

**Data Validation Report  
Tennessee Valley Authority  
Bull Run Fossil Plant  
Environmental Investigation Plan  
Background Soil Samples**

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the five background soil samples and two aqueous blanks collected on November 16, 2018, at the Tennessee Valley Authority (TVA) Bull Run Fossil Plant facility. These samples were collectively analyzed by TestAmerica Laboratories, Inc. (TestAmerica), of Pittsburgh, Pennsylvania for total metals by SW-846 Method 6020A; for total mercury by SW-846 Methods 7470A/7471B; for anions (specifically, chloride, fluoride, and sulfate) by SW-846 Method 9056A; and for pH by SW-846 Method 9045D.

This review was performed in accordance with the Quality Assurance Project Plan for the Tennessee Valley Authority Bull Run Fossil Plant Environmental Investigation (TVA BRF QAPP, Revision 2, July 2018) and the Background Soil Sampling and Analysis Plan for TVA Bull Run Fossil Plant (TVA BRF SAP, Revision 3, July 2018). This review was performed with guidance from the National Functional Guidelines for Inorganic Data Review (US EPA, October 2004); the US EPA Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (November 2001); and the US EPA Region IV Data Validation Standard Operating Procedures. These validation guidance documents specifically address analyses performed in accordance with the Contract Laboratory Program (CLP) analytical methods and are not completely applicable to the type of analyses and analytical protocols performed for the SW-846 Methods utilized by the laboratory for these samples. Environmental Standards, Inc. (Environmental Standards) used professional judgment to determine the usability of the analytical results and compliance relative to the SW-846 Methods utilized by the laboratory.

**Summary**

The analytical results and associated laboratory quality control (QC) samples were reviewed to determine the integrity of the reported analytical results and to ensure that the data met the established data quality objectives. This QA review includes all samples in TestAmerica Job Number 180-84161-1.

The samples that have undergone Stage 4 data validation are listed below:

| Sample Identification   | Laboratory Sample Identification | Job Number  | Matrix | Date Sample Collected | Parameter(s) Examined |
|---|----------------------------------|-------------|--------|-----------------------|-----------------------|
| BRF-BS-BG04-1.2/3.2-20181116  | 180-84161-1                      | 180-84161-1 | Soil   | 11/16/18              | A, M, Hg, pH          |
| BRF-BS-DUP02-20181116<br>(Field Duplicate of<br>BRF-BS-BG04-0.0/0.5-20181116) | 180-84161-2                      | 180-84161-1 | Soil   | 11/16/18              | A, M, Hg, pH          |
| BRF-BS-BG04-6.5/8.5-20181116  | 180-84161-3                      | 180-84161-1 | Soil   | 11/16/18              | A, M, Hg, pH          |
| BRF-BS-FB08-20181116<br>(Field Blank)   | 180-84161-4                      | 180-84161-1 | Aq     | 11/16/18              | A, M, Hg              |
| BRF-BS-BG04-10.3/12.3-20181116  | 180-84161-5                      | 180-84161-1 | Soil   | 11/16/18              | A, M, Hg, pH          |
| BRF-BS-EB03-20181116<br>(Equipment Blank)                                     | 180-84161-6                      | 180-84161-1 | Aq     | 11/16/18              | A, M, Hg              |
| BRF-BS-BG04-0.0/0.5-20181116  | 180-84161-7                      | 180-84161-1 | Soil   | 11/16/18              | A, M, Hg, pH          |

Parameters Examined

- M - Total Metals by SW-846 Method 6020A.
- Hg - Mercury by SW-846 Methods 7470A/7471B.
- A - Anions (specifically, chloride, fluoride, and sulfate) by SW-846 Method 9056A.
- pH - pH by SW-846 Method 9045D.
- Aq - Aqueous.



| Items Reviewed                                       |  |
|--|--|
| Holding Times  | Instrument Tuning and Calibrations       |
| Sample Preservation                                  | Reporting Limit (RL) Standard Recoveries |
| Chain-of-Custody (COC) Record and Case Narrative     | Internal Standard Recoveries             |
| Blank Results  | Serial Dilution Analysis                 |
| Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results | Post-Digestion Spike Results             |
| Laboratory Control Sample (LCS) Results              | Sample Preparation                       |
| Laboratory and Field Duplicate Results               | Analytical Sequence                      |
| Quantitation of Positive Results                     |  |

### **Comments and Exceptions**

- All analyses performed for the sampling event were in compliance with the requirements set forth in the QAPP.

### **Qualifier Summary**

| Analyte(s)                          | Job Number  | Sample(s)  | Validation Qualifier(s) | Reason(s) for Qualification |
|-------------------------------------|-------------|--|-------------------------|-----------------------------|
| boron                               | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | U*                      | BF                          |
| molybdenum                          | 180-84161-1 | BRF-BS-BG04-1.2/3.2-20181116,<br>BRF-BS-BG04-10.3/12.3-20181116,<br>and BRF-BS-BG04-0.0/0.5-20181116 | U*                      | BL                          |
| mercury                             | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | J/UR                    | M-                          |
| fluoride                            | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | J/UJ                    | M-                          |
| antimony,<br>copper, and<br>lithium | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | J                       | M-                          |
| arsenic,<br>chromium,<br>and nickel | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | J                       | M+                          |
| zinc                                | 180-84161-1 | All samples except<br>BRF-BS-FB08-20181116<br>and BRF-BS-EB03-20181116                               | J                       | MP                          |

| Analyte(s)                                    | Job Number  | Sample(s)   | Validation Qualifier(s) | Reason(s) for Qualification |
|---|-------------|---|-------------------------|-----------------------------|
| antimony,<br>cadmium,<br>lithium,<br>and zinc | 180-84161-1 | BRF-BS-DUP02-20181116 and<br>BRF-BS-BG04-0.0/0.5-20181116 | J                       | FD                          |
| cadmium                                       | 180-84161-1 | BRF-BS-BG04-6.5/8.5-20181116                              | J                       | ZZ                          |

All positive results reported between the method detection limit (MDL) and quantitation limit (QL) should be considered estimated and have been flagged "J" (unless previously flagged "U\*") on the data tables. (Reason Code: RL)

---

Review performed by: Danielle Coles, Quality Assurance Chemist  
Review reviewed by: Andrew L. Piasecki, Senior Quality Assurance Chemist/Data Validation Task Manager  
Review approved by: Jennifer N. Gable, Senior Quality Assurance Chemist/Technical Lead  
Review approved by: Rock J. Vitale, CEAC, Technical Director of Chemistry/Principal  
Date review completed: 12/6/18

**SECTION 2**

**ANALYTICAL RESULTS**

## **INORGANIC DATA QUALIFIERS**

- U\* This result should be considered “not-detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
- UR Unreliable reporting limit; analyte may or may not be present in sample.
- R Unreliable positive result; analyte may or may not be present in sample.
- J Quantitation is approximate due to limitations identified during data validation.
- UJ This analyte was not detected, but the reporting limit may or may not be higher due to a bias identified during data validation.



## REASON CODES AND EXPLANATIONS

| Reason Code | Explanation  |
|-------------|--|
| BE          | Equipment blank contamination. The result should be considered "not-detected."             |
| BF          | Field blank contamination. The result should be considered "not-detected."                 |
| BL          | Laboratory blank contamination. The result should be considered "not-detected."            |
| BN          | Negative laboratory blank contamination.   |
| C           | Initial and/or Continuing Calibration issue, indeterminate bias.                           |
| C+          | Initial and/or Continuing Calibration issue. The result may be biased high.                |
| C-          | Initial and/or Continuing Calibration issue. The result may be biased low.                 |
| FD          | Field duplicate imprecision.   |
| FG          | Total versus Dissolved Imprecision.  |
| H           | Holding time exceeded.   |
| I           | Internal standard recovery outside of acceptance limits.                                   |
| L           | LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.                  |
| L+          | LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.    |
| L-          | LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.     |
| LD          | Laboratory duplicate imprecision.  |
| LP          | LCS/LCSD imprecision.  |
| M           | MS and MSD recoveries outside of acceptance limits, indeterminate bias.                    |
| M+          | MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.      |
| M-          | MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.       |
| MP          | MS/MSD imprecision.  |
| P           | Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.          |
| P+          | Post-digestion spike recovery outside of acceptance limits. The result may be biased high. |
| P-          | Post-digestion spike recovery outside of acceptance limits. The result may be biased low.  |
| Q           | Chemical Preservation issue.   |
| R           | RL standards outside of acceptance limits, indeterminate bias.                             |
| R+          | RL standard(s) outside of acceptance limits. The result may be biased high.                |
| R-          | RL standard(s) outside of acceptance limits. The result may be biased low.                 |
| RL          | Reported result between the MDL and the RL.  |
| T           | Temperature preservation issue.  |
| SD          | Serial Dilution imprecision.   |
| X           | Percent solids < 50%.  |
| Y+          | Chemical Yield outside of acceptance limits. The result may be biased high.                |
| Y-          | Chemical yield outside of acceptance limits. The result may be biased low.                 |
| Z           | ICP or ICP/MS Interference.  |
| ZZ          | Other.   |

|                 |                              |
|-----------------|------------------------------|
| Lab Sample ID   | 180-84161-1                  |
| Sys Sample Code | BRF-BS-BG04-1.2/3.2-20181116 |
| Sample Name     | BRF-BS-BG04-1.2/3.2-20181116 |
| Sample Date     | 11/16/2018 11:23:00 AM       |
| Location        | BRF-BG-04                    |
| Sample Type     | N                            |
| Parent Sample   |                              |

