discharge Date                 | 10/15/11        |
| Visitor's Safety Equipment      | Hardhat, safety glasses, hearing protection and protective footwear (i.e., steel-toed shoes) | Number of Employees                    | 115             |
| Categorical Industrial User No. | 40 CFR 423   | Standard Industrial Classification No. | 4911            |
| Authorized Representative       | Harold Keyes   | Title                                  | Station Manager |
| Telephone                       | (603) 224-4081   | Email                                  | keyeshe@nu.com  |
| Secondary Contact               | Allan Palmer   | Title                                  | Senior Engineer |
| Telephone                       | (603) 634-2439   | Email                                  | palmeag@nu.com  |

**{II} Environmental Permits:** List permit number for all applicable categories.

|                   |   |                     |  |
|-------------------|---|---------------------|--|
| Storm Water       | NH0001465   | NPDES               | NH0001465  |
| Hazardous Waste   | DES-HW-LP-06-22<br>TP-008, FP-T-0054, TP-B-0462TP-B-0490,<br>PO-B-1788, PO-BP-2416, PO-BP-2417, PO-<br>B-0034, PO-B-0035, TV-AR-01, TV-AR-<br>0055, TP-0068 | Status (Check One): | <input type="checkbox"/> VSQG <input type="checkbox"/> SQG <input checked="" type="checkbox"/> LQG |
| Air Quality       |   | Recycling           |  |
| Flammable Storage |   | Other               | DPHS-SW-85-012, GWP-19840065-B-004,<br>11-026610   |

**{III} Facility Water Usage:** Describe all water usage, indicating water source, destination, and flow rates. Identify average flow rates (Gallons Per Day) based on historical and/or estimated water usage.

|                       |                                       |   |                       |
|-----------------------|---------------------------------------|---|-----------------------|
| Water Source (check): | <input type="checkbox"/> Private Well | <input type="checkbox"/> Public Supply (Specify): | Other: X <sup>1</sup> |
|-----------------------|---------------------------------------|---|-----------------------|

| Water Usage         | Source (Private/Public) | Destination (Sewer/Specify Other)          | Flow Rate (GPD) | Estimate (GPD) |
|---------------------|-------------------------|--|-----------------|----------------|
| Process             |                         |  |                 |                |
| Cleaning            |                         |  |                 |                |
| Non-Contact Cooling |                         |  |                 |                |
| Contact Cooling     |                         |  |                 |                |
| Boiler              |                         |  |                 |                |
| Sanitary            |                         |  |                 |                |
| Product             |                         |  |                 |                |
| Reclamation         |                         |  |                 |                |
| Air Scrubber        | Private <sup>1</sup>    | Proposed to be hauled to POTW <sup>2</sup> | Up to 70,000    | Up to 70,000   |
| Evaporation         |                         |  |                 |                |
| Irrigation          |                         |  |                 |                |

Total Facility Water Usage = N/A

- (1) On-site treatment pond (reuse of treated waste water). Original source is principally river water (Merrimack River).
- (2) The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year and generate up to 70,000 gpd on a continuous basis. However, volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system. The wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

**LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application**

**{IV} Manufacturing Processes:** Provide a general description of the facility's manufacturing process. Describe and number manufacturing processes (e.g. Process 001) that generate industrial wastewater. List Process Summary (s) Contaminants, and Wastewater generated (Gallons Per Day).

**General Description of the Manufacturing Processes:**

PSNH's Merrimack Station is a coal-fired power generating facility. Wastewater source is treated wastewater from a flue gas desulfurization (FGD) system.

| Process No. | Manufacturing Process        | Process Summary  | Contaminants | Wastewater (GPD) |
|-------------|------------------------------|--|--------------|------------------|
| 01          | Air pollution control device | A limestone (CaCO <sub>3</sub> ) slurry is utilized to precipitate Ca <sub>2</sub> SO <sub>4</sub> .<br>See Drawing # 3977-3-001-B | See Table 1  | Up to 70,000     |
|             |                              |  |              |                  |
|             |                              |  |              |                  |
|             |                              |  |              |                  |
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|             |                              |  |              |                  |
|             |                              |  |              |                  |

*(Use additional paper to describe processes if necessary)*

**LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application**

**{V} Wastewater Treatment System:** Provide a general description of the wastewater treatment system. Describe all unit processes that treat industrial wastewater, including chemical additions, contaminants removed and flow rates (Gallons Per Day). List all treatment processes according to flow pattern and indicate whether process is Batch [B] or Continuous [C]. For batch processes, indicate the number of batches per day (e.g. 2B = two batches per day).

**General Treatment System Description:**

The wastewater treatment system is designed to remove metals and other pollutants using advanced chemical / physical treatment.

| [B/C] | Unit Process                        | Chemical Additions                            | Contaminants Removed                             | Flow Rate (GPD)             |
|-------|-------------------------------------|---|--|-----------------------------|
| C     | Reaction tank 1                     | Hydrated lime, organo sulfide                 | N/A  | Up to 100,000               |
| C     | Reaction tank 2                     | Ferric chloride                               | N/A  | Up to 100,000               |
| C     | Solids contact clarifier            | Polymer                                       | Calcium sulfate, TSS, hardness, metal hydroxides | Up to 100,000               |
| C     | Continuous backwash gravity filters | Hydrochloric acid (dosed prior to filtration) | TSS  | Up to 100,000               |
| C     | Falling Film Evaporator             | Anitscalant, Antifoam, Acid / Base            | N/A (volume reduction)                           | As low as 15,400 (effluent) |
| C     | Crystallizer                        | Antifoam                                      | N/A (volume reduction)                           | As low as 4,600 (effluent)  |
|       |                                     |   |  |                             |
|       |                                     |   |  |                             |
|       |                                     |   |  |                             |
|       |                                     |   |  |                             |
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|       |                                     |   |  |                             |
|       |                                     |   |  |                             |
|       |                                     |   |  |                             |
|       |                                     |   |  |                             |

*(Use additional paper to describe processes if necessary)*



**LOWELL REGIONAL WASTEWATER UTILITY**  
**Industrial Sewer User Permit Application**

**{VI} Wastewater Treatment Operators and/or Authorized Representatives:** Provide information for all State-certified operators and/or authorized representatives, including title, typical work shift hours, license number, and license grade.

| Name           | Title                            | Shift Hours  | License Number | Grade |
|----------------|----------------------------------|--------------|----------------|-------|
| Arthur Auclair | Senior Environmental Coordinator | 9am – 5:30pm | N/A            | N/A   |
| Dave Fradette  | Maintenance Supervisor           | 7am – 3:30pm | N/A            | N/A   |
| Paul Raichle   | Operations Manager               | 7am – 3:30pm | N/A            | N/A   |
| Ken Kroh       | Working Foreman-Chemical Analyst | 7am – 3:30pm | N/A            | N/A   |

**NOTE: Industrial wastewater treatment system operator license not required in NH**

**{VII} Sampling Site Monitoring Equipment:** Number all sampling sites (e.g. Site 001) and provide a brief description of their locations. Describe all monitoring equipment, including the make/model of equipment and the frequency of calibration.

| Site No. | Sample Site Description         | Flow Meter | pH Meter |
|----------|---------------------------------|------------|----------|
| 001      | Treated Wastewater Storage Tank | See note   | See note |
|          |                                 |            |          |
|          |                                 |            |          |
|          |                                 |            |          |

**NOTE: PSNH will provide this monitoring equipment at the site of generation as required.**

**{VIII} Sewer Discharges:** Describe each sewer outfall (size/location) and list all discharges to each outfall. Number each connection to correlate with sampling sites described above (e.g. Outfall No. 001). Include discharges from the treatment system, as well as other usages (e.g. sanitary, boiler). Specify whether discharge is Batch [B] or Continuous [C] and include flow rates (Gallons Per Day). For batch discharges, indicate the number of batches per day (e.g. 2B = two batches per day).

| Outfall No. | Sewer Connection (Size/Location) | [B/C] | Wastewater Discharge (Treatment System/Specify Other) | Discharge Rate (GPD) |
|-------------|----------------------------------|-------|---|----------------------|
| N/A         |                                  |       |   |                      |
|             |                                  |       |   |                      |
|             |                                  |       |   |                      |

*(Use additional paper to describe discharges if necessary)*

Total Sewer Discharge =   N/A  

**NOTE: PSNH is not connected to the POTW via sewer lines. The proposed discharge will arrive to the POTW via tanker truck.**

**LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application**

**{IX} Chemical & Hazardous Waste Storage:** Describe all storage of chemicals and hazardous waste, including chemicals stored, storage container types, spill control measures (e.g. secondary containment, spill response equipment), floor drains, and accumulation / consumption rates. Indicate the occurrence of slug releases in the past five years and existence of an updated Slug Control Plan \*. Submit a Slug Control Plan to the Utility and make the plan available for implementation at the facility.

|                          |   |
|--------------------------|---|
| <input type="checkbox"/> | <b>Check box to indicate NO slug release / spill of chemicals or hazardous waste in previous five years</b> |
| <input type="checkbox"/> | <b>Check box to indicate a written Slug Control Plan is prepared and available for implementation</b>       |

\* The Slug Control Plan must contain, at a minimum, a description of all discharge practices, a description of all chemical storage, a facility site plan indicating the locations of all chemical / hazardous waste storage facilities, a protocol for notifying the Utility of a slug release, a description of spill control measures, and a certification statement attesting to the implementation of the plan.

**N/A because facility is not connected to POTW via sewer lines. All wastewater will be transported in tanker trucks.**

| Storage Site | Chemicals / Waste Stored | Container Type | Spill Control Measures | Destination Of Drains | Accumulation / Consumption Rate |
|--------------|--------------------------|----------------|------------------------|-----------------------|---------------------------------|
| N/A          |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |
|              |                          |                |                        |                       |                                 |

**{X} Baseline Monitoring Report:** Sample all industrial wastewater discharges from the facility. Submit a Baseline Monitoring Report (BMR)\*\* to the Utility that includes analytical results for the following parameters.

\*\* The BMR must contain a description of sample collection methods (including a description of all sample sites), a Utility self-monitoring report sheet that summarizes the analytical results, all chains of custody documenting the transport of samples, and the analytical results from a state-certified laboratory. Refer to **Standard Methods** for the proper collection and analysis of samples.

|           |              |             |          |              |           |
|-----------|--------------|-------------|----------|--------------|-----------|
| Flow      | pH           | BOD         | COD      | TOC*         | TSS       |
| TTO's *** | Aluminum     | Antimony    | Arsenic  | Barium       | Beryllium |
| Cadmium   | Chromium (T) | Copper      | Cyanide  | Fluoride     | Lead      |
| Mercury   | Molybdenum   | Nickel      | Nitrogen | Oil & Grease | Phenols   |
| Selenium  | Silver       | Temperature | Thallium | Zinc         |           |

\*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 (Total Toxic Organics) = Summation of all quantifiable values greater than 0.01 mg/L for toxic organics listed in 40 CFR 413.02(i). 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 624, and 625, respectively.

**See attached Table 1.** The system has not yet reached operational status. Therefore, values have been provided by the treatment system design team and station operator. A baseline monitoring report will be submitted upon system startup.

LOWELL REGIONAL WASTEWATER UTILITY  
Industrial Sewer User Permit Application

**{XI} Facility Site Plan:** Submit a Facility Site Plan to the Utility that depicts a building layout for the facility. Locate all manufacturing processes that generate industrial wastewater, all wastewater treatment processes, and all chemical / hazardous waste storage facilities. Include locations of all water supplies and all wastewater discharges. Number manufacturing processes and sewer outfalls to correlate with other information provided in this application.

**SEE DRAWING # MK-S-5605**

**{XII} Process Flow Diagram:** Submit a Process Flow Diagram to the Utility that illustrates the flow of industrial wastewater through the facility. Identify all manufacturing processes that generate industrial wastewater, and all wastewater treatment system components. Include component sizes and volumes, as well as system flow rates. Ensure that process flow inputs and outputs establish an accurate water balance for the facility.

**SEE DRAWING # 3977-3-001-B (FGD) and Figure 1 (WWTS)**

**{XIII} Authorized Signature List:** Submit a Authorized Signature List to the Utility that lists the Industry's designated employees who have the authority to sign the Chain of Custody Forms & our Industrial User Reports sent to the Lowell Regional Wastewater Utility. **SEE ATTACHMENT 1**

**{XIV} Permit Application Submittal:** All permit application submittals must include the following items:

1. *Permit Application* **Attached**
2. *Slug Control Plan* **A slug control plan is not required.**
3. *Baseline Monitoring Report* **A baseline monitoring report will be submitted upon system startup. However, an estimate of worst case wastewater characteristics has been included in Table 1.**
4. *Facility Site Plan* **Attached**
5. *Process Flow Diagram* **Attached**
6. *Authorized Signature list* **Attached as Attachment 1**
7. *\$50 Permit Application Fee* **Attached**

Submit to:

Pretreatment Coordinator  
Lowell Regional Wastewater Utility  
451 First Street Boulevard  
Lowell, MA 01850

**{XV} Certification:** An authorized representative of the facility shall sign below to indicate that all information provided herein is accurate and complete. The person who signs this application will be deemed the signatory authority for the facility.