| Analytic Method | Chemical Name      | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL | Final QL | Final Detect | Final Report | DF  | Basis |
|-----------------|--------------------|------------|----------|-------------|--------------|------------|-------------|-----------|----------|----------|--------------|--------------|-----|-------|
| SW-846 6020A    | Antimony           | 7440-36-0  | T        | MG/KG       | 0.249        | J          | M-          | 0.0740    | 0.0740   | 0.239    | Y            | Yes          | 1   | DRY   |
|                 | Arsenic            | 7440-38-2  | T        | MG/KG       | 5.78         | J          | M+          | 0.0310    | 0.0310   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Barium             | 7440-39-3  | T        | MG/KG       | 69.2         |            |             | 0.0680    | 0.0680   | 1.19     | Y            | Yes          | 1   | DRY   |
|                 | Beryllium          | 7440-41-7  | T        | MG/KG       | 0.838        |            |             | 0.00895   | 0.00895  | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Boron              | 7440-42-8  | T        | MG/KG       |              | U*         | BF,RL       | 2.05      | 2.05     | 9.55     | N            | Yes          | 1   | DRY   |
|                 | Cadmium            | 7440-43-9  | T        | MG/KG       | 0.183        |            |             | 0.0203    | 0.0203   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Calcium            | 7440-70-2  | T        | MG/KG       | 1020         |            |             | 10.7      | 10.7     | 59.7     | Y            | Yes          | 1   | DRY   |
|                 | Chromium           | 7440-47-3  | T        | MG/KG       | 25.2         | J          | M+          | 0.0788    | 0.0788   | 0.239    | Y            | Yes          | 1   | DRY   |
|                 | Cobalt             | 7440-48-4  | T        | MG/KG       | 41.2         |            |             | 0.00991   | 0.00991  | 0.0597   | Y            | Yes          | 1   | DRY   |
|                 | Copper             | 7440-50-8  | T        | MG/KG       | 11.2         | J          | M-          | 0.135     | 0.135    | 0.239    | Y            | Yes          | 1   | DRY   |
|                 | Lead               | 7439-92-1  | T        | MG/KG       | 69.9         |            |             | 0.0418    | 0.0418   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Lithium            | 7439-93-2  | T        | MG/KG       | 6.16         | J          | M-          | 0.329     | 0.329    | 0.597    | Y            | Yes          | 1   | DRY   |
|                 | Molybdenum         | 7439-98-7  | T        | MG/KG       | 0.708        |            |             | 0.0740    | 0.0740   | 0.597    | Y            | Yes          | 1   | DRY   |
|                 | Nickel             | 7440-02-0  | T        | MG/KG       | 9.01         | J          | M+          | 0.0728    | 0.0728   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Selenium           | 7782-49-2  | T        | MG/KG       | 0.364        | J          | RL          | 0.0716    | 0.0716   | 0.597    | Y            | Yes          | 1   | DRY   |
|                 | Silver             | 7440-22-4  | T        | MG/KG       | 0.0240       | J          | RL          | 0.0167    | 0.0167   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Thallium           | 7440-28-0  | T        | MG/KG       | 0.189        |            |             | 0.0155    | 0.0155   | 0.119    | Y            | Yes          | 1   | DRY   |
|                 | Vanadium           | 7440-62-2  | T        | MG/KG       | 23.6         |            |             | 0.0728    | 0.0728   | 0.119    | Y            | Yes          | 1   | DRY   |
| Zinc            | 7440-66-6          | T          | MG/KG    | 26.0        | J            | MP         | 0.399       | 0.399     | 0.597    | Y        | Yes          | 1            | DRY |       |
| SW-846 7471B    | Mercury            | 7439-97-6  | T        | MG/KG       | 0.0300       | J          | M-,RL       | 0.0162    | 0.0162   | 0.0373   | Y            | Yes          | 1   | DRY   |
| SW-846 9045D    | pH at 25 Degrees C | PH         | N        | SU          | 7.5          |            |             | 0.1       | 0.1      | 0.1      | Y            | Yes          | 1   | WET   |
| SW-846 9056A    | Chloride           | 16887-00-6 | N        | MG/KG       |              | U          |             | 4.63      | 4.63     | 11.9     | N            | Yes          | 1   | DRY   |
|                 | Fluoride           | 16984-48-8 | N        | MG/KG       |              | UJ         | M-          | 0.812     | 0.812    | 1.19     | N            | Yes          | 1   | DRY   |
|                 | Sulfate            | 14808-79-8 | N        | MG/KG       | 12.9         |            |             | 8.10      | 8.10     | 11.9     | Y            | Yes          | 1   | DRY   |

|                 |                              |
|-----------------|------------------------------|
| Lab Sample ID   | 180-84161-2                  |
| Sys Sample Code | BRF-BS-DUP02-20181116        |
| Sample Name     | BRF-BS-DUP02-20181116        |
| Sample Date     | 11/16/2018 12:00:00 AM       |
| Location        | BRF-BG-04                    |
| Sample Type     | FD                           |
| Parent Sample   | BRF-BS-BG04-0.0/0.5-20181116 |

| Analytic Method | Chemical Name      | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL | Final QL | Final Detect | Final Report | DF  | Basis |
|-----------------|--------------------|------------|----------|-------------|--------------|------------|-------------|-----------|----------|----------|--------------|--------------|-----|-------|
| SW-846 6020A    | Antimony           | 7440-36-0  | T        | MG/KG       | 2.81         | J          | FD,M-       | 0.0763    | 0.0763   | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Arsenic            | 7440-38-2  | T        | MG/KG       | 4.50         | J          | M+          | 0.0320    | 0.0320   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Barium             | 7440-39-3  | T        | MG/KG       | 56.9         |            |             | 0.0701    | 0.0701   | 1.23     | Y            | Yes          | 1   | DRY   |
|                 | Beryllium          | 7440-41-7  | T        | MG/KG       | 0.303        |            |             | 0.00922   | 0.00922  | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Boron              | 7440-42-8  | T        | MG/KG       |              | U*         | BF,RL       | 7.90      | 7.90     | 9.84     | N            | Yes          | 1   | DRY   |
|                 | Cadmium            | 7440-43-9  | T        | MG/KG       | 7.44         | J          | FD          | 0.0209    | 0.0209   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Calcium            | 7440-70-2  | T        | MG/KG       | 128000       |            |             | 11.0      | 11.0     | 61.5     | Y            | Yes          | 1   | DRY   |
|                 | Chromium           | 7440-47-3  | T        | MG/KG       | 14.3         | J          | M+          | 0.0812    | 0.0812   | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Cobalt             | 7440-48-4  | T        | MG/KG       | 5.82         |            |             | 0.0102    | 0.0102   | 0.0615   | Y            | Yes          | 1   | DRY   |
|                 | Copper             | 7440-50-8  | T        | MG/KG       | 85.0         | J          | M-          | 0.139     | 0.139    | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Lead               | 7439-92-1  | T        | MG/KG       | 48.7         |            |             | 0.0430    | 0.0430   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Lithium            | 7439-93-2  | T        | MG/KG       | 8.00         | J          | FD,M-       | 0.339     | 0.339    | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Molybdenum         | 7439-98-7  | T        | MG/KG       | 1.18         |            |             | 0.0763    | 0.0763   | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Nickel             | 7440-02-0  | T        | MG/KG       | 11.0         | J          | M+          | 0.0750    | 0.0750   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Selenium           | 7782-49-2  | T        | MG/KG       | 0.510        | J          | RL          | 0.0738    | 0.0738   | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Silver             | 7440-22-4  | T        | MG/KG       | 0.0593       | J          | RL          | 0.0172    | 0.0172   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Thallium           | 7440-28-0  | T        | MG/KG       | 0.0809       | J          | RL          | 0.0160    | 0.0160   | 0.123    | Y            | Yes          | 1   | DRY   |
| Vanadium        | 7440-62-2          | T          | MG/KG    | 13.2        |              |            | 0.0750      | 0.0750    | 0.123    | Y        | Yes          | 1            | DRY |       |
| Zinc            | 7440-66-6          | T          | MG/KG    | 1450        | J            | FD,MP      | 0.411       | 0.411     | 0.615    | Y        | Yes          | 1            | DRY |       |
| SW-846 7471B    | Mercury            | 7439-97-6  | T        | MG/KG       |              | UR         | M-          | 0.0167    | 0.0167   | 0.0386   | N            | Yes          | 1   | DRY   |
| SW-846 9045D    | pH at 25 Degrees C | PH         | N        | SU          | 7.9          |            |             | 0.1       | 0.1      | 0.1      | Y            | Yes          | 1   | WET   |
| SW-846 9056A    | Chloride           | 16887-00-6 | N        | MG/KG       |              | U          |             | 4.86      | 4.86     | 12.5     | N            | Yes          | 1   | DRY   |
|                 | Fluoride           | 16984-48-8 | N        | MG/KG       | 1.62         | J          | M-          | 0.852     | 0.852    | 1.25     | Y            | Yes          | 1   | DRY   |
|                 | Sulfate            | 14808-79-8 | N        | MG/KG       |              | U          |             | 8.51      | 8.51     | 12.5     | N            | Yes          | 1   | DRY   |

|                 |                              |
|-----------------|------------------------------|
| Lab Sample ID   | 180-84161-3                  |
| Sys Sample Code | BRF-BS-BG04-6.5/8.5-20181116 |
| Sample Name     | BRF-BS-BG04-6.5/8.5-20181116 |
| Sample Date     | 11/16/2018 11:31:00 AM       |
| Location        | BRF-BG-04                    |
| Sample Type     | N                            |
| Parent Sample   |                              |

| Analytic Method | Chemical Name      | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL | Final QL | Final Detect | Final Report | DF  | Basis |
|-----------------|--------------------|------------|----------|-------------|--------------|------------|-------------|-----------|----------|----------|--------------|--------------|-----|-------|
| SW-846 6020A    | Antimony           | 7440-36-0  | T        | MG/KG       | 0.195        | J          | M-,RL       | 0.0762    | 0.0762   | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Arsenic            | 7440-38-2  | T        | MG/KG       | 7.76         | J          | M+          | 0.0320    | 0.0320   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Barium             | 7440-39-3  | T        | MG/KG       | 73.6         |            |             | 0.0701    | 0.0701   | 1.23     | Y            | Yes          | 1   | DRY   |
|                 | Beryllium          | 7440-41-7  | T        | MG/KG       | 0.800        |            |             | 0.00922   | 0.00922  | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Boron              | 7440-42-8  | T        | MG/KG       |              | U*         | BF,RL       | 1.71      | 1.71     | 9.84     | N            | Yes          | 1   | DRY   |
|                 | Cadmium            | 7440-43-9  | T        | MG/KG       | 0.220        | J          | ZZ          | 0.0209    | 0.0209   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Calcium            | 7440-70-2  | T        | MG/KG       | 1210         |            |             | 11.0      | 11.0     | 61.5     | Y            | Yes          | 1   | DRY   |
|                 | Chromium           | 7440-47-3  | T        | MG/KG       | 26.5         | J          | M+          | 0.0811    | 0.0811   | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Cobalt             | 7440-48-4  | T        | MG/KG       | 37.8         |            |             | 0.0102    | 0.0102   | 0.0615   | Y            | Yes          | 1   | DRY   |
|                 | Copper             | 7440-50-8  | T        | MG/KG       | 9.69         | J          | M-          | 0.139     | 0.139    | 0.246    | Y            | Yes          | 1   | DRY   |
|                 | Lead               | 7439-92-1  | T        | MG/KG       | 60.5         |            |             | 0.0430    | 0.0430   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Lithium            | 7439-93-2  | T        | MG/KG       | 9.02         | J          | M-          | 0.339     | 0.339    | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Molybdenum         | 7439-98-7  | T        | MG/KG       | 1.07         |            |             | 0.0762    | 0.0762   | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Nickel             | 7440-02-0  | T        | MG/KG       | 9.83         | J          | M+          | 0.0750    | 0.0750   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Selenium           | 7782-49-2  | T        | MG/KG       | 0.319        | J          | RL          | 0.0738    | 0.0738   | 0.615    | Y            | Yes          | 1   | DRY   |
|                 | Silver             | 7440-22-4  | T        | MG/KG       | 0.0204       | J          | RL          | 0.0172    | 0.0172   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Thallium           | 7440-28-0  | T        | MG/KG       | 0.185        |            |             | 0.0160    | 0.0160   | 0.123    | Y            | Yes          | 1   | DRY   |
|                 | Vanadium           | 7440-62-2  | T        | MG/KG       | 26.6         |            |             | 0.0750    | 0.0750   | 0.123    | Y            | Yes          | 1   | DRY   |
| Zinc            | 7440-66-6          | T          | MG/KG    | 33.0        | J            | MP         | 0.411       | 0.411     | 0.615    | Y        | Yes          | 1            | DRY |       |
| SW-846 7471B    | Mercury            | 7439-97-6  | T        | MG/KG       |              | UR         | M-          | 0.0176    | 0.0176   | 0.0407   | N            | Yes          | 1   | DRY   |
| SW-846 9045D    | pH at 25 Degrees C | PH         | N        | SU          | 7.3          |            |             | 0.1       | 0.1      | 0.1      | Y            | Yes          | 1   | WET   |
| SW-846 9056A    | Chloride           | 16887-00-6 | N        | MG/KG       |              | U          |             | 4.62      | 4.62     | 11.9     | N            | Yes          | 1   | DRY   |
|                 | Fluoride           | 16984-48-8 | N        | MG/KG       |              | UJ         | M-          | 0.810     | 0.810    | 1.19     | N            | Yes          | 1   | DRY   |
|                 | Sulfate            | 14808-79-8 | N        | MG/KG       | 26.7         |            |             | 8.09      | 8.09     | 11.9     | Y            | Yes          | 1   | DRY   |