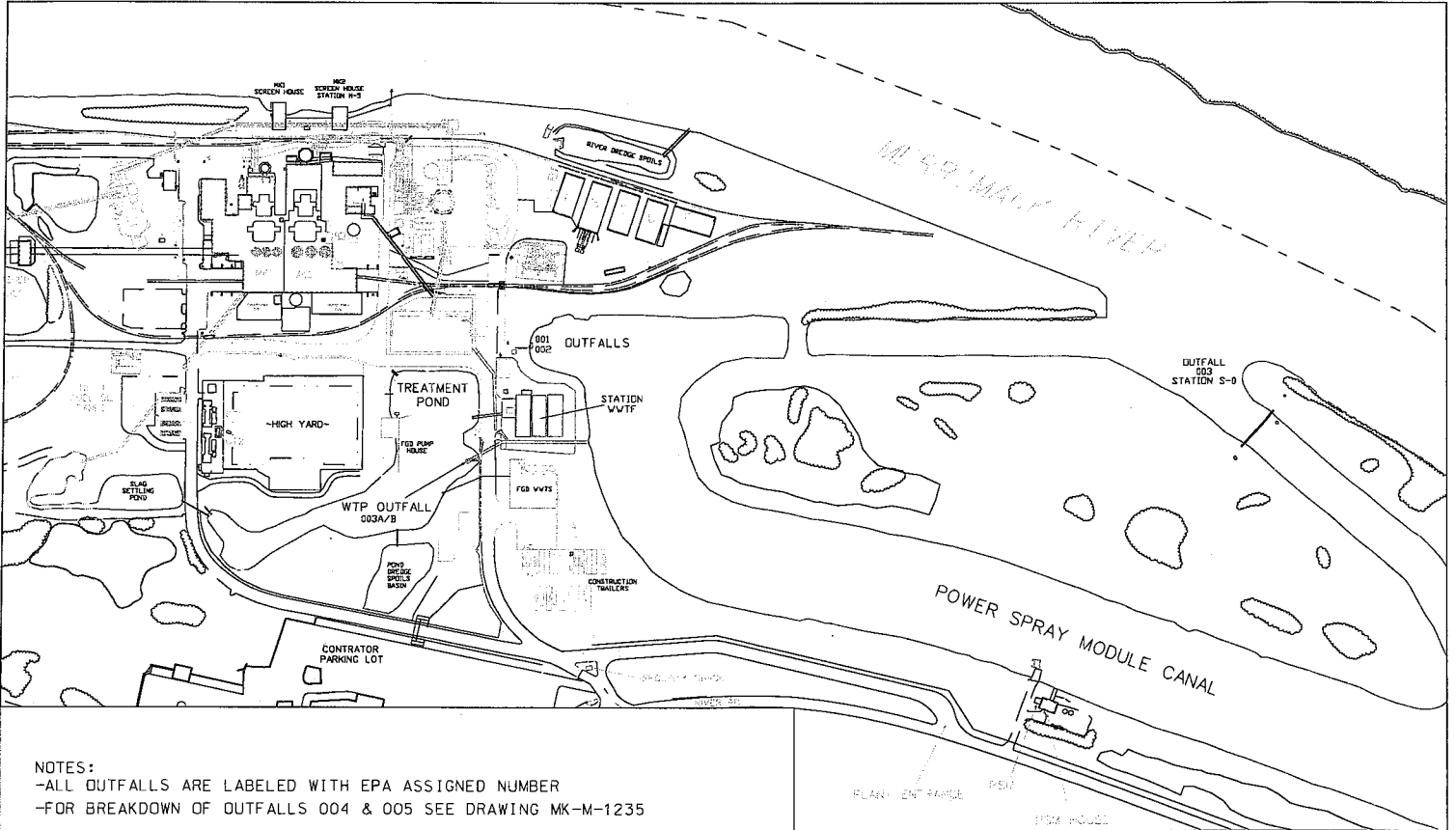
\_\_\_\_\_  
Printed Name of Authorized Representative

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date

## **FIGURES**

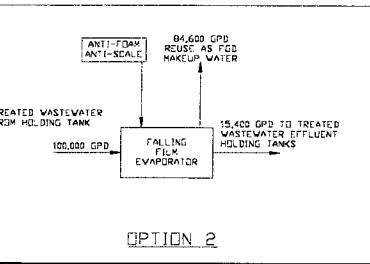
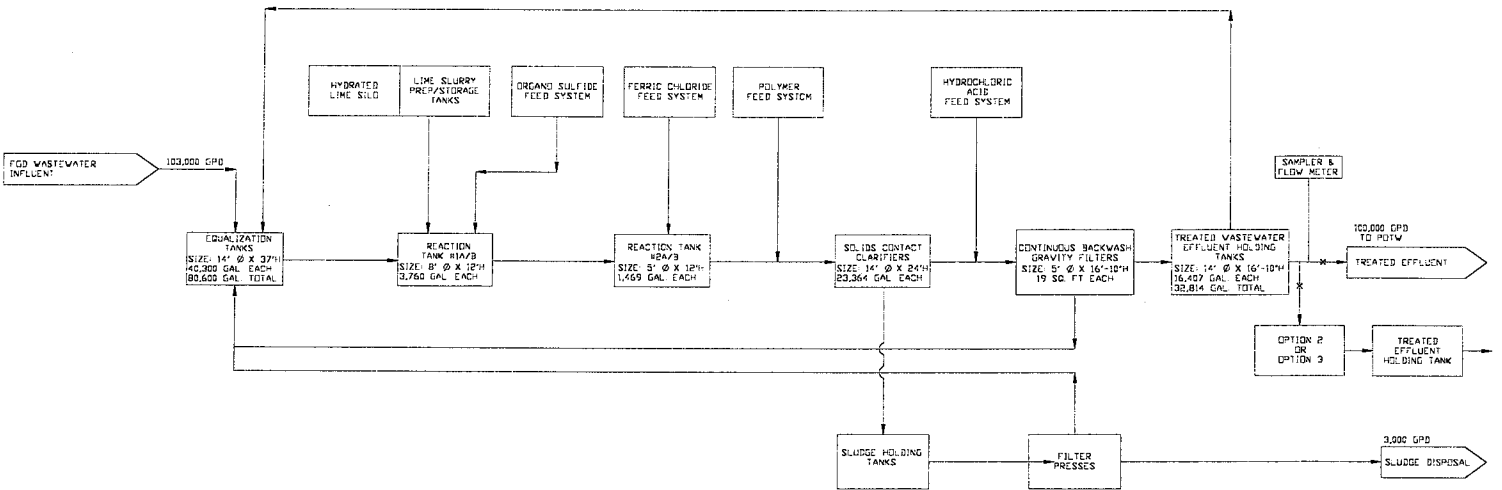


NOTES:  
 -ALL OUTFALLS ARE LABELED WITH EPA ASSIGNED NUMBER  
 -FOR BREAKDOWN OF OUTFALLS 004 & 005 SEE DRAWING MK-M-1235

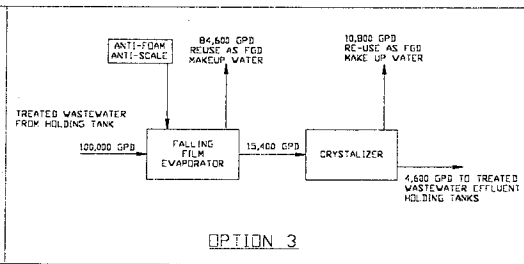
|  |  |                            |
|--|--|----------------------------|
| Public Service<br>of New Hampshire         |  | PROJECT #<br>1001-1000     |
| NEW MERRIMACK STATION<br>WASTE WATER PLANT |  | DRAWING #<br>MK-M-1235     |
| DATE<br>10/15/00                           |  | SCALE<br>AS SHOWN          |
| DRAWN BY<br>J. M. [unreadable]             |  | CHECKED BY<br>[unreadable] |
| APPROVED BY<br>[unreadable]                |  | DATE<br>10/15/00           |

NOTE:  
 1. THE WASTEWATER SYSTEM CAN OPERATE TWO TREATMENT TRAINS IN PARALLEL.  
 2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

OPTION 1



OPTION 2



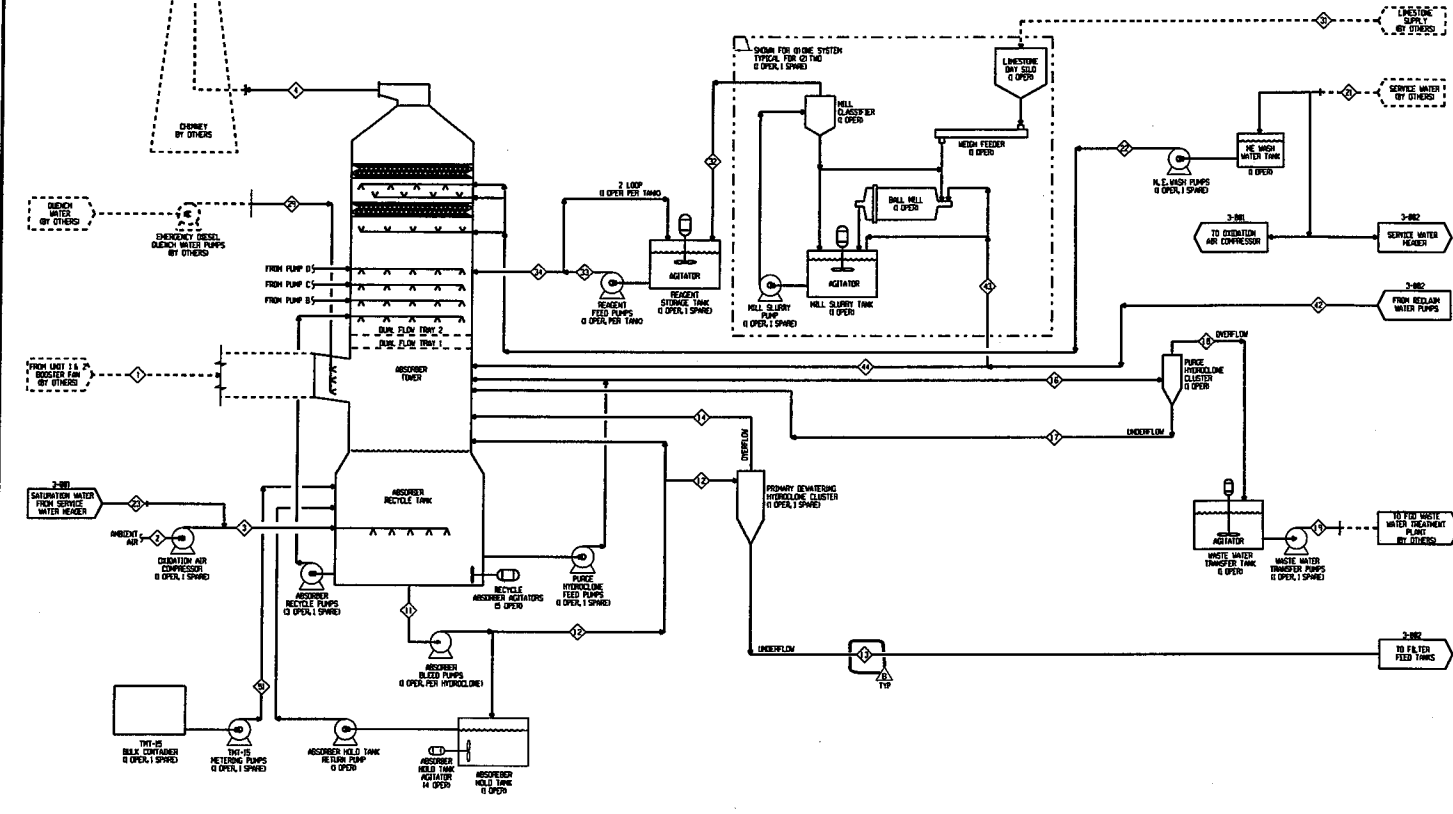
OPTION 3

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE  
 REQUEST APPLICATION  
 PSNH  
 BOW, NEW HAMPSHIRE  
 WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

|  |  |   |           |
|--|--|---|-----------|
| PREPARED BY: GZA GeoEnvironmental, Inc.<br>Engineers and Scientists<br>10000 Highway 101<br>Suite 200<br>Bow, NH 03043 |  | PREPARED FOR:<br>PUBLIC SERVICE OF<br>NEW HAMPSHIRE |           |
| PROJECT NO.: 04.0029307.00<br>DATE: JUNE 2011  | DRAWN BY: JPS<br>CHECKED BY: JPS<br>SCALE: NTS | REVISION NO.:<br>SHEET NO.: 2                       | FIGURE: 2 |

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100-E-776E



| NO. | REVISION     | DATE     | NO. | REVISION | DATE | NO. | REVISION | DATE | NOTE  |
|-----|--------------|----------|-----|----------|------|-----|----------|------|---|
| 1   | ISSUE        | 12-28-81 |     |          |      |     |          |      | FABRICATION, MANUFACTURING, OR DETAILING MAY PROCEED ONLY WHEN DRAWING IS ISSUED OR AUTHORIZED FOR SUCH PURPOSES.   |
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|             |      |
|-------------|------|
| DESIGNED BY | DATE |
| DRAWN BY    | DATE |
| CHECKED BY  | DATE |
| APPROVED BY | DATE |

PUBLIC SERVICE OF NEW HAMPSHIRE  
 MERRIMACK STATION UNITS 1&2  
 BOW, NEW HAMPSHIRE  
**PROCESS FLOW DIAGRAM**

**PRELIMINARY**

SIEMENS Power Generation, Inc  
 Environmental Systems & Services

3977-3-001

SCALE: B

h:\cont\act\3977 psh\86 engineering information\6.5 cad.drafting\6.5.2 spec drawings\39773001.DGN