|                 |                        |
|-----------------|------------------------|
| Lab Sample ID   | 180-84161-4            |
| Sys Sample Code | BRF-BS-FB08-20181116   |
| Sample Name     | BRF-BS-FB08-20181116   |
| Sample Date     | 11/16/2018 11:10:00 AM |
| Location        | BRF-BG-04              |
| Sample Type     | FB                     |
| Parent Sample   |                        |

| Analytic Method | Chemical Name | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL  | Final QL | Final Detect | Final Report | DF | Basis |
|-----------------|---------------|------------|----------|-------------|--------------|------------|-------------|-----------|-----------|----------|--------------|--------------|----|-------|
| SW-846 6020A    | Antimony      | 7440-36-0  | T        | MG/L        |              | U          |             | 0.00112   | 0.00112   | 0.00200  | N            | Yes          | 1  | NA    |
|                 | Arsenic       | 7440-38-2  | T        | MG/L        |              | U          |             | 0.000323  | 0.000323  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Barium        | 7440-39-3  | T        | MG/L        |              | U          |             | 0.000373  | 0.000373  | 0.0100   | N            | Yes          | 1  | NA    |
|                 | Beryllium     | 7440-41-7  | T        | MG/L        |              | U          |             | 0.0000570 | 0.0000570 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Boron         | 7440-42-8  | T        | MG/L        | 0.0442       | J          | RL          | 0.0303    | 0.0303    | 0.0800   | Y            | Yes          | 1  | NA    |
|                 | Cadmium       | 7440-43-9  | T        | MG/L        |              | U          |             | 0.000125  | 0.000125  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Calcium       | 7440-70-2  | T        | MG/L        | 0.134        | J          | RL          | 0.116     | 0.116     | 0.500    | Y            | Yes          | 1  | NA    |
|                 | Chromium      | 7440-47-3  | T        | MG/L        | 0.00114      | J          | RL          | 0.000631  | 0.000631  | 0.00200  | Y            | Yes          | 1  | NA    |
|                 | Cobalt        | 7440-48-4  | T        | MG/L        |              | U          |             | 0.0000750 | 0.0000750 | 0.000500 | N            | Yes          | 1  | NA    |
|                 | Copper        | 7440-50-8  | T        | MG/L        |              | U          |             | 0.00130   | 0.00130   | 0.00200  | N            | Yes          | 1  | NA    |
|                 | Lead          | 7439-92-1  | T        | MG/L        |              | U          |             | 0.0000940 | 0.0000940 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Lithium       | 7439-93-2  | T        | MG/L        |              | U          |             | 0.00256   | 0.00256   | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Molybdenum    | 7439-98-7  | T        | MG/L        |              | U          |             | 0.000474  | 0.000474  | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Nickel        | 7440-02-0  | T        | MG/L        |              | U          |             | 0.000312  | 0.000312  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Selenium      | 7782-49-2  | T        | MG/L        |              | U          |             | 0.000813  | 0.000813  | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Silver        | 7440-22-4  | T        | MG/L        |              | U          |             | 0.000121  | 0.000121  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Thallium      | 7440-28-0  | T        | MG/L        |              | U          |             | 0.0000630 | 0.0000630 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Vanadium      | 7440-62-2  | T        | MG/L        | 0.000935     | J          | RL          | 0.000899  | 0.000899  | 0.00100  | Y            | Yes          | 1  | NA    |
| Zinc            | 7440-66-6     | T          | MG/L     |             | U            |            | 0.00242     | 0.00242   | 0.00500   | N        | Yes          | 1            | NA |       |
| SW-846 7470A    | Mercury       | 7439-97-6  | T        | MG/L        |              | U          |             | 0.0000653 | 0.0000653 | 0.000200 | N            | Yes          | 1  | NA    |
| SW-846 9056A    | Chloride      | 16887-00-6 | N        | MG/L        |              | U          |             | 0.715     | 0.715     | 1.00     | N            | Yes          | 1  | NA    |
|                 | Fluoride      | 16984-48-8 | N        | MG/L        |              | U          |             | 0.0263    | 0.0263    | 0.100    | N            | Yes          | 1  | NA    |
|                 | Sulfate       | 14808-79-8 | N        | MG/L        |              | U          |             | 0.380     | 0.380     | 1.00     | N            | Yes          | 1  | NA    |

|                 |                                |
|-----------------|--------------------------------|
| Lab Sample ID   | 180-84161-5                    |
| Sys Sample Code | BRF-BS-BG04-10.3/12.3-20181116 |
| Sample Name     | BRF-BS-BG04-10.3/12.3-20181116 |
| Sample Date     | 11/16/2018 11:43:00 AM         |
| Location        | BRF-BG-04                      |
| Sample Type     | N                              |
| Parent Sample   |                                |

| Analytic Method | Chemical Name      | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL | Final QL | Final Detect | Final Report | DF  | Basis |
|-----------------|--------------------|------------|----------|-------------|--------------|------------|-------------|-----------|----------|----------|--------------|--------------|-----|-------|
| SW-846 6020A    | Antimony           | 7440-36-0  | T        | MG/KG       | 0.136        | J          | M-,RL       | 0.0802    | 0.0802   | 0.259    | Y            | Yes          | 1   | DRY   |
|                 | Arsenic            | 7440-38-2  | T        | MG/KG       | 9.93         | J          | M+          | 0.0336    | 0.0336   | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Barium             | 7440-39-3  | T        | MG/KG       | 127          |            |             | 0.0737    | 0.0737   | 1.29     | Y            | Yes          | 1   | DRY   |
|                 | Beryllium          | 7440-41-7  | T        | MG/KG       | 1.81         |            |             | 0.00970   | 0.00970  | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Boron              | 7440-42-8  | T        | MG/KG       |              | U*         | BF,RL       | 3.11      | 3.11     | 10.3     | N            | Yes          | 1   | DRY   |
|                 | Cadmium            | 7440-43-9  | T        | MG/KG       | 0.476        |            |             | 0.0220    | 0.0220   | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Calcium            | 7440-70-2  | T        | MG/KG       | 4840         |            |             | 11.6      | 11.6     | 64.7     | Y            | Yes          | 1   | DRY   |
|                 | Chromium           | 7440-47-3  | T        | MG/KG       | 32.0         | J          | M+          | 0.0853    | 0.0853   | 0.259    | Y            | Yes          | 1   | DRY   |
|                 | Cobalt             | 7440-48-4  | T        | MG/KG       | 20.4         |            |             | 0.0107    | 0.0107   | 0.0647   | Y            | Yes          | 1   | DRY   |
|                 | Copper             | 7440-50-8  | T        | MG/KG       | 30.3         | J          | M-          | 0.146     | 0.146    | 0.259    | Y            | Yes          | 1   | DRY   |
|                 | Lead               | 7439-92-1  | T        | MG/KG       | 48.9         |            |             | 0.0453    | 0.0453   | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Lithium            | 7439-93-2  | T        | MG/KG       | 22.6         | J          | M-          | 0.357     | 0.357    | 0.647    | Y            | Yes          | 1   | DRY   |
|                 | Molybdenum         | 7439-98-7  | T        | MG/KG       |              | U*         | BL,RL       | 0.358     | 0.358    | 0.647    | N            | Yes          | 1   | DRY   |
|                 | Nickel             | 7440-02-0  | T        | MG/KG       | 31.6         | J          | M+          | 0.0789    | 0.0789   | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Selenium           | 7782-49-2  | T        | MG/KG       | 0.734        |            |             | 0.0776    | 0.0776   | 0.647    | Y            | Yes          | 1   | DRY   |
|                 | Silver             | 7440-22-4  | T        | MG/KG       | 0.0301       | J          | RL          | 0.0181    | 0.0181   | 0.129    | Y            | Yes          | 1   | DRY   |
|                 | Thallium           | 7440-28-0  | T        | MG/KG       | 0.172        |            |             | 0.0168    | 0.0168   | 0.129    | Y            | Yes          | 1   | DRY   |
| Vanadium        | 7440-62-2          | T          | MG/KG    | 27.6        |              |            | 0.0789      | 0.0789    | 0.129    | Y        | Yes          | 1            | DRY |       |
| Zinc            | 7440-66-6          | T          | MG/KG    | 77.0        | J            | MP         | 0.432       | 0.432     | 0.647    | Y        | Yes          | 1            | DRY |       |
| SW-846 7471B    | Mercury            | 7439-97-6  | T        | MG/KG       | 0.0403       | J          | M-,RL       | 0.0192    | 0.0192   | 0.0443   | Y            | Yes          | 1   | DRY   |
| SW-846 9045D    | pH at 25 Degrees C | PH         | N        | SU          | 8.1          |            |             | 0.1       | 0.1      | 0.1      | Y            | Yes          | 1   | WET   |
| SW-846 9056A    | Chloride           | 16887-00-6 | N        | MG/KG       |              | U          |             | 4.84      | 4.84     | 12.5     | N            | Yes          | 1   | DRY   |
|                 | Fluoride           | 16984-48-8 | N        | MG/KG       |              | UJ         | M-          | 0.848     | 0.848    | 1.25     | N            | Yes          | 1   | DRY   |
|                 | Sulfate            | 14808-79-8 | N        | MG/KG       | 49.2         |            |             | 8.47      | 8.47     | 12.5     | Y            | Yes          | 1   | DRY   |

|                 |                        |
|-----------------|------------------------|
| Lab Sample ID   | 180-84161-6            |
| Sys Sample Code | BRF-BS-EB03-20181116   |
| Sample Name     | BRF-BS-EB03-20181116   |
| Sample Date     | 11/16/2018 12:22:00 PM |
| Location        | BRF-BG-04              |
| Sample Type     | EB                     |
| Parent Sample   |                        |

| Analytic Method | Chemical Name | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL  | Final QL | Final Detect | Final Report | DF | Basis |
|-----------------|---------------|------------|----------|-------------|--------------|------------|-------------|-----------|-----------|----------|--------------|--------------|----|-------|
| SW-846 6020A    | Antimony      | 7440-36-0  | T        | MG/L        |              | U          |             | 0.00112   | 0.00112   | 0.00200  | N            | Yes          | 1  | NA    |
|                 | Arsenic       | 7440-38-2  | T        | MG/L        |              | U          |             | 0.000323  | 0.000323  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Barium        | 7440-39-3  | T        | MG/L        |              | U          |             | 0.000373  | 0.000373  | 0.0100   | N            | Yes          | 1  | NA    |
|                 | Beryllium     | 7440-41-7  | T        | MG/L        |              | U          |             | 0.0000570 | 0.0000570 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Boron         | 7440-42-8  | T        | MG/L        |              | U          |             | 0.0303    | 0.0303    | 0.0800   | N            | Yes          | 1  | NA    |
|                 | Cadmium       | 7440-43-9  | T        | MG/L        |              | U          |             | 0.000125  | 0.000125  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Calcium       | 7440-70-2  | T        | MG/L        |              | U          |             | 0.116     | 0.116     | 0.500    | N            | Yes          | 1  | NA    |
|                 | Chromium      | 7440-47-3  | T        | MG/L        | 0.00128      | J          | RL          | 0.000631  | 0.000631  | 0.00200  | Y            | Yes          | 1  | NA    |
|                 | Cobalt        | 7440-48-4  | T        | MG/L        |              | U          |             | 0.0000750 | 0.0000750 | 0.000500 | N            | Yes          | 1  | NA    |
|                 | Copper        | 7440-50-8  | T        | MG/L        |              | U          |             | 0.00130   | 0.00130   | 0.00200  | N            | Yes          | 1  | NA    |
|                 | Lead          | 7439-92-1  | T        | MG/L        |              | U          |             | 0.0000940 | 0.0000940 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Lithium       | 7439-93-2  | T        | MG/L        |              | U          |             | 0.00256   | 0.00256   | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Molybdenum    | 7439-98-7  | T        | MG/L        |              | U          |             | 0.000474  | 0.000474  | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Nickel        | 7440-02-0  | T        | MG/L        |              | U          |             | 0.000312  | 0.000312  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Selenium      | 7782-49-2  | T        | MG/L        |              | U          |             | 0.000813  | 0.000813  | 0.00500  | N            | Yes          | 1  | NA    |
|                 | Silver        | 7440-22-4  | T        | MG/L        |              | U          |             | 0.000121  | 0.000121  | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Thallium      | 7440-28-0  | T        | MG/L        |              | U          |             | 0.0000630 | 0.0000630 | 0.00100  | N            | Yes          | 1  | NA    |
|                 | Vanadium      | 7440-62-2  | T        | MG/L        | 0.00124      |            |             | 0.000899  | 0.000899  | 0.00100  | Y            | Yes          | 1  | NA    |
| Zinc            | 7440-66-6     | T          | MG/L     |             | U            |            | 0.00242     | 0.00242   | 0.00500   | N        | Yes          | 1            | NA |       |
| SW-846 7470A    | Mercury       | 7439-97-6  | T        | MG/L        |              | U          |             | 0.0000653 | 0.0000653 | 0.000200 | N            | Yes          | 1  | NA    |
| SW-846 9056A    | Chloride      | 16887-00-6 | N        | MG/L        |              | U          |             | 0.715     | 0.715     | 1.00     | N            | Yes          | 1  | NA    |
|                 | Fluoride      | 16984-48-8 | N        | MG/L        |              | U          |             | 0.0263    | 0.0263    | 0.100    | N            | Yes          | 1  | NA    |
|                 | Sulfate       | 14808-79-8 | N        | MG/L        |              | U          |             | 0.380     | 0.380     | 1.00     | N            | Yes          | 1  | NA    |

|                 |                              |
|-----------------|------------------------------|
| Lab Sample ID   | 180-84161-7                  |
| Sys Sample Code | BRF-BS-BG04-0.0/0.5-20181116 |
| Sample Name     | BRF-BS-BG04-0.0/0.5-20181116 |
| Sample Date     | 11/16/2018 12:04:00 PM       |
| Location        | BRF-BG-04                    |
| Sample Type     | N                            |
| Parent Sample   |                              |

| Analytic Method | Chemical Name      | CAS Rn     | Fraction | Result Unit | Final Result | Final Qual | Reason code | Final MDL | Final RL | Final QL | Final Detect | Final Report | DF  | Basis |
|-----------------|--------------------|------------|----------|-------------|--------------|------------|-------------|-----------|----------|----------|--------------|--------------|-----|-------|
| SW-846 6020A    | Antimony           | 7440-36-0  | T        | MG/KG       | 1.33         | J          | FD,M-       | 0.0759    | 0.0759   | 0.245    | Y            | Yes          | 1   | DRY   |
|                 | Arsenic            | 7440-38-2  | T        | MG/KG       | 3.87         | J          | M+          | 0.0318    | 0.0318   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Barium             | 7440-39-3  | T        | MG/KG       | 48.0         |            |             | 0.0698    | 0.0698   | 1.22     | Y            | Yes          | 1   | DRY   |
|                 | Beryllium          | 7440-41-7  | T        | MG/KG       | 0.326        |            |             | 0.00919   | 0.00919  | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Boron              | 7440-42-8  | T        | MG/KG       |              | U*         | BF          | 15.5      | 15.5     | 15.5     | N            | Yes          | 1   | DRY   |
|                 | Cadmium            | 7440-43-9  | T        | MG/KG       | 4.15         | J          | FD          | 0.0208    | 0.0208   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Calcium            | 7440-70-2  | T        | MG/KG       | 89600        |            |             | 11.0      | 11.0     | 61.2     | Y            | Yes          | 1   | DRY   |
|                 | Chromium           | 7440-47-3  | T        | MG/KG       | 11.0         | J          | M+          | 0.0808    | 0.0808   | 0.245    | Y            | Yes          | 1   | DRY   |
|                 | Cobalt             | 7440-48-4  | T        | MG/KG       | 5.80         |            |             | 0.0102    | 0.0102   | 0.0612   | Y            | Yes          | 1   | DRY   |
|                 | Copper             | 7440-50-8  | T        | MG/KG       | 61.4         | J          | M-          | 0.138     | 0.138    | 0.245    | Y            | Yes          | 1   | DRY   |
|                 | Lead               | 7439-92-1  | T        | MG/KG       | 43.2         |            |             | 0.0429    | 0.0429   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Lithium            | 7439-93-2  | T        | MG/KG       | 21.4         | J          | FD,M-       | 0.338     | 0.338    | 0.612    | Y            | Yes          | 1   | DRY   |
|                 | Molybdenum         | 7439-98-7  | T        | MG/KG       |              | U*         | BL          | 0.691     | 0.691    | 0.691    | N            | Yes          | 1   | DRY   |
|                 | Nickel             | 7440-02-0  | T        | MG/KG       | 9.54         | J          | M+          | 0.0747    | 0.0747   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Selenium           | 7782-49-2  | T        | MG/KG       | 0.499        | J          | RL          | 0.0735    | 0.0735   | 0.612    | Y            | Yes          | 1   | DRY   |
|                 | Silver             | 7440-22-4  | T        | MG/KG       | 0.0524       | J          | RL          | 0.0171    | 0.0171   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Thallium           | 7440-28-0  | T        | MG/KG       | 0.0921       | J          | RL          | 0.0159    | 0.0159   | 0.122    | Y            | Yes          | 1   | DRY   |
|                 | Vanadium           | 7440-62-2  | T        | MG/KG       | 14.8         |            |             | 0.0747    | 0.0747   | 0.122    | Y            | Yes          | 1   | DRY   |
| Zinc            | 7440-66-6          | T          | MG/KG    | 841         | J            | FD,MP      | 0.409       | 0.409     | 0.612    | Y        | Yes          | 1            | DRY |       |
| SW-846 7471B    | Mercury            | 7439-97-6  | T        | MG/KG       | 0.0340       | J          | M-,RL       | 0.0188    | 0.0188   | 0.0434   | Y            | Yes          | 1   | DRY   |
| SW-846 9045D    | pH at 25 Degrees C | PH         | N        | SU          | 7.9          |            |             | 0.1       | 0.1      | 0.1      | Y            | Yes          | 1   | WET   |
| SW-846 9056A    | Chloride           | 16887-00-6 | N        | MG/KG       |              | U          |             | 4.83      | 4.83     | 12.5     | N            | Yes          | 1   | DRY   |
|                 | Fluoride           | 16984-48-8 | N        | MG/KG       | 1.91         | J          | M-          | 0.847     | 0.847    | 1.25     | Y            | Yes          | 1   | DRY   |
|                 | Sulfate            | 14808-79-8 | N        | MG/KG       | 9.24         | J          | RL          | 8.46      | 8.46     | 12.5     | Y            | Yes          | 1   | DRY   |

**SECTION 3**

**SUPPORTING DOCUMENTATION FOR QUALIFIERS**



## INORGANIC ANALYSIS SUPPORT DOCUMENTATION

ESI project name: TVA BRF BGS  
 Sample Collection Dates: 11/16/18  
 Job Number: 20188395.A000  
 Project Manager: AJC  
 Laboratory: TestAmerica- Pittsburgh

Reviewed by: Danielle Coles  
 Approved by: AP  
 Completion Date: 12/2018

Applicable Sample No's ( X )      Refer to Table 1 in the Quality Assurance Review

|   |   |   |
|---|---|---|
| Deliverable:    CLP (Full)    ( )<br>Level IV (Full)    ( X )<br>Limited                    ( )<br>Other: _____ | <u>Sample No.</u><br>_____<br>180-84161-1<br>_____<br>_____ | <u>Lab Control No.</u><br>_____<br>_____<br>_____ |
|---|---|---|

The following table indicates criteria that were examined, the identified problems, and support documentation attachments

|   | Criteria Examined in Detail                            |           |      |          |  | Problems Identified                                    |           |      |          |  | Support Documentation Attachments                      |           |      |          |  |
|---|--|-----------|------|----------|--|--|-----------|------|----------|--|--|-----------|------|----------|--|
|   | Check (√) if Yes or Footnote Letter for Comments Below |           |      |          |  | Check (√) if Yes or Footnote Letter for Comments Below |           |      |          |  | Check (√) if Yes or Footnote Letter for Comments Below |           |      |          |  |
|   | 6020A  | 7470/7471 | 9056 | Gen Chem |  | 6020A  | 7470/7471 | 9056 | Gen Chem |  | 6020A  | 7470/7471 | 9056 | Gen Chem |  |
| Holding Times   | X  | X         | X    | X        |  |  |           |      |          |  |  |           |      |          |  |
| Blank Analysis Results                                | X  | X         | X    | X        |  | X  |           |      |          |  | X  |           |      |          |  |
| Matrix Spike (Predigestion) Results                   | X  | X         | X    |          |  | X  | X         | X    |          |  | X  | X         | X    |          |  |
| Duplicate Analysis: ( ) Field ( X ) Lab               |  |           |      | X        |  |  |           |      |          |  |  |           |      |          |  |
| Quantitation of Results                               | X  | X         | X    | X        |  |  |           |      |          |  |  |           |      |          |  |
| Detection Limit/Sensitivity                           |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| Initial Calibrations                                  | X  | X         | X    |          |  |  |           |      |          |  |  |           |      |          |  |
| Continuing Calibrations                               | X  | X         | X    | X        |  |  |           |      |          |  |  |           |      |          |  |
| Laboratory Control Standard (LCS)                     | X  | X         | X    | X        |  |  |           |      |          |  |  |           |      |          |  |
| ICP Linear Range Analysis                             | X  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| ICP Interference Checks                               |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| ICP Serial Dilutions                                  | X  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| ICP Post-Digestion Spike                              | X  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| GFAA Post Digestion Spikes                            |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| GFAA Duplicate Injections                             |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| ICP Multiple Exposures                                |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| GFAA Standard Additions                               |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| CRDL Standards  | X  | X         | X    |          |  |  |           |      |          |  |  |           |      |          |  |
| Condition on Receipt                                  | X  | X         | X    | X        |  |  |           |      |          |  |  |           |      |          |  |
| Percent Solids  |  |           |      |          |  |  |           |      |          |  |  |           |      |          |  |
| Others: ICPMS internal standards, multiple injections | X  |           |      |          |  | X  |           |      |          |  | X  |           |      |          |  |

Comments: All results are acceptable unless otherwise qualified.