**TABLE**



**LOWELL TABLE 1  
REPRESENTATIVE WASTEWATER CHARACTERISTICS**

PSNH

| METAL             | WASTE STREAM<br>CONCENTRATION AT<br>70,000 gpd<br>(mg/L) | MASS LOADING (lb/day)      |
|-------------------|--|----------------------------|
|                   |  | (FLOW: 4,000 - 70,000 gpd) |
| Aluminum          | 1  | 0.58                       |
| Antimony          | 0.48   | 0.28                       |
| Arsenic           | 0.02   | 0.01                       |
| Barium            | 4.8  | 2.80                       |
| Beryllium         | 0.1  | 0.06                       |
| Cadmium           | 0.05   | 0.03                       |
| Chromium          | 0.15   | 0.09                       |
| Copper            | 0.05   | 0.03                       |
| Iron              | 0.2  | 0.12                       |
| Lead              | 0.1  | 0.06                       |
| Manganese         | 1  | 0.58                       |
| Mercury           | 0.000014   | 0.000008                   |
| Nickel            | 1  | 0.58                       |
| Silver            | 0.05   | 0.03                       |
| Zinc              | 0.05   | 0.03                       |
| Selenium          | 3  | 1.75                       |
| Thallium          | 0.57   | 0.33                       |
| <i>Molybdenum</i> | <i>No Data</i>   | <i>No Data</i>             |
| <i>Cyanide</i>    | <i>&lt; 0.020</i>  | <i>BDL</i>                 |
| <i>Phenols</i>    | <i>&lt; 0.050</i>  | <i>BDL</i>                 |

| POLLUTANT      | CONCENTRATION (mg/L) |
|----------------|----------------------|
| Ammonia        | <50                  |
| Nitrate        | <50                  |
| Fluoride       | 118                  |
| <i>BOD</i>     | <i>BDL</i>           |
| <i>COD</i>     | <i>No Data</i>       |
| <i>TTO</i>     | <i>BDL</i>           |
| <i>O&amp;G</i> | <i>BDL</i>           |
| pH             | 6.0-8.0 SU           |
| <i>TOC</i>     | <i>BDL</i>           |
| TSS            | <30                  |
| Temperature    | < 104° F             |

NOTES:

1. lb/day means pounds per day, gpd means gallons per day, mg/L means milligrams per liter, BDL means anticipated below detection limit, SU means standard units.
2. Please note, steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably less than the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case wastewater characteristics. All mass loadings are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.

**ATTACHMENT 1**

**AUTHORIZED SIGNATURE LIST**

## MEMORANDUM:

TO: LRWWU - Pretreatment Department  
FROM: PSNH, Bow, New Hampshire  
DATE: July 8, 2011  
RE: Delegation of Signature Authority for Chain-of-Custody Forms and Industrial User Reports

I, Harold Keyes, Station Manager of PSNH, Bow, New Hampshire hereby authorize the following individuals to sign the Chain of Custody Forms and our Industrial User Reports to the Lowell Regional Wastewater Utility. Below are the present representatives that are allowed to sign documents on behalf of the company.

- Harold Keyes
- Allan Palmer
- Arthur Auclair
- Dave Fradette
- Ken Kroh
- William Smagula

Industrial User Reports shall include the following as described in 40 CFR 403.12, as well as similar reports required by Massachusetts State and local approved control authorities.

- Baseline Monitoring Reports 40 CFR 403.12 (b)
- Report on Compliance with Categorical Pretreatment Standard Deadline 40 CFR 403.12 (d)
- Periodic Reports on Continued Compliance 40 CFR 403.12 (E)

Signature & Title \_\_\_\_\_



**Public Service  
of New Hampshire**

PSNH Energy Park  
780 North Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire  
P.O. Box 330  
Manchester, NH 03105-0330  
(603) 669-4000  
www.psnh.com

May 11, 2011

The Northeast Utilities System

Mr. Bruce Kudrick  
Superintendent  
Town of Hooksett  
Wastewater Department  
1 Egawes Drive  
Hooksett, New Hampshire 03106

Re: NHDES Industrial Wastewater Indirect Discharge Request Application  
Public Service of New Hampshire (PSNH)

Dear Mr. Kudrick:

Based on your previous discussions with Allan Palmer of PSNH and Ron Breton of GZA GeoEnvironmental, Inc., our consulting engineer, PSNH is requesting that the Town of Hooksett consider our request to accept treated wastewater from our wet flue gas desulfurization system that is scheduled to become operational in the fourth quarter of this year. With the approval from the New Hampshire Department of Environmental Services (NHDES) and issuance of a permit and/or a contract outlining the terms of service and financial compensation by the City, it is our intention to transport treated wastewater by tanker truck from our power station in Bow to a designated discharge location in the Town's collection system.

As presented in our attached application, we are installing a technologically advanced wastewater treatment system. In addition, we are adding post-treatment systems that can be operated to reduce the volume of the treated wastestream from roughly 100,000 gallons per day (gpd) to as small a volume as 5,000 gpd. With these post-treatment systems, we will have the ability to reduce the volume of wastewater while maintaining concentrations of pollutants that are compatible with your treatment system. While our goal is to gain approval to discharge all of the wastewater we generate at your facility, we recognize that there may be restrictions and that only a portion of the total discharge may be accepted. This scenario has been considered in our overall wastewater management strategy.

During the course of performing your evaluation process, GZA and PSNH will be available to provide additional information and technical support.

We have also forwarded a copy of the NHDES Industrial Wastewater Indirect Discharge Request Application directly to Mr. George Carlson along with the required design review fee of \$1,000.00.



NH DES WATER DIVISION  
 29 Hazen Drive - PO Box 95  
 CONCORD, NEW HAMPSHIRE 03302-0095  
 (603)271-3908 FAX (603)271-4128



**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION**

**PART I. MUNICIPAL**

The Town/City of Hooksett proposes:

To discharge to its publicly owned treatment works the industrial flow from:

Applicant PSNH  
 (Name of Indirect Discharger)

New Discharge or **Modified Discharge**

**Flow: Average Process Wastewater Volume (gallons/day):**

|                           |         |
|---------------------------|---------|
| Previous Permitted Total: | 0       |
| <b>This Request:</b>      | 100,000 |
| <b>TOTAL:</b>             | 100,000 |

**CERTIFICATION:**

**“This proposal meets with the approval of all local authorities having jurisdiction over the request.”**

Name \_\_\_\_\_ Title \_\_\_\_\_  
 (Print or Type)

Signature: \_\_\_\_\_ Date \_\_\_\_\_  
 (Authorized Municipal Official)

Notes:

- ✧ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ✧ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ✧ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit

\* This value is the average daily process flow requested by the Applicant on Page 2

**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION**

**PART II. APPLICANT**

**(a) DISCHARGER NAME & ADDRESS**

|                         |   |
|-------------------------|---|
| <b>Name:</b>            | PSNH                                    |
| <b>Street Address:</b>  | 97 River Road, Bow, New Hampshire 03304 |
| <b>Mailing Address:</b> |   |

**(b) RESPONSIBLE OFFICIAL**

|                        |                 |
|------------------------|-----------------|
| <b>Official - Name</b> | Harold Keyes    |
| <b>Position:</b>       | Station Manager |
| <b>Phone #:</b>        | 603-224-4081    |
| <b>Contact - Name:</b> | Allan Palmer    |
| <b>Position:</b>       | Senior Engineer |
| <b>Phone #:</b>        | (603) 634-2439  |

**(c) INDUSTRY TYPE**

|                                  |                        |                        |      |
|----------------------------------|------------------------|------------------------|------|
| <b>Product(s) / Description:</b> | Electricity Generation |                        |      |
| <b>NAICS Code # (s):</b>         | 221112                 | <b>SIC Code # (s):</b> | 4911 |

**(d) SIU or CATEGORICAL STANDARDS  Yes  No**

|  |                    |                 |
|--|--------------------|-----------------|
| <b>CIU-Category(s) Name:</b>             | <b>40CFR Part:</b> | <b>Subpart:</b> |
| Steam Electric Power Generating Category | 423.16             |                 |
| <b>SIU Description:</b>                  |                    |                 |

**(e) FLOW INFORMATION:**

|                                      |                                   |                        |                      |                      |
|--------------------------------------|-----------------------------------|------------------------|----------------------|----------------------|
| <b>This IDR- Ave. Process (gpd):</b> | <b># of Connections to sewer:</b> | <b># of Employees:</b> | <b># of Shifts:</b>  |                      |
| ** 100,000                           | N/A                               | 115                    | 2 per day            |                      |
| <b>FLOW SUMMARY</b>                  | <b>Source</b>                     | <b>Average (gpd)</b>   | <b>Maximum (gpd)</b> | <b>Time/Duration</b> |
| <b>Previous</b>                      | Sanitary                          | 0                      | 0                    |                      |
|                                      | Process                           | 0                      | 0                    |                      |
|                                      | <b>TOTAL</b>                      | 0                      | 0                    |                      |
| <b>Change - This IDR:</b>            | Sanitary                          | 0                      | 0                    |                      |
|                                      | <b>Process</b>                    | * 100,000              | 100,000              | Batch                |
|                                      | <b>TOTAL</b>                      | 100,000                | 100,000              | Batch                |
| <b>TOTAL :</b>                       | Sanitary                          | 0                      | 0                    | 0                    |
|                                      | Process                           | 100,000                | 100,000              | Batch                |
|                                      | <b>TOTAL</b>                      | 100,000                | 100,000              | Batch                |

\* This value to match the value of "This Request" on Page 1

- \* No pretreatment standards listed for this particular process wastestream.

NOTE: The proposed FGD system will run continuously 24 hours per day, 7 days per week, 365 days per year and generate up to 100,000 gpd on a continuous basis. However, volume reduction steps can reduce the volume as necessary and actual discharge to the POTW is expected to be much less than the volume generated by the FGD system. The wastewater will be transported to the POTW in tanker trucks on a daily basis and discharged intermittently.

**NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION**

**(g) ENGINEER FOR TREATMENT SYSTEM PLANS & SPECS [ \$ 1,000 Review Fee]**

|                  |                            |
|------------------|----------------------------|
| <b>Engineer:</b> | Ronald A. Breton, P.E.     |
| <b>Company:</b>  | GZA GeoEnvironmental, Inc. |
| <b>NH P.E. #</b> | 5956                       |

**ATTACHMENTS Check List**

|  | Attached                            | Remarks/Explanation             |
|--|-------------------------------------|---------------------------------|
| <b>(f) TREATMENT PROCESS SCHEMATIC</b>             | <input checked="" type="checkbox"/> | See Figure 2                    |
| <b>(g) PLANS, SPECS, O&amp;M PROCEDURES</b>        | <input checked="" type="checkbox"/> | See Attachment 1                |
| <b>(h) PRODUCTION PROCESS DIAGRAM</b>              | <input checked="" type="checkbox"/> | See Drawing Number 3977-3-001-B |
| <b>(i) WASTE STREAM POLLUTANTS LIST</b>            | <input checked="" type="checkbox"/> | See Table 1                     |
| <b>(j) TOXICITY/TREATABILITY INFO.</b>             | <input checked="" type="checkbox"/> | See Attachment 2                |
| <b>(k) LOCATION MAP</b>                            | <input checked="" type="checkbox"/> | See Figure 1                    |
| <b>(l) CHEMICAL LIST</b>                           | <input checked="" type="checkbox"/> | See Table 2                     |
| <b>(m) SAMPLING LOCATION</b>                       | <input checked="" type="checkbox"/> | See Figure 2                    |
| <b>(n) H<sub>2</sub>O REDUCTION / P2 NARRATIVE</b> | <input checked="" type="checkbox"/> | See Attachment 3                |
| <b>(o) ENVIRONMENTAL PERMITS LIST</b>              | <input checked="" type="checkbox"/> | See Attachment 4                |

**CERTIFICATION : (b)**

**"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."**

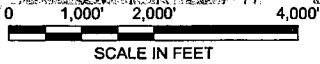
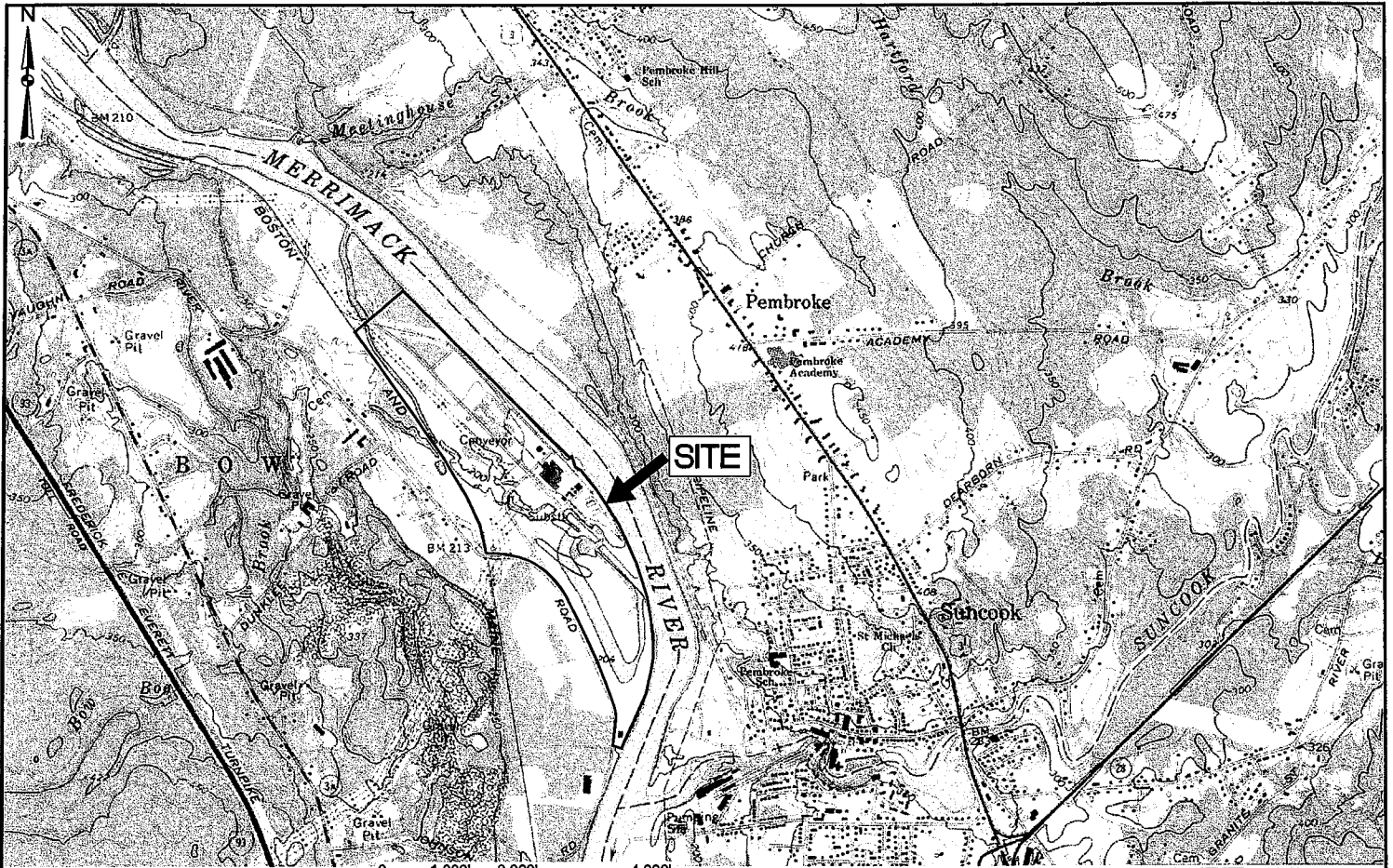
Name Harold Keyes Title Station Manager  
(Print or Type)

Signature: \_\_\_\_\_ Date \_\_\_\_\_  
(Indirect Discharger Official)

- Notes:
- ◆ Please attach additional pages as needed.
  - ◆ Information not designated with shading is requested but optional.

**FIGURES**





PREPARED BY:  **GZA GeoEnvironmental, Inc.**  
Engineers and Scientists  
380 HARVEY ROAD  
MANCHESTER, NEW HAMPSHIRE 03103  
(603) 523-2000

PREPARED FOR:  
PUBLIC SERVICE OF NEW HAMPSHIRE

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION  
97 RIVER ROAD  
MERRIMACK STATION  
BOW, NEW HAMPSHIRE

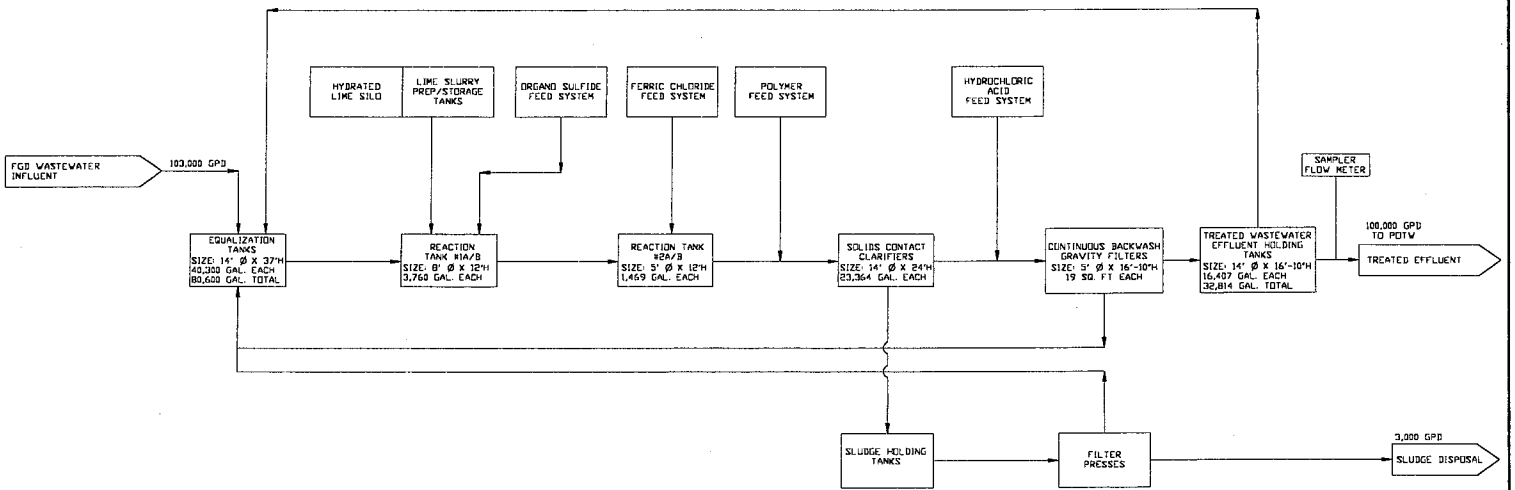
| NO. |  | ISSUE/DESCRIPTION  | BY | DATE                      |
|-----|--|--------------------|----|---------------------------|
|     |  | PROJ MGR: RAB      |    | DATE: MARCH 2011          |
|     |  | DESIGNED BY: PTP   |    | PROJECT NO. 04.0029307.00 |
|     |  | REVIEWED BY: KDB   |    | REVISION NO.              |
|     |  | DRAWN BY: JPN      |    | SHEET NO.                 |
|     |  | CHECKED BY: RAB    |    |                           |
|     |  | SCALE: 1" = 2,000' |    |                           |

LOCUS PLAN

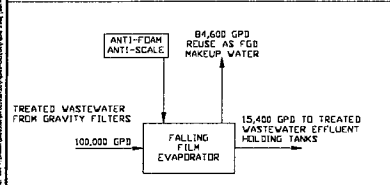
FIGURE  
1

NOTE:  
 1. THE WASTEWATER SYSTEM OPERATES TWO TREATMENT TRAINS IN PARALLEL.  
 2. THE TREATMENT SYSTEM INCLUDES TWO VOLUME REDUCTION UNIT PROCESSES WHICH CAN RECEIVE FLOW AT THE DISCRETION OF THE OPERATOR. THESE ARE LOCATED BETWEEN THE FINAL TREATED WASTEWATER HOLDING TANKS AND THE GRAVITY FILTERS. POSSIBLE FLOW SCENARIOS ARE LABELED OPTION 1, OPTION 2, AND OPTION 3.

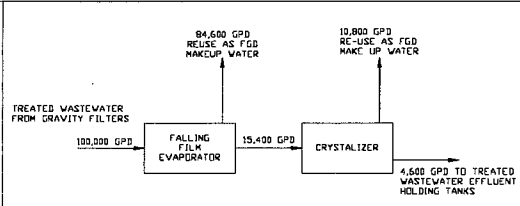
OPTION 1



OPTION 2



OPTION 3

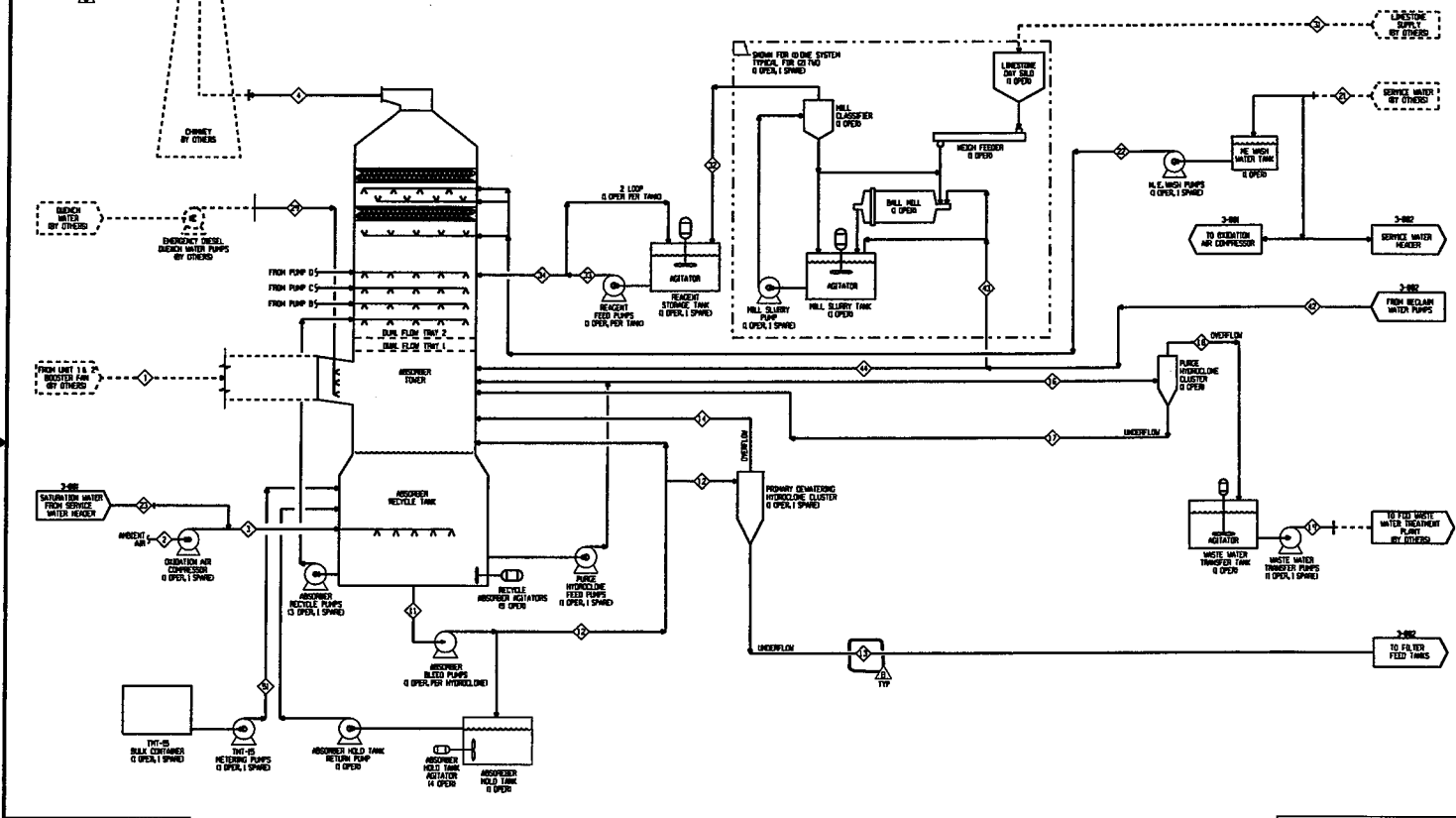


INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION  
 PSNH  
 BOW, NEW HAMPSHIRE  
 WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

|   |   |
|---|---|
| PREPARED BY:<br>GZA GeoEnvironmental, Inc.<br>ENGINEERS AND SCIENTISTS<br>10000 RIVER ROAD<br>SUITE 200<br>BOSTON, MA 02116 | PREPARED FOR:<br>PUBLIC SERVICE OF<br>NEW HAMPSHIRE |
| PREPARED BY: JEB<br>CHECKED BY: JEB<br>DATE: MAY 2011   | FIGURE NO.: 2<br>SHEET NO.:                         |

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100-C-2268



**PRELIMINARY**

| NO.                  | DATE     | REVISION | BY | CHKD. | DATE | NOTE   | DESIGNED BY | CHECKED BY | DATE | PROJECT  | SCALE      | SHEET NO. | TOTAL SHEETS |
|----------------------|----------|----------|----|-------|------|--|-------------|------------|------|--|------------|-----------|--------------|
| 1                    | 11-28-84 |          |    |       |      | MANUFACTURING, OR DETAILING MAY PROCEED ONLY WHEN DRAWING IS ISSUED OR AUTHORIZED FOR SUCH PURPOSES.   |             |            |      | PUBLIC SERVICE OF NEW HAMPSHIRE<br>MERRIMACK STATION UNITS 3A2<br>BOW, NEW HAMPSHIRE |            |           |              |
| 2                    | 11-28-84 |          |    |       |      | This sheet and all information thereon is the property of P.S.E. It is loaned to you for the project indicated and is not to be used for any other purpose. It is to be returned to the originator upon completion of the project. |             |            |      | SIEMENS Power Generation, Inc.<br>Environmental Systems & Services                   |            |           |              |
| PROCESS FLOW DIAGRAM |          |          |    |       |      |  |             |            |      |  | 3977-3-001 | B         |              |

## TABLES

**TABLE 1  
REPRESENTATIVE WASTEWATER CHARACTERISTICS**

PSNH

FLOW: 4,000 - 100,000 gpd

| METAL             | MASS LOADING<br>(lb/day) |
|-------------------|--------------------------|
| Aluminum          | 0.83                     |
| Antimony          | 0.40                     |
| Arsenic           | 0.02                     |
| Barium            | 4.01                     |
| Beryllium         | 0.08                     |
| Cadmium           | 0.04                     |
| Chromium          | 0.13                     |
| Copper            | 0.04                     |
| Iron              | 0.17                     |
| Lead              | 0.08                     |
| Manganese         | 0.83                     |
| Mercury           | 0.000012                 |
| Nickel            | 0.83                     |
| Silver            | 0.04                     |
| Zinc              | 0.04                     |
| Selenium          | 2.50                     |
| Thallium          | 0.48                     |
| <i>Molybdenum</i> | <i>No Data</i>           |
| <i>Cyanide</i>    | <i>BDL</i>               |
| <i>Phenols</i>    | <i>BDL</i>               |

| POLLUTANT      | CONCENTRATION<br>(mg/L) |
|----------------|-------------------------|
| Nitrogen       | <i>No Data</i>          |
| Fluoride       | 118                     |
| <i>BOD</i>     | <i>BDL</i>              |
| <i>COD</i>     | <i>No Data</i>          |
| <i>TTO</i>     | <i>BDL</i>              |
| <i>O&amp;G</i> | <i>BDL</i>              |
| TEMPERATURE    | < 104° F                |

**NOTE:**

1. lb/day means pounds per day, gpd means gallons per day, BDL means below detection limit.
2. Please note, steps in volume reduction can concentrate the waste stream as necessary. The concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.
3. It should be noted that the anticipated selenium mass value of the treated physical-chemical WWTS effluent is expected to be considerably less than the contracted guarantee concentration of 9 mg/L. The value presented in the table represents best professional engineering judgment at this time.
4. The values above represent an estimation of the absolute worst case waste water characteristics. All mass loadings are expected to be lower. Since the proposed system is not yet operational, data has been provided by the treatment system design team with the exception of the italicized values, which were provided by the station operator.