---



---



---



---



---





# Client Sample Results

Client: Environmental Standards Inc.  
Project/Site: BRF\_BS\_20181116\_1A

TestAmerica Job ID: 180-84161-1

**Client Sample ID: BRF-BS-FB08-20181116**

**Lab Sample ID: 180-84161-4**

Date Collected: 11/16/18 11:10

Matrix: Water

Date Received: 11/17/18 09:30

| Method: EPA 9056A - Anions, Ion Chromatography |        |           |       |        |      |   |          |                |         |
|--|--------|-----------|-------|--------|------|---|----------|----------------|---------|
| Analyte  | Result | Qualifier | RL    | MDL    | Unit | D | Prepared | Analyzed       | Dil Fac |
| Chloride                                       | ND     |           | 1.00  | 0.715  | mg/L |   |          | 11/27/18 15:53 | 1       |
| Fluoride                                       | ND     |           | 0.100 | 0.0263 | mg/L |   |          | 11/27/18 15:53 | 1       |
| Sulfate  | ND     |           | 1.00  | 0.380  | mg/L |   |          | 11/27/18 15:53 | 1       |

| Method: EPA 6020A - Metals (ICP/MS) - Total Recoverable |          |           |          |           |      |   |                |                |         |
|---|----------|-----------|----------|-----------|------|---|----------------|----------------|---------|
| Analyte   | Result   | Qualifier | RL       | MDL       | Unit | D | Prepared       | Analyzed       | Dil Fac |
| Antimony  | ND       |           | 0.00200  | 0.00112   | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Arsenic   | ND       |           | 0.00100  | 0.000323  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Barium  | ND       |           | 0.0100   | 0.000373  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Beryllium   | ND       |           | 0.00100  | 0.0000570 | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Boron   | 0.0442   | J B       | 0.0800   | 0.0303    | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Cadmium   | ND       |           | 0.00100  | 0.000125  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Calcium   | 0.134    | J         | 0.500    | 0.116     | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Chromium  | 0.00114  | J         | 0.00200  | 0.000631  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Cobalt  | ND       |           | 0.000500 | 0.0000750 | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Copper  | ND       |           | 0.00200  | 0.00130   | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Lead  | ND       |           | 0.00100  | 0.0000940 | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Lithium   | ND       |           | 0.00500  | 0.00256   | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Molybdenum  | ND       |           | 0.00500  | 0.000474  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Nickel  | ND       |           | 0.00100  | 0.000312  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Selenium  | ND       |           | 0.00500  | 0.000813  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Silver  | ND       |           | 0.00100  | 0.000121  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Thallium  | ND       |           | 0.00100  | 0.0000630 | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Vanadium  | 0.000935 | J         | 0.00100  | 0.000899  | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |
| Zinc  | ND       |           | 0.00500  | 0.00242   | mg/L |   | 11/19/18 08:49 | 11/21/18 12:43 | 1       |

*U\* qual  
all soil samples*

*(+) 575x  
no qual*

| Method: EPA 7470A - Mercury (CVAA) |        |           |          |           |      |   |                |                |         |
|------------------------------------|--------|-----------|----------|-----------|------|---|----------------|----------------|---------|
| Analyte                            | Result | Qualifier | RL       | MDL       | Unit | D | Prepared       | Analyzed       | Dil Fac |
| Mercury                            | ND     |           | 0.000200 | 0.0000653 | mg/L |   | 11/19/18 15:40 | 11/20/18 21:39 | 1       |

3-IN  
INSTRUMENT BLANKS  
METALS

Lab Name: TestAmerica Pittsburgh

Job No.: 180-84161-1

SDG No.:

Concentration Units: ug/L

| Analyte    | RL    | ICB 180-263560/6<br>11/20/2018 14:19 ✓ |   | CCB1 180-263560/11<br>11/20/2018 14:42 ✓ |   | CCB2 180-263560/23<br>11/20/2018 15:42 ✓ |   | CCB3 180-263560/35<br>11/20/2018 16:42 ✓ |   |
|------------|-------|--|---|--|---|--|---|--|---|
|            |       | Found                                  | C | Found                                    | C | Found                                    | C | Found                                    | C |
| Antimony   | 2.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Arsenic    | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Barium     | 10.0  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Beryllium  | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Boron      | 80.0  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Cadmium    | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Calcium    | 500   | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Chromium   | 2.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Cobalt     | 0.500 | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Copper     | 2.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Lead       | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Lithium    | 5.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Molybdenum | 5.00  | ND                                     |   | 1.432 J                                  |   | ND                                       |   | 0.7210 J                                 |   |
| Nickel     | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | 0.3830 J                                 |   |
| Selenium   | 5.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Silver     | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Thallium   | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Vanadium   | 1.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |
| Zinc       | 5.00  | ND                                     |   | ND                                       |   | ND                                       |   | ND                                       |   |

clear

clear

1.432 ppb x 5 = 7.16  
U<sup>o</sup>BL = 7.1

0.7210 ppb x 5 = 3.605  
U<sup>o</sup>BL = 5

~~0.3830~~ 0.3830 ppb x 5 = 1.915  
result > 5x, no qual

Italicized analytes were not requested for this sequence.

5A-IN  
MATRIX SPIKE SAMPLE RECOVERY  
METALS

Client ID: BRF-BS-BG04-0.0/0.5-20181116 MS

Lab ID: 180-84161-7 MS

Lab Name: TestAmerica Pittsburgh

Job No.: 180-84161-1

SDG No.: \_\_\_\_\_

Matrix: Solid

Concentration Units: mg/Kg

% Solids: 80.0

| Analyte    | SSR<br>C | Sample<br>Result (SR)<br>C | Spike<br>Added (SA) | %R  | Control<br>Limit<br>%R | Q  | Method    |
|------------|----------|----------------------------|---------------------|-----|------------------------|----|-----------|
| Antimony   | 45.98    | 1.33                       | 65.1                | 69  | 75-125                 | F1 | EPA 6020A |
| Arsenic    | 9.096    | 3.87                       | 5.21                | 100 | 75-125                 |    | EPA 6020A |
| Barium     | 285.9    | 48.0                       | 260                 | 91  | 75-125                 |    | EPA 6020A |
| Beryllium  | 6.529 ✓  | 0.326                      | 6.51                | 95  | 75-125                 |    | EPA 6020A |
| Boron      | 122.8    | 15.5                       | 130                 | 83  | 75-125                 |    | EPA 6020A |
| Cadmium    | 11.88    | 4.15                       | 6.51                | 119 | 75-125                 |    | EPA 6020A |
| Calcium    | 100800   | 89600                      | 6510                | 173 | 75-125                 | 4* | EPA 6020A |
| Chromium   | 39.61    | 11.0                       | 26.0                | 110 | 75-125                 |    | EPA 6020A |
| Cobalt     | 68.20    | 5.80                       | 65.1                | 96  | 75-125                 |    | EPA 6020A |
| Copper     | 88.62    | 61.4                       | 32.5                | 84  | 75-125                 |    | EPA 6020A |
| Lead       | 45.06    | 43.2                       | 2.60                | 71  | 75-125                 | 4* | EPA 6020A |
| Lithium    | 19.13 ✓  | 21.4                       | 6.51                | -35 | 75-125                 | F1 | EPA 6020A |
| Molybdenum | 123.4 ✓  | 0.691                      | 130                 | 94  | 75-125                 |    | EPA 6020A |
| Nickel     | 75.55    | 9.54                       | 65.1                | 101 | 75-125                 |    | EPA 6020A |
| Selenium   | 1.986    | 0.499 J                    | 1.30                | 114 | 75-125                 |    | EPA 6020A |
| Silver     | 5.961    | 0.0524 J                   | 6.51                | 91  | 75-125                 |    | EPA 6020A |
| Thallium   | 6.175 ✓  | 0.0921 J                   | 6.51                | 93  | 75-125                 |    | EPA 6020A |
| Vanadium   | 81.02    | 14.8                       | 65.1                | 102 | 75-125                 |    | EPA 6020A |
| Zinc       | 1301     | 841                        | 65.1                | 708 | 75-125                 | 4* | EPA 6020A |
| Mercury    | ND       | 0.0340 J                   | 0.223               | 0   | 80-120                 | F1 | EPA 7471B |

SSR = Spiked Sample Result

\* result > 4x Spike, no eval

**Sb+Li**

J,M-:1-3,5,7

**Hg**

J,U,R,M-:1-3,5,7

Calculations are performed before rounding to avoid round-off errors in calculated results.  
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VA - IN

5A-IN  
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY  
METALS

Client ID: BRF-BS-BG04-0.0/0.5-20181116 MSD

Lab ID: 180-84161-7 MSD

Lab Name: TestAmerica Pittsburgh

Job No.: 180-84161-1

SDG No.:

Matrix: Solid

Concentration Units: mg/Kg

% Solids: 80.0

35

| Analyte    | (SDR)<br>C | Spike Added (SA) | %R    | Control Limit %R | RPD  | RPD Limit | Q        | Method    |
|------------|------------|------------------|-------|------------------|------|-----------|----------|-----------|
| Antimony   | 35.20      | 60.6             | 56    | 75-125           | 27   | 20        | F2<br>F1 | EPA 6020A |
| Arsenic    | 11.81      | 4.85             | 164   | 75-125           | 26   | 20        | F1<br>F2 | EPA 6020A |
| Barium     | 301.0 ✓    | 243              | 104   | 75-125           | 5    | 20        |          | EPA 6020A |
| Beryllium  | 6.456      | 6.06             | 101 ✓ | 75-125           | 1    | 20        |          | EPA 6020A |
| Boron      | 105.9      | 121              | 75    | 75-125           | 15 ✓ | 20        |          | EPA 6020A |
| Cadmium    | 9.726      | 6.06             | 92    | 75-125           | 20   | 20        |          | EPA 6020A |
| Calcium    | 96110      | 6060             | 108   | 75-125           | 5    | 20        | 4        | EPA 6020A |
| Chromium   | 48.16      | 24.3             | 153   | 75-125           | 19   | 20        | F1       | EPA 6020A |
| Cobalt     | 68.11      | 60.6             | 103   | 75-125           | 0    | 20        |          | EPA 6020A |
| Copper     | 63.07 ✓    | 30.3             | 6     | 75-125           | 34   | 20        | F2<br>F1 | EPA 6020A |
| Lead       | 38.86      | 2.43             | -180  | 75-125           | 15 ✓ | 20        | 4        | EPA 6020A |
| Lithium    | 26.57      | 6.06             | 85 ✓  | 75-125           | 33 ✓ | 20        | F2       | EPA 6020A |
| Molybdenum | 115.5      | 121              | 95    | 75-125           | 7    | 20        |          | EPA 6020A |
| Nickel     | 85.97      | 60.6             | 126   | 75-125           | 13   | 20        | F1       | EPA 6020A |
| Selenium   | 1.519 ✓    | 1.21             | 84    | 75-125           | 27   | 20        | F2       | EPA 6020A |
| Silver     | 5.523      | 6.06             | 90    | 75-125           | 8    | 20        |          | EPA 6020A |
| Thallium   | 5.750      | 6.06             | 93    | 75-125           | 7    | 20        |          | EPA 6020A |
| Vanadium   | 88.64      | 60.6             | 122 ✓ | 75-125           | 9    | 20        |          | EPA 6020A |
| Zinc       | 808.7      | 60.6             | -53   | 75-125           | 47   | 20        | 4 F2     | EPA 6020A |
| Mercury    | 0.04484 ✓  | 0.223            | 5     | 80-120           | NC   | 20        | F1       | EPA 7471B |

SDR = Sample Duplicate Result

\* result > RPK spike, % R no omitted

Sb+Cu     Hg     As+Cr+Ni     Zn  
 WJ,M:-1-3,5,7     JOR,A:-1-3,5,7     J,M+:1-3,5,7     J,MP:1-3,5,7

Calculations are performed before rounding to avoid round-off errors in calculated results.  
Note - Results and Reporting Limits have been adjusted for dry weight.

FORM VD - IN

180-84161-B-3-A 11/20/2018 3:29:21 PM

User Pre-dilution: 1.000

| Run  | Time     | 7Li       | 9Be      | 10B       | 11B        | 13C        | 23Na     | 25Mg     | 26Mg     |
|------|----------|-----------|----------|-----------|------------|------------|----------|----------|----------|
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 74.530    | 6.533    | 13.980    | 13.650     | 0.000      | 235.000  | 9491.000 | 9489.000 |
| 2    | 15:28:37 | 72.250    | 6.245    | 13.670    | 14.090     | 0.000      | 237.500  | 9531.000 | 9502.000 |
| 3    | 15:28:45 | 73.430    | 6.732    | 12.710    | 13.950     | 0.000      | 232.300  | 9369.000 | 9378.000 |
| X    |          | 73.400    | 6.504    | 13.450    | 13.900     | 0.000      | 234.900  | 9464.000 | 9456.000 |
| σ    |          | 1.140     | 0.245    | 0.666     | 0.227      | 0.000      | 2.638    | 84.320   | 68.410   |
| %RSD |          | 1.553     | 3.769    | 4.949     | 1.630      | 0.000      | 1.123    | 0.891    | 0.723    |
| Run  | Time     | 27Al      | 28Si     | 37Cl      | 39K        | 43Ca       | 44Ca     | 45Sc     | 47Ti     |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 97560.000 | 9495.000 | 0.000     | 5983.000   | 9841.000   | 9872.000 | 99.434%  | 1198.000 |
| 2    | 15:28:37 | 97520.000 | 9684.000 | 0.000     | 6040.000   | 9690.000   | 9908.000 | 98.627%  | 1200.000 |
| 3    | 15:28:45 | 95750.000 | 9476.000 | 0.000     | 5920.000   | 10120.000  | 9686.000 | 97.728%  | 1174.000 |
| X    |          | 96940.000 | 9552.000 | 0.000     | 5981.000   | 9883.000   | 9822.000 | 98.597%  | 1191.000 |
| σ    |          | 1037.000  | 114.900  | 0.000     | 60.130     | 216.000    | 119.000  | 0.853%   | 14.350   |
| %RSD |          | 1.069     | 1.203    | 0.000     | 1.005      | 2.185      | 1.211    | 0.865    | 1.205    |
| Run  | Time     | 51V       | 52Cr     | 55Mn      | 56Fe       | 57Fe       | 59Co     | 60Ni     | 63Cu     |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 205.700   | 202.700  | 20910.000 | 173000.000 | 167700.000 | 276.900  | 71.200   | 65.460   |
| 2    | 15:28:37 | 210.600   | 205.700  | 20930.000 | 175900.000 | 171200.000 | 280.800  | 70.580   | 69.250   |
| 3    | 15:28:45 | 206.900   | 208.100  | 20830.000 | 177600.000 | 172200.000 | 279.100  | 74.040   | 69.730   |
| X    |          | 207.800   | 205.500  | 20890.000 | 175500.000 | 170400.000 | 278.900  | 71.940   | 68.150   |
| σ    |          | 2.565     | 2.699    | 51.130    | 2320.000   | 2382.000   | 1.962    | 1.846    | 2.338    |
| %RSD |          | 1.235     | 1.313    | 0.245     | 1.322      | 1.398      | 0.704    | 2.566    | 3.431    |
| Run  | Time     | 65Cu      | 66Zn     | 68Zn      | 75As       | 78Se       | 82Se     | 83Kr     | 88Sr     |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 69.130    | 225.600  | 218.500   | 51.800     | 2.525      | 5.489    | 0.000    | 23.810   |
| 2    | 15:28:37 | 66.800    | 232.500  | 220.200   | 51.020     | 1.758      | 3.475    | 0.000    | 26.750   |
| 3    | 15:28:45 | 69.250    | 235.000  | 219.100   | 49.870     | 1.774      | 9.807    | 0.000    | 26.530   |
| X    |          | 68.390    | 231.100  | 219.300   | 50.890     | 2.019      | 6.257    | 0.000    | 25.700   |
| σ    |          | 1.383     | 4.851    | 0.840     | 0.970      | 0.438      | 3.235    | 0.000    | 1.636    |
| %RSD |          | 2.022     | 2.099    | 0.383     | 1.907      | 21.710     | 51.710   | 0.000    | 6.368    |
| Run  | Time     | 89Y       | 95Mo     | 98Mo      | 103Rh      | 107Ag      | 109Ag    | 111Cd    | 114Cd    |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 128.324%  | 7.066    | 8.024     | 89.931%    | 0.118      | 0.086    | 2.211    | 1.053    |
| 2    | 15:28:37 | 126.559%  | 6.892    | 7.588     | 89.948%    | 0.138      | 0.084    | 1.318    | 1.313    |
| 3    | 15:28:45 | 125.582%  | 7.316    | 7.808     | 88.809%    | 0.242      | 0.063    | 1.848    | 1.105    |
| X    |          | 126.822%  | 7.092    | 7.807     | 89.563%    | 0.166      | 0.078    | 1.792    | 1.157    |
| σ    |          | 1.390%    | 0.213    | 0.218     | 0.653%     | 0.067      | 0.013    | 0.449    | 0.137    |
| %RSD |          | 1.096     | 3.003    | 2.796     | 0.729      | 40.200     | 16.540   | 25.030   | 11.880   |
| Run  | Time     | 115In     | 118Sn    | 121Sb     | 123Sb      | 135Ba      | 137Ba    | 159Tb    | 203Tl    |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        | ppb      | ppb      | ppb      |
| 1    | 15:28:29 | 83.410%   | 37.480   | 1.610     | 1.645      | 610.000    | 595.600  | 89.751%  | 1.444    |
| 2    | 15:28:37 | 87.541%   | 35.730   | 1.372     | 1.284      | 586.500    | 594.400  | 87.797%  | 1.352    |
| 3    | 15:28:45 | 84.694%   | 36.840   | 1.773     | 1.610      | 608.800    | 605.000  | 86.821%  | 1.422    |
| X    |          | 85.215%   | 36.690   | 1.585     | 1.513      | 601.800    | 598.400  | 88.123%  | 1.406    |
| σ    |          | 2.115%    | 0.884    | 0.202     | 0.199      | 13.260     | 5.789    | 1.492%   | 0.048    |
| %RSD |          | 2.481     | 2.409    | 12.740    | 13.170     | 2.203      | 0.968    | 1.693    | 3.439    |
| Run  | Time     | 205Tl     | 206Pb    | 207Pb     | 208Pb      | 209Bi      |          |          |          |
|      |          | ppb       | ppb      | ppb       | ppb        | ppb        |          |          |          |
| 1    | 15:28:29 | 1.468     | 514.500  | 473.600   | 492.900    | 77.429%    |          |          |          |
| 2    | 15:28:37 | 1.526     | 508.900  | 473.600   | 490.700    | 78.299%    |          |          |          |
| 3    | 15:28:45 | 1.516     | 513.100  | 476.600   | 493.300    | 77.499%    |          |          |          |
| X    |          | 1.503     | 512.200  | 474.600   | 492.300    | 77.742%    |          |          |          |
| σ    |          | 0.031     | 2.892    | 1.704     | 1.415      | 0.483%     |          |          |          |
| %RSD |          | 2.040     | 0.565    | 0.359     | 0.287      | 0.621      |          |          |          |

13.900 v\*BF

21.710 51.710

115In 109Ag

72%

25.030 72%

%RSD > 20%  
when conc > RL  
∴ T<sub>u</sub> qual

2A-IN  
 CALIBRATION VERIFICATIONS  
 METALS

Lab Name: TestAmerica Pittsburgh Job No.: 180-84161-1  
 SDG No.: \_\_\_\_\_  
 ICV Source: MHgWorkingicv\_01882 Concentration Units: ug/L  
 CCV Source: MHgworkingCal\_01921

| Analyte        | ICV 180-263550/7-A<br>11/21/2018 12:51 ✓ |   |      |       | CCV 180-263550/10-A<br>11/21/2018 12:54 |   |      |     | CCV 180-263550/10-A<br>11/21/2018 13:05 ✓ |   |      |    |
|----------------|--|---|------|-------|---|---|------|-----|---|---|------|----|
|                | Found                                    | C | True | %R    | Found                                   | C | True | %R  | Found                                     | C | True | %R |
| <i>Mercury</i> | <i>2.44</i> ND                           |   | 2.50 | 100 ✓ | ND                                      |   | 5.00 | 101 | <i>4.912</i> ND                           |   | 5.00 | 98 |

└──────────────────────────┘  
 does not bracket,  
 no end

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Italicized analytes were not requested for this sequence.

2A-IN  
 CALIBRATION VERIFICATIONS  
 METALS

Lab Name: TestAmerica Pittsburgh Job No.: 180-84161-1

SDG No.: \_\_\_\_\_

ICV Source: MHgWorkingicv\_01882 Concentration Units: ug/L

CCV Source: MHgworkingCal\_01921

| Analyte        | CCV 180-263550/10-A<br>11/21/2018 13:17 ✓ |   |      |      | CCV 180-263550/10-A<br>11/21/2018 13:28 ✓ |   |      |      | Found | C | True | %R |
|----------------|---|---|------|------|---|---|------|------|-------|---|------|----|
|                | Found                                     | C | True | %R   | Found                                     | C | True | %R   |       |   |      |    |
| <b>Mercury</b> | <i>4.826</i> ND                           |   | 5.00 | 97 ✓ | <i>4.864</i> ND                           |   | 5.00 | 97 ✓ |       |   |      |    |

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Italicized analytes were not requested for this sequence.