**TABLE 2**  
**CHEMICAL INVENTORY**

PSNH Merrimack Station  
Bow, New Hampshire

| REFERENCE # | RAW MATERIALS           | AMOUNT USED PER YEAR |
|-------------|-------------------------|----------------------|
| 1           | Ferric chloride         | 7614 lbs             |
| 2           | Hydrochloric acid (32%) | 282,800 lbs          |
| 3           | Sodium Hydroxide (50%)  | 683,282 lbs          |
| 4           | Antifoam 1430           | 7,008 lbs            |
| 5           | Antiscalant             | 2,628 lbs            |
| 6           | Organosulfide           | 1522 lbs             |
| 7           | Polymer                 | 761 lbs              |
| 8           | TMT 15                  | 219 tons             |
| 9           | Limestone               | 152,000 tons         |

Note:

1. Values have been estimated by PSNH's treatment system design team.
2. It is not expected that significant amounts of chemicals will discharge to the sewer.

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**ATTACHMENT 1**

**PLANS, SPECS, O&M PROCEDURES**

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**PLANS, SPECS, O&M PROCEDURES**

**ATTACHMENT 1**

The proposed WWTS represents a modification to the facility which will minimize the impact on air quality and water. The conceptual design and treatment chemistry were developed by PSNH's current treatment design team. Engineering design review and permitting services were provided by GZA. **FIGURE 1** depicts the WWTS process flow and unit process details for the proposed treatment system.

**Wastewater Treatment System Description**

**Provided by Treatment System Design Team in Philosophy/Sequence of Operation Revision 2, August 2, 2010**

The FGD purge stream is unsuitable for reuse by other power plant facilities, and therefore must be treated separately and discharged. The characteristics of this wastewater stream require extensive treatment. A dedicated FGD wastewater treatment system offered for this application consists of two major sub-systems:

- Physical-Chemical Treatment; and
- Sludge Handling/Dewatering System.

The FGD purge stream is initially directed to the two 50 percent (%) equalization tanks (each has 50% of the total specified storage capacity) to partially attenuate any chemical or hydraulic fluctuations resulting from the FGD operations. In addition, the equalization tanks can receive flow from the treated wastewater effluent pumps and filtrate sump pumps, which consists of filtrate from the filter presses, backwash reject, building trench drains and tank overflow.

At a fairly constant rate, flow from the two 50% equalization tanks shall be pumped to the two 100% capacity reaction tanks (No. 1A and 1B). The wastewater will cascade by gravity through two 100% capacity reaction tanks (No. 2A and 2B), on to the two 100% capacity solids contact clarifiers (No. A and B), then to the two 100% capacity gravity filters and on to the two 50% capacity treated wastewater effluent tanks.

Reaction tanks No. 1A and 1B are chemical conditioning tanks where pH adjustment/gypsum "desaturation" is conducted. In the pH adjustment/gypsum "desaturation" phase, hydrated lime is added to elevate the pH to between 8.5 and 9.2 to provide "desaturation" of gypsum from the wastewater which has a tendency to be supersaturated when received from the FGD process. If not brought to equilibrium, this supersaturation can result in gypsum scale formation in the downstream wastewater treatment plant equipment. In order to achieve the "desupersaturation" operation in a controlled fashion via a crystal growth mechanism, sludge is recycled from the downstream solids contact clarifier to provide seed crystals for gypsum nucleation. The desired solids concentration within the reaction tanks is 3% – 5% by weight. The pH is also elevated to aid in the precipitation of soluble metals as insoluble hydroxides and oxyhydroxides. This operating pH range has been selected to achieve optimal metals reduction while minimizing the formation of magnesium hydroxide which can occur at higher pH.



In addition, an organosulfide reagent is added to reaction tanks No. 1A and 1B to form organosulfide heavy metal complexes which have very low solubility products, thus resulting in maximum heavy metal removal. Of particular importance for this project is the removal of mercury.

In reaction tanks No. 2A and 2B, ferric chloride is added to form a dense floc and enhance the settling characteristics of the precipitate. Additionally, the hydrolyzed form of this coagulant provides precipitation sites for co-precipitation of other metals. Polymer shall be injected into the clarifier influent line in order to form a denser floc which in turn will enhance the settling characteristics.

Two 100% capacity solids contact clarifiers will be provided for clarifying the chemically conditioned waste stream.

Overflow from the solids contact clarifiers will flow by gravity to a standpipe. HCl is dosed into the wastewater to reduce the pH to approximately 6.5 to 7.0 SU. An in-line static mixer with a HCl injection port shall be provided ahead of the standpipe to enhance the chemical blending with the clarified effluent.

The pH adjusted clarifier effluent shall flow by gravity to the two 100% capacity continuous backwash gravity filters for further suspended solids reduction.

The filtered effluent from the continuous backwash gravity filters will flow by gravity to the two 50% treated wastewater effluent storage tanks and shall be subsequently conveyed to the point of discharge by the treated wastewater discharge pumps. During low flow conditions and/or if the treated wastewater is found to be out of compliance, the discharge pumps shall be used to recycle flow back to the equalization tanks for reprocessing.

Two volume reduction steps can be utilized to concentrate the waste stream as necessary. A Falling Film Evaporator will reduce the volume by up to 85% (1-10/65), from 100,000 gallons per day (gpd) to approximately 15,400 gpd. The volume of wastewater is reduced, concentrations of contaminants increase but the mass remains unchanged. Effluent from the Evaporator can be directed to a Crystallizer to reduce the volume by up to an additional 70% (1-3/10), from 15,400 gpd to approximately 4,600 gpd. It should be noted that the concentration of metals will change based on the degree of volume reduction. However, the mass loading of metals will not change.

Sludge from the solids contact clarifier is pumped via the sludge recycle/transfer pumps to the two 50% capacity sludge holding tanks. In addition, sludge is recycled to reaction tanks No. 1A and 1B. Dewatering is achieved by two 100% capacity recessed plate and frame filter presses. Filtrate from the dewatering operation, as well as any drain water from filter press drip trays, floor drains and floor trenches, is directed to the filtrate sump and pumped to the equalization tanks for subsequent treatment.

Overflows are routed to a floor trench collection system which discharges to the filtrate sump. Flows to the filtrate sump are recycled back to the equalization tank.

**ATTACHMENT 2**

**TOXICITY AND TREATABILITY INFORMATION**

**INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE**

**PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE**

**TOXICITY AND TREATABILITY INFORMATION**

**ATTACHMENT 2**

Federal standards applicable to all industrial wastewater discharges include a prohibition against discharges that cause or contribute to pass-through or interference. These limitations are related to the biodegradability of wastewater pollutants and toxicity to wastewater treatment system activated sludge microorganisms. Based on a review of the estimated wastewater treatment system effluent water quality and the MSDSs of materials used in the process, there is no evidence to suggest that the treated wastewater will adversely impact the performance of Municipality's POTW.

**ATTACHMENT 3**

**WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE**

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INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

PSNH  
97 RIVER ROAD  
BOW, NEW HAMPSHIRE

**WATER CONSERVATION / POLLUTION PREVENTION NARRATIVE**

**ATTACHMENT 3**

PSNH will continue to evaluate opportunities for implementing conservation/pollution prevention measures. The project currently proposed was designed for the purpose of pollution prevention. Makeup water for the scrubber is recycled wastewater from an on-site pond where nearly 1 million gallons are recycled daily. Treated wastewater from the proposed treatment system will be recycled and used as makeup water for the scrubber. PSNH will continue to evaluate options for on-site reuse of this treated waste stream.

**ATTACHMENT 4**

**ENVIRONMENTAL PERMITS LIST**

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST  
PROPOSED WASTEWATER TREATMENT SYSTEM DISCHARGE

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ENVIRONMENTAL PERMITS LIST

ATTACHMENT 4

- TP-008: Flue Gas Desulfurization Unit
- FP-T-0054: Electric Generating Unit #1
- TP-B-0462: Electric Generating Unit #2
- TP-B-0490: Emergency Boiler
- PO-B-1788: Emergency Generator #1
- PO-BP-2416: Primary Coal Crusher
- PO-BP-2417: Secondary Coal Crusher
- PO-B-0034: Combustion Turbine #1
- PO-B-0035: Combustion Turbine #2
- TV-AR-01: Title V Operating Permit
- TV-AR-0055: Proposed Title V Operating Permit
- TP-0068: Emergency Cooling Water Pump Engine
- DPHS-SW-85-012: Solid Waste Facility
- GWP-19840065-B-004: Ground Water Permit
- 11-026610: Permit to Operate Public Water System
- DES-HW-LP-06-22: Hazardous Waste Limited Permit
- NH0001465: National Pollutant Discharge Elimination System

NHDES Fact Sheet submitted to EPA,

October 4, 2010

Antigradation Analysis of the Merrimack River

in the vicinity of Merrimack Station



October 4, 2010

## ANTIDegradation

## FACT SHEET

# 209

PSNH is constructing a wet flue gas desulfurization (FDG) system at Merrimack Station to comply with New Hampshire State Law (HB 1673). This law requires that the station achieve a 90% reduction of air emissions of sulfur dioxide and an 80% reduction of air emissions of mercury by July 2013.

The FGD system scrubs the stack emissions with a slurry of limestone and water. The slurry is recirculated as much as possible to the stack. Spent slurry is sent to an absorber where it is converted to calcium sulfate (gypsum) and wastewater. The gypsum is recycled off site and a small portion of the wastewater that cannot be reused will be discharged to the ash settling basin. PSNH is constructing a new wastewater treatment system to treat the FGD wastewater prior to discharge to the ash settling basin.

The new discharge could affect the quality of the discharge of the ash settling basin (outfall 003A) to the cooling canal (outfall 003) which could in turn affect the quality of the Merrimack River. This new discharge prompted NHDES to conduct an antidegradation review to ensure that the provisions of Env-Wq 1708 are met. Further, the analysis will assist PSNH with the design of the new treatment system.

NHDES requires applicants for new or increased discharges to provide sampling of their discharge and of the river upstream of their discharge during low river flow conditions. This data is used to evaluate the resulting water quality of the river downstream of the discharge. By comparing the resulting downstream water quality with the surface water quality standards, the river's *available* remaining assimilative capacity, if any, is determined for each pollutant of concern. "Available" refers to the capacity to assimilate wastewater discharges after holding the required reserve of ten percent of the assimilative capacity pursuant to NH RSA 485-A:13, I(a) and Env-Wq 1705.01.

To determine the potential changes in water quality NHDES looked for data on existing FGD systems. Any parameters determined to be present in FGD wastewater is considered a pollutant of concern. NHDES reviewed the following information:

- EPA's Steam Electric Power Generating Point Source Category: Final Detailed Study Report, October 2009, EPA 821-R-09-008.
- Duke Energy Carolina LLC's Strategy and Initial Experience of FGD Waste Water Treatment Systems, Robert Wylie, et al, IWC-08-32
- Merrimack Station, FGD Wastewater Treatment System, WT Project 57001495, PSNH, Bow, New Hampshire, Siemens Water Technologies, Warrendale, PA, 15086, February 27, 2009
- Flue Gas Desulfurization Wastewater Treatment Primer, Thomas E. Higgins, PhD., P.E., et al, March 1, 2009, [http://www.powermag.com/issues/features/Flue-Gas-Desulfurization-Wastewater-Treatment-Primer\\_1739.html](http://www.powermag.com/issues/features/Flue-Gas-Desulfurization-Wastewater-Treatment-Primer_1739.html).
- Personal communication w/ Ronald Jordan, Engineering and Analysis Division, Office of Water, EPA, Washington, DC., May 20, 2009, 10:00 a.m.