2B-IN  
CRQL CHECK STANDARD  
METALS

Lab Name: TestAmerica Pittsburgh Job No.: 180-84161-1  
 SDG No.: \_\_\_\_\_  
 Method: EPA 7471B Instrument ID: HGZ  
 Lab Sample ID: CRA 180-263550/9-A Concentration Units: ug/L  
 CRQL Check Standard Source: MHgworkingCal\_01921

| Analyte | CRQL Check Standard |       |            |       |        |
|---------|---------------------|-------|------------|-------|--------|
|         | True                | Found | Qualifiers | %R(1) | Limits |
| Mercury | 0.200               | 0.159 | ND ✓       | 80 ✓  | 70-130 |

Lab Sample ID: CRA 180-263550/9-A Concentration Units: ug/L  
 CRQL Check Standard Source: MHgworkingCal\_01921

| Analyte | CRQL Check Standard |       |            |       |        |
|---------|---------------------|-------|------------|-------|--------|
|         | True                | Found | Qualifiers | %R(1) | Limits |
| Mercury | 0.200               | 0.153 | ND -       | 77 ✓  | 70-130 |

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

Report Generated By Teledyne Leeman QuickTrace

Analyst: pitbal02

Worksheet file: C:\Users\Public\Documents\Teledyne CETAC\QuickTrace\Worksheets\HGZ81121A.wszf

Creation Date: 11/21/2018 12:08:48 PM

Comment:

## Results

| Sample Name            | Type | Date/Time            | Conc (ug/L) | µAbs   | %RSD | Residual | Flags | % Recovery |
|------------------------|------|----------------------|-------------|--------|------|----------|-------|------------|
| Calibration Blank      | STD  | 11/21/18 12:42:09 pm | 0.000       | 650    | 2.09 | -6.13    |       | N/A        |
| Standard #1 (0.2 ug/L) | STD  | 11/21/18 12:43:06 pm | 0.200       | 2750   | 1.51 | -9.82    |       | N/A        |
| Standard #2 (0.5 ug/L) | STD  | 11/21/18 12:44:03 pm | 0.500       | 5873   | 1.20 | -17.78   |       | N/A        |
| Standard #3 (1.0 ug/L) | STD  | 11/21/18 12:45:01 pm | 1.000       | 11301  | 1.42 | -10.20   |       | N/A        |
| Standard #4 (5 ug/L)   | STD  | 11/21/18 12:45:59 pm | 5.000       | 55080  | 1.10 | 83.65    |       | N/A        |
| Standard #5 (10 ug/L)  | STD  | 11/21/18 12:46:57 pm | 10.000      | 107230 | 1.44 | -39.72   |       | N/A        |

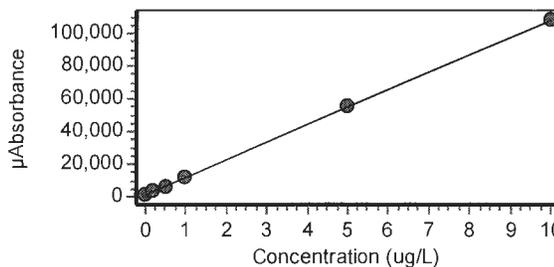
Calibration

Equation: Abs = 10693.892x + 715.889

R2: 0.99989

SEE: 510.8604

Flags:



|                     |      |                      |        |       |       |  |  |        |
|---------------------|------|----------------------|--------|-------|-------|--|--|--------|
| ICV 180-263550/7-A  | ICV  | 11/21/18 12:51:32 pm | 2.494  | 27381 | 1.06  |  |  | 99.74  |
| ICB 180-263550/8-A  | ICB  | 11/21/18 12:52:32 pm | -0.053 | 145   | 2.24  |  |  | N/A    |
| CRA 180-263550/9-A  | CRDL | 11/21/18 12:53:31 pm | 0.159  | 2411  | 1.38  |  |  | 79.26  |
| CCV 180-263550/10-A | CCV  | 11/21/18 12:54:30 pm | 5.029  | 54498 | 0.96  |  |  | 100.58 |
| CCB 180-263550/11-A | CCB  | 11/21/18 12:55:29 pm | -0.063 | 41    | 0.93  |  |  | N/A    |
| MB 180-263456/1-A   | MB   | 11/21/18 12:56:26 pm | -0.011 | 598   | 16.96 |  |  | N/A    |
| LCS 180-263456/2-A  | LCS  | 11/21/18 12:57:22 pm | 2.560  | 28095 | 1.32  |  |  | 102.41 |
| 180-83981-A-37-A    | UNK  | 11/21/18 12:58:18 pm | 1.567  | 17471 | 0.50  |  |  | N/A    |
| 180-83981-A-38-A    | UNK  | 11/21/18 12:59:15 pm | 0.695  | 8144  | 1.07  |  |  | N/A    |
| 180-83981-A-50-A    | UNK  | 11/21/18 01:00:12 pm | 4.579  | 49682 | 0.26  |  |  | N/A    |
| 180-83981-A-51-A    | UNK  | 11/21/18 01:01:09 pm | 0.317  | 4105  | 0.75  |  |  | N/A    |
| 180-83981-A-52-A    | UNK  | 11/21/18 01:02:06 pm | 1.204  | 13588 | 0.53  |  |  | N/A    |
| 180-83981-A-53-A    | UNK  | 11/21/18 01:03:03 pm | 0.282  | 3728  | 0.48  |  |  | N/A    |
| 180-83981-A-54-A    | UNK  | 11/21/18 01:04:01 pm | 0.124  | 2044  | 1.43  |  |  | N/A    |
| 180-83981-A-55-A    | UNK  | 11/21/18 01:04:58 pm | 0.065  | 1407  | 2.29  |  |  | N/A    |
| CCV 180-263550/10-A | CCV  | 11/21/18 01:05:57 pm | 4.912  | 53241 | 0.84  |  |  | 98.23  |
| CCB 180-263550/11-A | CCB  | 11/21/18 01:06:57 pm | -0.063 | 43    | 1.98  |  |  | N/A    |
| 180-83981-A-56-A    | UNK  | 11/21/18 01:07:55 pm | 0.063  | 1386  | 2.06  |  |  | N/A    |
| 180-83981-A-57-A    | UNK  | 11/21/18 01:08:53 pm | 0.136  | 2175  | 1.78  |  |  | N/A    |
| 180-83981-A-58-A    | UNK  | 11/21/18 01:09:49 pm | -0.007 | 636   | 15.99 |  |  | N/A    |
| 180-84063-A-1-G     | UNK  | 11/21/18 01:10:45 pm | 0.018  | 912   | 6.48  |  |  | N/A    |
| 180-84105-B-1-B     | UNK  | 11/21/18 01:11:42 pm | -0.052 | 159   | 1.01  |  |  | N/A    |

| Sample Name          | Type | Date/Time            | Conc (ug/L) | µAbs  | %RSD  | Residual | Flags | % Recovery |
|----------------------|------|----------------------|-------------|-------|-------|----------|-------|------------|
| 180-84105-B-2-B      | UNK  | 11/21/18 01:12:39 pm | -0.048      | 200   | 2.82  |          |       | N/A        |
| 180-84133-A-1-E      | UNK  | 11/21/18 01:13:35 pm | -0.056      | 116   | 1.48  |          |       | N/A        |
| 180-84161-A-1-B      | UNK  | 11/21/18 01:14:32 pm | 0.159       | 2416  | 0.64  |          |       | N/A        |
| 180-84161-A-2-B      | UNK  | 11/21/18 01:15:29 pm | 0.058       | 1338  | 2.05  |          |       | N/A        |
| 180-84161-A-3-B      | UNK  | 11/21/18 01:16:27 pm | 0.065       | 1408  | 11.55 |          |       | N/A        |
| CCV 180-263550/10-A  | CCV  | 11/21/18 01:17:26 pm | 4.826       | 52327 | 0.73  |          |       | 96.52      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 01:18:25 pm | -0.060      | 77    | 1.06  |          |       | N/A        |
| 180-84161-A-5-B      | UNK  | 11/21/18 01:19:23 pm | 0.180       | 2639  | 0.72  |          |       | N/A        |
| 180-84161-A-7-F      | UNK  | 11/21/18 01:20:20 pm | 0.155       | 2375  | 1.31  |          |       | N/A        |
| 180-84161-A-7-G MS   | UNK  | 11/21/18 01:21:18 pm | -0.050      | 178   | 2.29  |          |       | N/A        |
| 180-84161-A-7-H MSD  | UNK  | 11/21/18 01:22:16 pm | 0.201       | 2864  | 2.11  |          |       | N/A        |
| MB 180-263455/1-A    | MB   | 11/21/18 01:23:12 pm | -0.049      | 192   | 0.89  |          |       | N/A        |
| LCS 180-263455/2-A   | LCS  | 11/21/18 01:24:09 pm | 2.337       | 25704 | 0.56  |          |       | 93.47      |
| 180-83981-A-12-B     | UNK  | 11/21/18 01:25:06 pm | 0.799       | 9259  | 0.98  |          |       | N/A        |
| 180-83981-A-12-C MS  | UNK  | 11/21/18 01:26:02 pm | 1.621       | 18050 | 0.44  |          |       | N/A        |
| 180-83981-A-12-D MSD | UNK  | 11/21/18 01:26:59 pm | 1.605       | 17880 | 0.68  |          |       | N/A        |
| 180-83981-A-13-B     | UNK  | 11/21/18 01:27:56 pm | 1.273       | 14329 | 0.38  |          |       | N/A        |
| CCV 180-263550/10-A  | CCV  | 11/21/18 01:28:55 pm | 4.864       | 52731 | 0.80  |          |       | 97.28      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 01:29:55 pm | -0.058      | 100   | 2.21  |          |       | N/A        |
| 180-83981-A-39-B     | UNK  | 11/21/18 01:30:52 pm | 0.584       | 6956  | 0.74  |          |       | N/A        |
| 180-83981-A-40-B     | UNK  | 11/21/18 01:31:49 pm | 0.995       | 11357 | 0.23  |          |       | N/A        |
| 180-83981-A-41-B     | UNK  | 11/21/18 01:32:47 pm | 0.589       | 7012  | 0.67  |          |       | N/A        |
| 180-83981-A-42-B     | UNK  | 11/21/18 01:33:44 pm | 1.505       | 16815 | 0.57  |          |       | N/A        |
| 180-83981-A-43-B     | UNK  | 11/21/18 01:34:42 pm | 1.073       | 12193 | 0.67  |          |       | N/A        |
| 180-83981-A-44-B     | UNK  | 11/21/18 01:35:40 pm | 0.566       | 6766  | 0.77  |          |       | N/A        |
| 180-83981-A-45-B     | UNK  | 11/21/18 01:36:36 pm | 0.496       | 6021  | 0.39  |          |       | N/A        |
| 180-83981-A-5-A      | UNK  | 11/21/18 01:37:33 pm | 0.083       | 1602  | 2.49  |          |       | N/A        |
| 180-83981-A-6-A      | UNK  | 11/21/18 01:38:30 pm | 0.246       | 3349  | 1.34  |          |       | N/A        |
| 180-83981-A-7-A      | UNK  | 11/21/18 01:39:26 pm | 0.514       | 6209  | 0.60  |          |       | N/A        |
| CCV 180-263550/10-A  | CCV  | 11/21/18 01:40:25 pm | 4.850       | 52581 | 1.39  |          |       | 97.00      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 01:41:25 pm | -0.059      | 85    | 2.77  |          |       | N/A        |
| 180-83981-A-14-B     | UNK  | 11/21/18 01:42:22 pm | 3.008       | 32883 | 0.41  |          |       | N/A        |
| 180-83981-A-15-B     | UNK  | 11/21/18 01:43:19 pm | 1.122       | 12711 | 2.45  |          |       | N/A        |
| 180-83981-A-16-B     | UNK  | 11/21/18 01:44:16 pm | 0.898       | 10324 | 0.45  |          |       | N/A        |
| 180-83981-A-17-B     | UNK  | 11/21/18 01:45:13 pm | 1.693       | 18818 | 0.44  |          |       | N/A        |
| 180-83981-A-18-B     | UNK  | 11/21/18 01:46:11 pm | 0.457       | 5603  | 0.30  |          |       | N/A        |
| 180-83981-A-19-B     | UNK  | 11/21/18 01:47:08 pm | 0.305       | 3976  | 0.63  |          |       | N/A        |
| 180-83981-A-20-B     | UNK  | 11/21/18 01:48:06 pm | 0.241       | 3294  | 0.92  |          |       | N/A        |
| 180-83981-A-21-B     | UNK  | 11/21/18 01:49:04 pm | 0.380       | 4778  | 0.69  |          |       | N/A        |
| MB 180-263454/1-A    | MB   | 11/21/18 01:50:01 pm | -0.051      | 175   | 2.99  |          |       | N/A        |
| LCS 180-263454/2-A   | LCS  | 11/21/18 01:50:57 pm | 2.396       | 26340 | 0.86  |          |       | 95.84      |
| CCV 180-263550/10-A  | CCV  | 11/21/18 01:51:57 pm | 4.867       | 52760 | 0.96  |          |       | 97.33      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 01:52:56 pm | -0.062      | 55    | 1.94  |          |       | N/A        |