The above information was used to determine the list of parameters that are likely to be present in the new discharge from the FGD wastewater treatment system and that PSNH should be

required to test for to establish baseline conditions in outfall 003A. The list includes the following parameters: aluminum, antimony, arsenic, beryllium, cadmium, chromium III, chromium VI, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, zinc, chlorides, ammonia (as N), and nitrates (as N).

In response to the NHDES request for information needed to conduct the antidegradation review, PSNH hired URS Corporation, Washington Division, of Princeton, NJ (URS) and Eastern Analytical, Inc. of Concord, NH (EAI). For certain pollutants of concern, with extremely low surface water quality standards criteria in Env-Wq 1703.21(b), EAI sent the samples they had collected using special "clean" sampling techniques to Frontier Geosciences, Inc. of Seattle, WA for trace metals analyses in a clean laboratory.

The analytical results for the [redacted] rounds of river samples and the six rounds of samples collected during normal operating conditions from outfall 003A are found in this Fact Sheet in Attachment X-1. The administrative record contains the URS report including the Executive Summary, the Sampling and Analysis Plan, and the analytical results including the necessary Chain of Custody, Quality Assurance and Quality Control data.

The NHDES calculations to determine the available remaining assimilative capacity use the river low flow as required per Env-Wq 1705.02, the existing and proposed monthly average wastewater flows, and the criteria for each pollutant of concern found in Env-Wq 1703.21(b). Wastewater flows provided by PSNH can be found in their permit renewal application (Form 2C) submitted to EPA on [redacted] and are summarized below:

|                         | Maximum daily (mgd) | Max 30-day average (mgd) |
|-------------------------|---------------------|--------------------------|
| Outfall 003A(existing): | 14.03               | 6.33                     |
| Outfall 003A(proposed): | 13.0                | 5.3                      |
| FGD Scrubber WWTS:      | 0.05                | 0.05                     |

The reason that the flow from outfall 003A will be reduced after the wet FGD scrubber is on line is that the source of the make up water for the scrubber will be wastewater from the ash settling basin upstream of where the new FGD wastewater treatment system discharges into it. This make up water flow will be 1.08 mgd.

To simplify the calculations, NHDES treats the existing and proposed wastewater discharge from outfall 003A as if it discharges directly to the Merrimack River. This is appropriate since although this is technically an internal outfall (in that it discharges to the cooling canal), the cooling canal does not have any common pollutants of concern and it can be considered to be just a portion of the Merrimack River where initial mixing occurs. The only pollutants added to the condenser cooling water discharges (outfalls 001 and 002) to the cooling canal are heat and chlorine, which is only used intermittently.

The antidegradation provisions in Env-Wq 1708.08 (Assessing Waterbodies) requires that existing water quality be established based on point sources discharging at their allowed loadings and the highest loadings anticipated from nonpoint sources. There are three major point sources upstream of PSNH (Concord Hall Street, Penacook, and Winnepesaukee River Basin Program). NHDES considered the other point source discharges and determined that they could be ignored since they were either very small, already close to their design flow or located so far upstream that the pollutants of concern in their effluent would settle out or otherwise undergo

biogeochemical transformation processes that made their contributions no longer measurable by the time they reached the Merrimack River upstream of Merrimack Station. NHDES used 1) the difference between the POTW's current flow and its design flow and 2) effluent data from the most recent permit reapplication (Form 2A) to estimate the future mass load from these upstream point sources. The addition of that anticipated future mass load, for each pollutant of concern, resulted in an increase in the average upstream river concentration used in the antidegradation calculations.

NHDES also considered nonpoint source discharges and determined that they could also be ignored since the pollutants of concern that may occur in stormwater runoff are not significantly associated with the low river flow conditions used for the antidegradation calculations. Further, NHDES considered nonpoint sources associated with low river flow conditions and determined that they could be ignored since new sources or increases in these sources are not anticipated. For example, new hazardous and solid waste land disposal sites are not routinely being built and existing facilities with groundwater quality problems are being remediated over time. For any that are built or expanded, and for any new groundwater discharge permits, the groundwater quality at the site boundary with surface waters must meet surface water quality standards.

The NHDES antidegradation calculations result in three possible outcomes, as follows:

1. For a parameter for which the receiving water is high quality, the permit limit that, when achieved, would utilize an insignificant (< 20%) portion of the available remaining assimilative capacity per Env-Wq 1708.09(c)(4).
2. For a parameter where the receiving water is marginal (just barely meets standards), an indication that the applicable water quality standard is being met but there is no additional capacity to add pollutants since the required reserve assimilative capacity is less than 10%.
3. An indication that the existing water quality downstream of the discharge exceeds the water quality standard.

In the first case, limits are necessary at outfall 003A when there is "reasonable potential" that the calculated limit could be violated, which is in accordance with 40 CFR 122.44(d). To determine reasonable potential, NHDES uses the approach found in Section 3.3 of the Technical Support Document for Water Quality Based Toxics Control, EPA/505/2-90-001, March 1991.

In the second case, since there is no available remaining assimilative capacity, PSNH must hold the loadings for the pollutant of concern to the loadings that they are discharging now at outfall 003A.

In the third case, there is also no available remaining assimilative capacity, and PSNH must hold the loading at outfall 003A until such time as a total maximum daily load (TMDL) study is completed. After a TMDL is completed, the allowable loading for the pollutant of concern will be allocated among all point and nonpoint sources, which could necessitate additional reductions in load by PSNH.

It is important to note that the concentration limits in outfall 003A that are required to hold the mass load (lbs/day) to that which exists now will be somewhat higher than the maximum baseline concentration. This is due to the fact that, as mentioned previously, the flow at outfall

003A will be reduced by flow of the make-up water for the scrubber. See example calculations in the section below for arsenic.

The results of the NHDES antidegradation calculations are provided in Attachment X-2.

Parameters that NHDES has determined, based on their antidegradation review, need either permit limits at outfall 003A, or monitoring during the reissued permit term to determine the need for permit limits, are discussed below and are summarized in Table X-1.

#### Aluminum

A limit for aluminum of  $\blacksquare$  mg/l is necessary to ensure that the discharge only causes an insignificant (<20%) lowering of water quality in the Merrimack River in the assessment unit (AU) that Merrimack Station discharges into. However, the NHDES' 2010 303(d) list indicates that the river in both the upstream and downstream assessment units are "potentially not attaining standards." For this reason, and the fact that the AU that PSNH discharges into could be listed as impaired in the future, PSNH plans to design the new scrubber WWTS to meet a lower limit that would hold the loading of aluminum to that which is discharged now. This is prudent since any future TMDL established for this parameter could require additional reductions by Merrimack Station.

#### Arsenic

The antidegradation calculations for arsenic were performed for both the aquatic life criteria (acute and chronic) and (since there are no public water supplies for over twenty miles downstream) the fish consumption human health criteria. As shown in Attachment X-2 there is no reasonable potential for the proposed discharge to cause any violations of the aquatic life criteria. However, the data collected by PSNH indicates that the Merrimack River exceeds the 140 ng/l arsenic criteria for the fish consumption use. Thus PSNH needs to hold the load.

NHDES calculated a limit at outfall 003A that will hold the mass load to that being discharged now. The limit that would hold the loading is 0.00227 mg/l, which is calculated as follows:

$$\begin{aligned} \text{Existing Load} &= \text{Existing Maximum Concentration} \times \text{Existing Flow} \times 8.34 \\ &= 0.0019 \text{ mg/l} \times 6.33 \text{ mgd} \times 8.34 \\ &= 0.1 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{Limit (future) to Hold Load} &= \text{Existing Load} / (\text{Future Flow} \times 8.34) \\ &= 0.1 \text{ lbs/day} / (5.3 \text{ mgd} \times 8.34) \\ &= 0.00227 \text{ mg/l} \end{aligned}$$

There are no New Hampshire surface waters listed as being impaired for arsenic for either aquatic life or fish consumption. The lack of any listing for fish consumption is due to the lack of in stream analytical data at low enough detection limits and data for three lakes from the National Lake Fish Tissue Study (see [www.epa.gov/fishadvisories/study/tissue.htm](http://www.epa.gov/fishadvisories/study/tissue.htm)) all showing fish tissue concentrations for total arsenic less than a detection limit of 0.1 ppb (ug/g). Section 3.2.6 of the 2010 New Hampshire Consolidated Assessment and Listing Methodology indicates that all surface waters must support fish that are free from contamination at levels that pose a human health risk to consumers. There are currently no fish consumption advisories for arsenic.

EPA modified their methodology for deriving human health criteria in October 2000. However, EPA has not updated its human health criteria recommendation for arsenic due to ongoing research on bioaccumulation and speciation of arsenic in fish tissue and lack of agreement on a final cancer potency factor (see <http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/1A8B1D874ECECD45852576C0005DCFOB?OpenDocument> ). New Hampshire promulgated its human health water quality standards for arsenic in December 10, 1999, before the new methodology and uncertainties came to light.

The EPA Region 6 identified several problems in the derivation of the existing human health criteria recommendation for arsenic in their "Interim Strategy: Arsenic – Freshwater Human Health Criterion for Fish Consumption" (See [www.epa.gov/region6/water/ecopro/watershd/standard/arsenic.htm](http://www.epa.gov/region6/water/ecopro/watershd/standard/arsenic.htm)). The latest (August 2, 2007) update of the interim strategy reports that states are continuing to use the arsenic criteria without recognizing that it applies to inorganic arsenic rather than total recoverable arsenic. It is also reported that the bioconcentration factor used in the derivation is too high in that it is based on a marine species (eastern oyster) rather than the range found for freshwater fish.

In the interim period until EPA finalizes the new human health criteria recommendation for arsenic, many states have chosen to adopt different fish consumption human health criteria (Table X). EPA has approved these new criteria when states 1) use the maximum contaminant level as the human health criteria, 2) recalculate the criteria using different bioconcentration factors, or 3) recalculate the criteria to recognize that inorganic arsenic is a small fraction of the total recoverable arsenic contained in fish tissue.

Table X

| Arsenic Water Quality Standards (WQS)<br>for Fish Consumption in Various States <sup>1</sup> |                            |  |
|--|----------------------------|--|
| State  | Fish Consumption WQS, ug/l | Basis                                    |
| Kansas   | 20.5                       | Recalculated                             |
| Nebraska   | 16.7                       | Unknown, 10 <sup>-5</sup> risk           |
| North Carolina   | 10                         | MCL                                      |
| California   | 5                          | EPA's CA Toxics Rule                     |
| Vermont  | 1.5                        | Recalculated                             |
| Iowa   | 1.4                        | Proposed 2007, 10 <sup>-5</sup> risk     |
| Rhode Island   | 1.4                        | 304(a) criteria w/ 10 <sup>-5</sup> risk |
| New Hampshire  | 0.14 <sup>2</sup>          | 304(a) criteria w/ 10 <sup>-6</sup> risk |
| South Carolina   | 0.14 <sup>2</sup>          | 304(a) criteria w/ 10 <sup>-6</sup> risk |
| Connecticut  | 0.021 <sup>3</sup>         | Unknown, 10 <sup>-6</sup> risk           |

1. Compare with EPA's Clean Water Act Section 304(a) Recommended Criteria of 0.14 ug/l for the 10<sup>-6</sup> cancer risk.
2. Inorganic arsenic only
3. Arsenic+3 only

NHDES is concerned about 1) the arsenic water quality standard being outdated and subject to revision by EPA, 2) the proposed limit possibly being unnecessarily stringent, 3) the potential for the federal antibacksliding regulations to require such a limit to be retained in the permit, 4) the

excessive cost of monitoring for arsenic using clean sampling and analytical procedures, not just for PSNH but possibly for other permittees and 5) the technical feasibility of achieving the limit.

NHDES has determined that it would be inappropriate to include a numeric permit limit for arsenic in NPDES permits at this time. NHDES is proposing that the draft permit require PSNH to monitor and report the concentrations of arsenic in outfalls 003A and 003C (FGD WWTF) and to conduct fish tissue monitoring for arsenic. The goal of the fish tissue monitoring will be to develop a site specific bioaccumulation factor (BAF) for arsenic for the middle Merrimack River. In addition to the effluent and fish tissue monitoring requirements, NHDES believes that a permit reopener clause should be added to allow the permit to be modified to include a limit if new information, such as a new water quality standard, indicates that a limit is necessary.

NHDES believes that monitoring of the discharge and fish tissue for arsenic and the inclusion of a permit reopener clause will meet water quality standards for the following reasons:

1. New information is available that suggests that the existing water quality criteria for the protection of human health are incorrect and should be revised.
2. EPA has approved state water quality standards for human health for fish consumption set equal to the MCL (of 10 ug/l) or recalculated with state specific information.
3. When new information becomes available, that was not available when the existing water quality standard was developed, Env-Wq 1704 allows for the development of alternative site specific criteria.
4. Arsenic does not biomagnify, or increase in concentration higher in the food chain.
5. Human exposure to arsenic is decreasing since the manufacture of pesticides containing arsenic is being phased out and since the drinking water MCL has been lowered.
6. Using the updated MCL of 10 ug/l as the water quality standard for fish consumption in the antidegradation calculations results in assimilative capacity for arsenic and no reasonable potential for the calculated limit to be violated.
7. Using a preliminary estimate of an alternative site specific arsenic criterion of 0.842 ug/l (Attachment X-3) as the water quality standard for fish consumption in the antidegradation calculations results in assimilative capacity for arsenic and no reasonable potential for the calculated limit to be violated.

For these reasons the draft permit requires monitoring of the effluent and fish tissue for arsenic and contains a permit reopener clause. As described in Part I. of the draft permit, PSNH will have 180 days to develop a fish tissue monitoring program for review and approval by EPA and NHDES such that the monitoring can begin in year two.

## Copper

The NHDES antidegradation calculations indicate that there is assimilative capacity for copper but there is a need for both monthly average and daily maximum permit limits.

A monthly average limit of 0.028 mg/l is necessary to ensure that the discharge only causes an insignificant (<20%) lowering of water quality in the Merrimack River. A maximum daily limit of 0.086 mg/l is also required to ensure that the acute water quality criteria is met at the anticipated maximum daily flow of outfall 003A of 13 mgd. Copper was the only pollutant that NHDES determined during the antidegradation review would require a maximum daily limit.

None of the other pollutants evaluated showed reasonable potential for the calculated limit to be violated.

### Mercury

The NHDES antidegradation calculations indicate that there is assimilative capacity for mercury and no reasonable potential that a limit that would use less than 20% of the available remaining assimilative capacity for either the aquatic life criteria or the human health criteria would be violated. However, all New Hampshire surface waters are listed as being impaired for mercury due to fish tissue concentrations that have led to a statewide fish consumption advisory and therefore a permit limit is needed to ensure that the loading of mercury in the discharge will not increase.

The major source contributing to the fish tissue impairment is air emissions from coal fired power plants. The EPA approved Northeast Regional Mercury TMDL (see [http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/mercury\\_final.pdf](http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/mercury_final.pdf)) states that point sources only account for 2.1% of the total load. Reductions in point sources of mercury are not required in this phase of implementation of the TMDL. However, reductions are anticipated due to New England states implementing mercury amalgam separation programs, recycling programs such as mercury switches being collected at automobile salvage yards and mercury products legislation.

If and when the TMDL is revised to require additional reductions from point sources, PSNH could be required to reduce their existing load. Until that time NHDES has determined that the existing load (0.000315 lbs/day) should be held by requiring a new limit for outfall 003A of 0.0072 ug/l. This limit at outfall 003A, and the limit described below for 003C, are not measurable using standard analytical procedures and the draft permit states that the compliance will be assumed to be achieved when the concentration in the effluent is at or below the minimum level for mercury of 0.2 ug/l (EPA methods 245.1 or 7470A).

NHDES is also proposing that a limit for mercury of 0.13 ug/l be required at the new FGD WWTF outfall 003C to help determine compliance with the hold the load requirement. This limit is derived using the following equation that relates the maximum existing mercury concentration at the ash settling pond weir (outfall 003A) with the allowable concentrations in the new FGD WWTF (outfall 003C):

$$C_{003C} = (C_{MAX\ 003A} \times Q_{FGD}) / (Q_{003C})$$

Where:  $C_{MAX\ 003A}$  = max existing mercury concentration at outfall 003A = 0.006 ug/l  
 $Q_{FGD}$  = Intake flow to scrubber (withdrawal) from ash settling pond = 1.08 mgd  
 $Q_{003C}$  = flow of discharge from FGD WWTF into ash settling pond = 0.05 mgd  
 $C_{003C}$  = concentration limit at FGD WWTF outfall 003A to hold load

Resulting in  $Q_{003C} = 0.13\ \text{ug/l}$

Since PSNH will be required to implement a fish tissue monitoring program for arsenic, they should consider analyzing the fish tissue samples for mercury as well. Baseline and ongoing fish tissue data for mercury should show the benefits of the scrubber installation over time and provide a basis for the eventual lifting of the fish consumption advisory.

## Selenium

Selenium was identified as a pollutant likely to be present at elevated concentrations in FGD system effluent. The NHDES antidegradation calculations show there is assimilative capacity for selenium and no reasonable potential for a limit to be violated for outfall 003A as it exists now. However, NHDES has determined that a limit of 0.058 mg/l may be needed to ensure that the discharge only causes an insignificant (<20%) lowering of water quality in the Merrimack River. This is due to the uncertainty as to the effluent concentration achievable with the new FGD WWTF which is reportedly between 3 and 9 mg/l.

NHDES has proposed that monitoring for selenium be included in the draft permit and that a reopener clause be added to allow the permit to be modified to include the limit of 0.058 mg/l at outfall 003A if it is determined during the permit term that there is reasonable potential for the limit to be violated. Accordingly, the draft permit contains a reopener clause and a monitoring requirement for selenium.

## Chloride

There is no reasonable potential for the existing discharge to cause a violation of the chronic aquatic life criteria for chloride. Similar to selenium, however, chloride was identified as a pollutant likely to be present at elevated concentrations in FGD system effluent. Due to the uncertainty as to the effluent quality NHDES has determined that it would be appropriate to require monitoring for chloride. Accordingly, the draft permit contains a reopener clause and a monitoring requirement for chloride.

Table X-1

| Summary of New Water Quality-Based Limits or Monitoring Requirements<br>at Outfall 003A Resulting from NHDES Antidegradation Calculations |                        |                       |                        |               |
|---|------------------------|-----------------------|------------------------|---------------|
| Parameter   | Existing Permit Limits |                       | Proposed Permit Limits |               |
|   | Monthly Average        | Maximum Daily         | Monthly Average        | Maximum Daily |
| Flow <sup>1</sup> , mgd   | 9.0                    | 19.1                  | 5.3                    | 13.0          |
| Aluminum, total   | NA                     | NA                    | 1.09 mg/l              | Report        |
| Arsenic <sup>2</sup> , total  | NA                     | NA                    | Report, ug/l           | Report, ug/l  |
| Copper, total   | NA                     | 0.2 mg/l <sup>3</sup> | 0.028 mg/l             | 0.086, mg/l   |
| Mercury <sup>4</sup> , total  | NA                     | NA                    | 0.0072 ug/l            | Report, ug/l  |
| Selenium, total   | NA                     | NA                    | Report, mg/l           | Report, ug/l  |
| Chloride  | NA                     | NA                    | Report, mg/l           | Report, mg/l  |

1. The new flow limits are values requested by PSNH in the permit application Form 2C and were the flows used to develop the proposed monthly average and maximum daily permit limits.
2. Additional monitoring of FGD WWTF (outfall 003C) and of fish tissue required
3. Existing limit based on Effluent Limitation Guideline (ELG)
4. Limit of 0.13 ug/l (monthly average) also required at internal FGD WWTF outfall 003C



## Attachment X-1

| Water Quality Criteria and Sampling Results <sup>1</sup> Used in NHDES Antidegradation Calculations, bold values non-detects, All Units ug/l |                                 |   |                                     |                                    |
|--|---------------------------------|---|-------------------------------------|------------------------------------|
| Chemical Name  | Criteria Used                   | Criteria from Table 1703.1 <sup>2</sup> | River Upstream of PSNH <sup>3</sup> | Outfall 003A Baseline <sup>4</sup> |
| Aluminum, total  | Chronic                         | 87                                      | 45.36 / 46.2                        | 650                                |
| Antimony, total  | Chronic                         | 1,600                                   | 0.046 / 0.1391                      | 0.158                              |
| Arsenic, total   | Fish Cons.                      | 0.14                                    | 0.364 / 0.414                       | 1.9                                |
| Arsenic, diss.   | Chronic                         | 150                                     | 0.364 / 0.414                       | 1.9                                |
| Beryllium, total   | Chronic                         | 5.3                                     | 0.06 / 0.109                        | 1.08                               |
| Cadmium, diss.   | Chronic                         | 0.8                                     | <b>0.02</b> / 0.045                 | 0.1857                             |
| Chromium <sup>3+</sup> , diss  | Chronic                         | 24                                      | 0.182 / .238                        | 1.625                              |
| Chromium <sup>6+</sup> , diss  | Chronic                         | 11                                      | 0.34 / 0.34                         | <b>0.192</b>                       |
| Copper, diss.  | Chronic                         | 2.7                                     | 0.538 / 1.17                        | 9.6                                |
| Iron, total  | Chronic                         | 1,000                                   | 272 / 272                           | 700                                |
| Lead, dissolved  | Chronic                         | 0.54                                    | 0.119 / 0.177                       | 1.06                               |
| Manganese, total   | Fish Cons.                      | 100                                     | 27.2 / 27.2                         | 55                                 |
| Mercury, total   | Fish Cons.                      | 0.051                                   | 0.001 / 0.0138                      | 0.006                              |
| Mercury, diss.   | Chronic                         | 0.77                                    | 0.00085 / 0.0117                    | 0.0051                             |
| Nickel, diss.  | Chronic                         | 16.1                                    | 0.259 / 0.384                       | 2.19                               |
| Selenium, total  | Chronic                         | 5                                       | <b>0.52</b> / 0.613                 | 1.5                                |
| Silver, dissolved  | Acute                           | 0.32                                    | <b>0.02</b> / 0.162                 | <b>0.034</b>                       |
| Thallium, total  | Fish Cons.                      | 6.3                                     | 0.009 / 0.04374                     | 0.289                              |
| Zinc, dissolved  | Acute                           | 36.2                                    | 1.908 / 3.46                        | 18.58                              |
| Chlorides, total   | Chronic                         | 230,000                                 | 17,000 / 17,000                     | 27,000                             |
| Ammonia (as N), total  | Chronic                         | 3,420                                   | 80.0 / 648.9                        | 2,600                              |
| Nitrates (as N), total   | Water + Fish Cons. <sup>5</sup> | 10,000                                  | 500 / 510                           | 500                                |

1. Results Provided by either Eastern Analytical, Inc. of Concord, NH or Frontier Geosciences, Inc. of Seattle, WA. Results are expressed in a form consistent with the standards (total recoverable or dissolved)
2. For hardness dependent metals a hardness of 25 mg/l as CaCO<sub>3</sub> was used.
3. Average of five rounds of river samples / adjusted value that includes future load of three major upstream POTW (Concord Hall Street, Penacook and Franklin)
4. Maximum of six baseline samples from outfall 003A
5. There is no fish consumption only criteria. This value, which is the same as the MCL is used only as a check.

Attachment X-2

| Parameter              | Dissolved or Total | Number of Effluent Samples "n" | Maximum Value measured in Outfall 003A (ug/l) | Reasonable Potential Multiplication Factor | Max Value x Factor (ug/l) | Maximum Allowable Permit Concentration to use < 20% ARAC* (ug/l) | Reasonable Potential (Yes/No) |
|------------------------|--------------------|--------------------------------|---|--|---------------------------|--|-------------------------------|
| Aluminum (Chronic)     | Total              | 6                              | 650   | 3.8  | 2,470                     | 1,091  | YES                           |
| Antimony (Chronic)     | Total              | 6                              | 0.158   | 3.8  | 0.60                      | 21,049   | NO                            |
| Arsenic (Fish cons.)   | Total              | 6                              | 1.9   | 3.8  | 7.2                       | Not Applicable   | Exceeds Criteria              |
| Arsenic (chronic)      | Dissolved          | 6                              | 1.9   | 3.8  | 7.2                       | 1,969  | NO                            |
| Beryllium (Chronic)    | Total              | 6                              | 1.08  | 3.8  | 4.1                       | 69.2   | NO                            |
| Cadmium (Chronic)      | Dissolved          | 6                              | 0.18566                                       | 3.8  | 0.7055                    | 10.0   | NO                            |
| Chromium +3 (Chronic)  | Dissolved          | 6                              | 1.63  | 3.8  | 6.18                      | 313.8  | NO                            |
| Chromium +6 (Chronic)  | Dissolved          | 6                              | 0.192   | 3.8  | 0.7296                    | 140  | NO                            |
| Copper (Chronic)       | Dissolved          | 8                              | 9.6   | 3.3  | 31.7                      | 27.6   | YES                           |
| Lead (Chronic)         | Dissolved          | 6                              | 1.06  | 3.8  | 4.04                      | 5.53   | NO                            |
| Mercury (Fish cons.)   | Total              | 6                              | 0.006   | 3.8  | 0.0228                    | 0.48   | NO                            |
| Mercury (chronic)      | Dissolved          | 6                              | 0.0051  | 3.8  | 0.0194                    | 9.96   | NO                            |
| Nickel (Chronic)       | Dissolved          | 6                              | 2.19  | 3.8  | 8.33                      | 208.3  | NO                            |
| Selenium (Chronic)     | Total              | 6                              | 1.5   | 3.8  | 5.7                       | 58.3   | NO                            |
| Silver (Acute)         | Dissolved          | 6                              | 0.034   | 3.8  | 0.1292                    | 1.89   | NO                            |
| Thallium (Fish cons.)  | Total              | 6                              | 0.289   | 3.8  | 1.1                       | 82.5   | NO                            |
| Zinc (Chronic)         | Dissolved          | 6                              | 18.58   | 3.8  | 70.6                      | 443.6  | NO                            |
| Manganese (Fish cons.) | Total              | 6                              | 55  | 3.8  | 209                       | 971.8  | NO                            |
| Iron (Chronic)         | Total              | 8                              | 700   | 3.3  | 2,310                     | 9,861  | NO                            |
| Ammonia (Chronic)      | Total              | 6                              | 2,600   | 3.8  | 9,880                     | 38,020   | NO                            |
| Nitrate (Water + fish) | Total              | 6                              | 500   | 3.8  | 1,900                     | 124,611  | NO                            |
| Chloride (Chronic)     | Total              | 6                              | 27,000  | 3.8  | 102,600                   | 2,804,060  | NO                            |

\*ARAC = available remaining assimilative capacity

PRELIMINARY ESTIMATE OF ALTERNATIVE SITE SPECIFIC  
HUMAN HEALTH FISH CONSUMPTION ONLY CRITERIA FOR ARSENIC  
IN FRESHWATER IN NEW HAMPSHIRE

Equation 1-3 from page 1-10 of the "Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health, October 2000" (EPA 2000) reads:

$$AWQC = RSD \times [ BW / [ DI + \sum_{i=2}^4 (FI_i \times BAF_i) ] ]$$

where,

AWQC = Ambient Water Quality Criterion, mg/l

RSD = Risk-specific dose for carcinogens based on a linear low-dose extrapolation. Equal to risk divided by  $q^*1$  (cancer slope factor), mg/kg-day

BW = Human body weight, kg

DI = Drinking water intake, L/day

$FI_i$  = Fish intake at trophic level, kg/day

$BAF_i$  = Bioaccumulation factor at trophic level  $i$ , lipid normalized, L/kg

Best available input for New Hampshire:

$$RSD = \text{risk}/q^*1 = 10^{-6} / 1.5 = 6.67 \times 10^{-7} \text{ mg/kg-day}$$

Source:  $q^*1$  from IRIS, Section II.B.1., Oral slope factor in Summary of Risk Estimates, see <http://www.epa.gov/ncsa/iris/subst/0278.htm#quaoral>.

Note - Env-Wq 1704.02(a) references "Assessment and Control of Bioconcentratable Contaminants in Surface Waters, March 1991" which in turn references the EPA's Integrated Risk Information System or IRIS.

$$BW = 70 \text{ kg}$$

Source: EPA 2000, default human body weight for adults

$$DI = 0 \text{ L/day}$$

Source: Fish consumption only criteria uses oral exposure for fish only

$$FI = 0.0175 \text{ kg/day}$$

Source: EPA 2000, default for total fish (all trophic levels) intake for general adult population and sport anglers.

$$BAF = 3.17 \text{ L/kg} (43 \times 0.33 \times 0.2)$$

Source: EPA 2000, default for fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

Source: EPA 2000, default for whole fish BAF to fillet BAF

AWQC (Preliminary Estimate of Alternate Site Specific Criteria) = 0.000842 mg/l

<http://epa.gov/sab/pdf/sab-07-008.pdf>  
<http://www.epa.gov/waterscience/criteria/wqtable/#B>  
<http://www.epa.gov/ncca/iris/subst/0278.htm#quaoral>  
<http://www.epa.gov/ncca/iris/subst/0278.htm#quaoral>  
<http://www.epa.gov/waterscience/criteria/arsenic/tech-sum-bioacc.pdf>  
<http://www.epa.gov/region6/water/ecopro/watershd/standard/arsenic.htm#geninfo>  
<http://www.epa.gov/waterscience/criteria/humanhealth/method/tsdvol3.pdf>  
<http://www.epa.gov/waterscience/criteria/humanhealth/method/tsdvol2.pdf>  
<http://www.epa.gov/waterscience/criteria/humanhealth/method/complete.pdf>  
<http://www.epa.gov/fedrgstr/EPA-WATER/2001/March/Day-26/w7403.htm>  
[http://www.epa.gov/waterscience/standards/wqslibrary/vt/vt\\_1\\_wqs.pdf](http://www.epa.gov/waterscience/standards/wqslibrary/vt/vt_1_wqs.pdf)  
<http://www.epa.gov/waterscience/criteria/library/ambientwqc/arsenic80.pdf>  
<http://www.epa.gov/waterscience/standards/academy/supp/health/page19.htm>  
[http://www.epa.gov/waterscience/criteria/arsenic/sab/ASIssuac\\_SAB.pdf](http://www.epa.gov/waterscience/criteria/arsenic/sab/ASIssuac_SAB.pdf)  
<http://www.epa.gov/fishadvisories/study/tissue.htm#methods>  
<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/1A8B1D874ECEED45852576C0005DC>  
[FOB?OpenDocument](#)

#### Fish Tissue Info from Bob Estabrook

Disk 4,

10/30/2003, composite of five largemouth bass (fillets)  
from Little Island Pond, Hillsboro County

Results (Dup) Arsenate = 0.1 ug/g in sample 63406, episode 6322  
Arsenite = 0.1 ug/g in sample 63406, episode 6322

Results (Std) Arsenate = 0.1 ug/g in sample 63404, episode 6322  
Arsenite = 0.1 ug/g in sample 63404, episode 6322

Results same for Samples 63225 (White sucker, Big Diamond Pond)  
Sample 63224 (Yellow perch, Big Diamond Pond)  
Sample 63202 ( Largemouth bass , Horn Pond)

0.1 ug/g = 0.1 mg/kg (DL too high to compare to action level of 0.016 mg/kg wet weight)

**2) Beginning in May 2012, please submit a monthly report containing all the information requested in Item No. 1. This report is due by the fifteenth day of the following month.**

2. PSNH objects to this information request as unduly burdensome, not reasonably limited with respect to time, and to the extent it calls for PSNH to create documents not otherwise in its possession, custody, and/or control as of March 26, 2012, the date PSNH received EPA's March 22, 2012 correspondence, as beyond the statutory authority of Section 308(a) of the Clean Water Act and Section 3007 of the Resource Conservation and Recovery Act. Subject to and without waiving the foregoing objections, PSNH hereby agrees to provide EPA documents and/or reports created during the normal course of business that are responsive to Question 1, subparts (a) through (c), that PSNH has in its possession, custody, and/or control on a monthly basis. PSNH respectfully requests, however, that the due date of these monthly submissions to EPA be changed to the last day of each month for providing material relevant to the preceding month (*i.e.* information related to the month of May will be produced to EPA on or before June 30). This reporting timeframe is necessary because PSNH does not have in-house laboratory capabilities, and the local laboratories are not capable of properly analyzing what are often infinitesimally minute levels of constituents in the effluent. As such, PSNH's contract laboratory must send samples to a subcontract laboratory in Seattle, Washington. This laboratory typically does not provide analyses to PSNH for a given month until after the fifteenth day of the following month. PSNH further requests that EPA set a reasonable deadline (*e.g.* six months, or November 2012), after which PSNH is no longer obligated to provide the aforementioned documents and/or reports to the agency because the effluent at issue is being discharged in accordance with all applicable laws and regulations and is not a hazardous waste, as explained in detail below.

**3) Please provide your determination of whether or not the FGD WWTS effluent transported offsite is considered a hazardous waste.**

3. Federal and state laws are clear on this issue, exempting flue-gas desulfurization wastewater treatment system effluent (“FGD Treated Wastewater Effluent”) from regulation as a hazardous waste. Specifically, the 1980 Bevill Amendment to RCRA categorizes, among other things, “flue gas emission control waste” (*i.e.* FGD waste) as a “special waste” subject to a conditional exemption from RCRA Subtitle C hazardous waste regulations.<sup>1</sup>

PSNH objects to this information request as vague, and insofar as it calls for the production of documents and or information covered by the attorney-client privilege. Subject to and without waiving the foregoing objection, PSNH did obtain a legal opinion from its attorney in May 2011 regarding the regulatory classification of the FGD Treated Wastewater Effluent generated at Merrimack Station. This opinion concluded that the FGD Treated Wastewater Effluent generated at Merrimack Station is categorically exempt from regulation as a hazardous waste under applicable federal and state hazardous waste laws. Additional review and research has been done since that time, confirming the original legal opinion.

FGD waste was found to be “conditionally exempt” from RCRA Subtitle C hazardous waste regulations in 1980 pending further study and promulgation of applicable regulations by EPA. Since that time, EPA has completed a number of studies and issued regulatory determinations on the classification of FGD wastes. In each instance, EPA has determined that FGD waste should not be regulated under Subtitle C of RCRA. Specifically, in 1993, EPA issued a regulatory determination for flue gas emission control waste, as well as fly ash, bottom ash, and boiler slag, specifically providing that regulation of these four materials as hazardous wastes is not “necessary or desirable,” and that regulation under RCRA subtitle C is “inappropriate.” *See* 58 Fed. Reg. 42,466, 42,476-77 (Aug. 9, 1993). Additionally, in Reports to Congress made in February 1988 and March 1999, EPA recommended the continued exclusion of fossil fuel combustion waste (“FFCs”), including FGD wastes, from Subtitle C regulations.<sup>2</sup> Lastly, on May 22, 2000, EPA issued another regulatory determination in which the agency yet again concluded that regulation of FFCs under Subtitle C is not warranted. *See, e.g.*, 65 Fed. Reg. 32214, 32,215 (May 22, 2000).<sup>3</sup>

Importantly, EPA has consistently applied the exemptions articulated in the Bevill Amendment to include not only the actual waste materials, but also any water separated out from

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<sup>1</sup> *See* 42 U.S.C. § 6921(b)(3)(A)(i) (referred to as the “Bevill Amendment”); 40 C.F.R. § 261.4(b)(4) (providing, in relevant part, that “flue gas emission control waste” is a solid waste that is not a hazardous waste); February, 18, 1981 Letter from Steffen W. Plehn and R. Sarah Compton to Regional Directors, Office of Regional Counsel and Director of National Enforcement Investigations Center (this letter was premised on a January 13, 1981 letter from the EPA Office of Water and Waste Management to Mr. Paul Emler, Jr., Chairman of Utility Solid Waste Activities Group); *see also* N.H. Code. Admin. R. Env-Hw 401.03(b)(4) (mirroring the federal regulation and containing the same exemption for FGD waste).

<sup>2</sup> *See* “Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants” (EPA530-SW-88-002) (February 1988); “Report to Congress: Wastes from the Combustion of Fossil Fuels” (EPA 530-S-99-010) (March, 31, 1999).

<sup>3</sup> *See also* <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/> (specifically providing that FFC wastes are exempt from federal hazardous waste regulations promulgated pursuant to Subtitle C of RCRA).

the waste materials.<sup>4</sup> EPA has likewise concluded that materials whose hazardous characteristics originate from a Bevill exempt waste remain exempt from hazardous waste regulation.<sup>5</sup>

Aside from this classification as a Bevill exempt waste under both state and federal law and the solid precedent supporting this exemption, PSNH and the New Hampshire Department of Environmental Services Water Division (“NHDES”) worked together for well over a year to ensure the quality of the Merrimack River is protected. NHDES required an antidegradation analysis to be conducted as part of its review regarding the impact of any direct discharge from the FGD WWTS to the Merrimack River, and following its diligent review of all relevant information, established stringent water quality limits protective of both human health and the environment that would have to be met. Repeated analysis of the FGD Treated Wastewater Effluent, documentation of which is included with this filing, clearly establishes that the Effluent is not just exempt by law from hazardous waste regulation but can in fact readily meet the state water quality standards established by NHDES. However, as a result of EPA’s unwillingness to work with NHDES and PSNH in permitting the FGD Treated Wastewater Effluent in any way other than through the prolonged NPDES permitting and appeals process (such as through an administrative order, independent permit, or permit amendment), and regardless of the resulting delay this would cause in achieving the significant environmental benefits of the FGD project, PSNH was forced to find an alternative method of disposal of the wastewater. The solution identified was the shipment of the FGD Treated Wastewater Effluent to facilities for an additional—and a completely unnecessary—treatment process before it is discharged. The applications to various facilities receiving the FGD Treated Wastewater Effluent, as well as the approvals provided by those facilities, are included in this filing.

Lastly, analytical material has been provided with this filing to demonstrate the non-hazardous quality of the treated FGD Treated Wastewater Effluent before it is subjected to an additional treatment process by the recipient POTWs. Specifically, the chemical constituents contained in the FGD Treated Wastewater Effluent are not listed hazardous wastes (*see* 40 C.F.R. §§ 261.31 to 261.33), nor do the constituents exhibit any of the four characteristics used to classify a waste as hazardous, as defined in 40 C.F.R. Part 261 Subpart C.

In conclusion and in accordance with long-standing law, PSNH’s FGD Treated Wastewater Effluent is exempt from regulatory classification as a hazardous waste pursuant to the Bevill Amendment. Furthermore, as evidenced by the actions of, and approvals by, NHDES and POTWs, the treated wastewater meets stringent state water quality standards. A review of the FGD Treated Wastewater Effluent sampling data PSNH has provided to NHDES, to POTWs, and herein to EPA in response to this information request, verifies that the Effluent is not a listed hazardous waste and does not possess any of the requisite characteristics established by the

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<sup>4</sup> *See* April 21, 1986 Letter from Marcia E. Williams to G.N. Weinreich (providing that precipitation that becomes corrosive solely from contact with coal gasification ash waste is exempt from hazardous waste regulations since the hazardous characteristic is derived from an exempt waste); June 16, 1986 Letter from Marcia E. Williams to G.N. Weinreich (providing that residual water, which became corrosive as a result of contact with coal ash, is exempt from hazardous regulation because the residual water is derived from an exempt waste).

<sup>5</sup> *See* October 2000 EPA Memorandum from Elizabeth A. Cotsworth to Stephen D’Esposito (providing that if EPA “were to regulate leakage from Bevill exempt wastes as hazardous wastes, such a position would essentially render all extraction/beneficiation wastes non-exempt which would not reflect Congressional intent” of the Bevill Amendment); *see also* February 1986 RCRA/Superfund Hotline Monthly Summary (finding quench water that became corrosive solely as a result of contact with fly and bottom ash exempt from hazardous waste regulation); June 30, 1993 EPA Memorandum from Sylvia K. Lowrance to Robert Duprey (finding same for soils contaminated from constituents from cement kiln dust).

agency to classify a waste as hazardous, even if it were not exempt from regulatory classification as a hazardous waste pursuant to the Beville Amendment.