| Sample Name          | Type | Date/Time            | Conc (ug/L) | µAbs   | %RSD | Residual | Flags | % Recovery |
|----------------------|------|----------------------|-------------|--------|------|----------|-------|------------|
| 180-84074-A-1-F      | UNK  | 11/21/18 01:53:53 pm | 11.874      | 127696 | 1.00 |          | O     | N/A        |
| 180-84074-A-1-I MS   | UNK  | 11/21/18 01:56:22 pm | 10.607      | 114149 | 0.59 |          | O     | N/A        |
| 180-84074-A-1-J MSD  | UNK  | 11/21/18 01:58:34 pm | 6.219       | 67222  | 0.96 |          |       | N/A        |
| 180-84142-A-1-D      | UNK  | 11/21/18 01:59:31 pm | -0.058      | 90     | 1.34 |          |       | N/A        |
| 180-84142-A-2-D      | UNK  | 11/21/18 02:00:29 pm | -0.036      | 330    | 3.82 |          |       | N/A        |
| 180-84142-A-6-D      | UNK  | 11/21/18 02:01:26 pm | 0.016       | 885    | 7.32 |          |       | N/A        |
| 180-84142-A-8-D      | UNK  | 11/21/18 02:02:24 pm | 0.029       | 1022   | 7.44 |          |       | N/A        |
| 180-84142-A-10-D     | UNK  | 11/21/18 02:03:21 pm | -0.037      | 325    | 1.85 |          |       | N/A        |
| 180-84142-A-11-D     | UNK  | 11/21/18 02:04:19 pm | -0.043      | 255    | 2.24 |          |       | N/A        |
| 180-84142-A-4-D      | UNK  | 11/21/18 02:05:17 pm | 0.173       | 2569   | 1.14 |          |       | N/A        |
| ✓ CRA 180-263550/9-A | CRDL | 11/21/18 02:06:15 pm | 0.153       | 2351   | 2.92 |          |       | 76.47      |
| CCV 180-263550/10-A  | CCV  | 11/21/18 02:07:15 pm | 4.856       | 52649  | 0.58 |          |       | 97.13      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 02:08:14 pm | -0.058      | 97     | 0.54 |          |       | N/A        |
| 180-83769-A-2-C      | UNK  | 11/21/18 02:09:11 pm | 1.169       | 13214  | 0.65 |          |       | N/A        |
| 180-83769-A-3-C      | UNK  | 11/21/18 02:10:08 pm | 0.030       | 1035   | 4.19 |          |       | N/A        |
| 180-83769-A-4-C      | UNK  | 11/21/18 02:11:06 pm | -0.031      | 385    | 6.16 |          |       | N/A        |
| 180-83769-A-6-C      | UNK  | 11/21/18 02:12:03 pm | 0.554       | 6639   | 0.80 |          |       | N/A        |
| 180-83769-A-7-C      | UNK  | 11/21/18 02:13:00 pm | 0.876       | 10087  | 0.79 |          |       | N/A        |
| 180-83769-A-8-C      | UNK  | 11/21/18 02:13:58 pm | -0.041      | 282    | 2.76 |          |       | N/A        |
| 180-83769-A-33-B     | UNK  | 11/21/18 02:14:55 pm | 0.316       | 4097   | 0.83 |          |       | N/A        |
| 180-84221-A-1-A      | UNK  | 11/21/18 02:15:52 pm | 77.255      | 826867 | 0.20 |          | O     | N/A        |
| MB 180-263457/1-A    | MB   | 11/21/18 02:19:42 pm | 0.168       | 2510   | 2.77 |          |       | N/A        |
| LCS 180-263457/2-A   | LCS  | 11/21/18 02:20:40 pm | 2.429       | 26689  | 1.03 |          |       | 97.15      |
| CCV 180-263550/10-A  | CCV  | 11/21/18 02:21:39 pm | 4.696       | 50938  | 0.89 |          |       | 93.93      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 02:22:38 pm | -0.056      | 113    | 1.40 |          |       | N/A        |
| LCSD 180-263457/3-A  | LCS  | 11/21/18 02:23:36 pm | 2.274       | 25030  | 0.28 |          |       | 90.95      |
| 180-83981-A-8-A      | UNK  | 11/21/18 02:24:34 pm | 6.079       | 65721  | 2.38 |          |       | N/A        |
| 180-83981-A-9-A      | UNK  | 11/21/18 02:25:31 pm | 11.401      | 122635 | 0.57 |          | O     | N/A        |
| 180-83981-A-10-A     | UNK  | 11/21/18 02:27:40 pm | 4.965       | 53815  | 0.69 |          |       | N/A        |
| 180-83981-A-11-A     | UNK  | 11/21/18 02:28:38 pm | 0.996       | 11370  | 0.55 |          |       | N/A        |
| 180-83981-A-22-A     | UNK  | 11/21/18 02:29:35 pm | 1.310       | 14722  | 0.74 |          |       | N/A        |
| 180-83981-A-23-A     | UNK  | 11/21/18 02:30:32 pm | 0.337       | 4316   | 0.67 |          |       | N/A        |
| 180-83981-A-32-A     | UNK  | 11/21/18 02:31:30 pm | 6.234       | 67384  | 0.46 |          |       | N/A        |
| 180-83981-A-33-A     | UNK  | 11/21/18 02:32:27 pm | 1.956       | 21631  | 0.54 |          |       | N/A        |
| 180-83981-A-24-A     | UNK  | 11/21/18 02:33:25 pm | 3.380       | 36857  | 0.59 |          |       | N/A        |
| CCV 180-263550/10-A  | CCV  | 11/21/18 02:35:24 pm | 4.864       | 52732  | 0.75 |          |       | 97.28      |
| CCB 180-263550/11-A  | CCB  | 11/21/18 02:36:23 pm | -0.062      | 54     | 1.91 |          |       | N/A        |
| 180-83981-A-25-A     | UNK  | 11/21/18 02:37:21 pm | 2.211       | 24360  | 0.76 |          |       | N/A        |
| 180-83981-A-26-A     | UNK  | 11/21/18 02:38:18 pm | 0.787       | 9137   | 0.62 |          |       | N/A        |
| 180-83981-A-27-A     | UNK  | 11/21/18 02:39:16 pm | 7.893       | 85120  | 0.73 |          |       | N/A        |
| 180-83981-A-28-A     | UNK  | 11/21/18 02:41:22 pm | 0.564       | 6750   | 0.66 |          |       | N/A        |
| 180-83981-A-29-A     | UNK  | 11/21/18 02:42:19 pm | 0.693       | 8124   | 0.28 |          |       | N/A        |
| 180-83981-A-30-A     | UNK  | 11/21/18 02:43:17 pm | 0.995       | 11357  | 1.33 |          |       | N/A        |

| Sample Name         | Type | Date/Time            | Conc (ug/L) | μAbs   | %RSD  | Residual | Flags | % Recovery |
|---------------------|------|----------------------|-------------|--------|-------|----------|-------|------------|
| 180-83981-A-31-A    | UNK  | 11/21/18 02:44:14 pm | 8.089       | 87216  | 0.49  |          |       | N/A        |
| MB 180-263459/1-A   | MB   | 11/21/18 02:46:18 pm | -0.052      | 162    | 1.77  |          |       | N/A        |
| LCS 180-263459/2-A  | LCS  | 11/21/18 02:47:15 pm | 2.412       | 26512  | 0.62  |          |       | 96.49      |
| 180-83821-B-1-N     | UNK  | 11/21/18 02:48:13 pm | 0.204       | 2903   | 10.68 |          |       | N/A        |
| CCV 180-263550/10-A | CCV  | 11/21/18 02:49:12 pm | 4.751       | 51518  | 0.91  |          |       | 95.01      |
| CCB 180-263550/11-A | CCB  | 11/21/18 02:50:11 pm | -0.061      | 64     | 0.62  |          |       | N/A        |
| 180-83821-B-1-O MS  | UNK  | 11/21/18 02:51:09 pm | 1.131       | 12815  | 0.89  |          |       | N/A        |
| 180-83821-B-1-P MSD | UNK  | 11/21/18 02:52:06 pm | 1.129       | 12791  | 0.93  |          |       | N/A        |
| 180-83821-B-2-N     | UNK  | 11/21/18 02:53:04 pm | 0.248       | 3364   | 1.60  |          |       | N/A        |
| 180-83821-B-3-J     | UNK  | 11/21/18 02:54:01 pm | 0.199       | 2843   | 0.29  |          |       | N/A        |
| MB 180-263458/1-A   | MB   | 11/21/18 02:54:59 pm | -0.049      | 192    | 2.50  |          |       | N/A        |
| LCS 180-263458/2-A  | LCS  | 11/21/18 02:55:57 pm | 2.398       | 26361  | 0.83  |          |       | 95.92      |
| 480-145097-E-1-A    | UNK  | 11/21/18 02:56:54 pm | -0.033      | 358    | 3.38  |          |       | N/A        |
| 460-168967-B-1-E    | UNK  | 11/21/18 02:57:52 pm | -0.020      | 506    | 4.19  |          |       | N/A        |
| 180-84048-A-1-C     | UNK  | 11/21/18 02:58:49 pm | -0.052      | 159    | 1.98  |          |       | N/A        |
| 180-84085-A-1-J     | UNK  | 11/21/18 02:59:47 pm | -0.051      | 167    | 0.60  |          |       | N/A        |
| CCV 180-263550/10-A | CCV  | 11/21/18 03:00:46 pm | 4.805       | 52100  | 0.74  |          |       | 96.10      |
| CCB 180-263550/11-A | CCB  | 11/21/18 03:01:45 pm | -0.060      | 71     | 2.35  |          |       | N/A        |
| 180-84085-A-1-K MS  | UNK  | 11/21/18 03:02:43 pm | 0.771       | 8957   | 1.44  |          |       | N/A        |
| 180-84085-A-1-L MSD | UNK  | 11/21/18 03:03:41 pm | 0.775       | 9009   | 0.62  |          |       | N/A        |
| 180-84022-A-1-C     | UNK  | 11/21/18 03:04:38 pm | 7.504       | 80967  | 0.58  |          |       | N/A        |
| 180-84074-A-1-F @2  | UNK  | 11/21/18 03:06:47 pm | 5.426       | 58735  | 0.99  |          |       | N/A        |
| 180-84221-A-1-A @10 | UNK  | 11/21/18 03:07:45 pm | 15.115      | 162351 | 0.50  |          | ○     | N/A        |
| 180-83981-A-9-A @2  | UNK  | 11/21/18 03:10:06 pm | 6.207       | 67094  | 0.48  |          |       | N/A        |
| 180-84221-A-1-A @20 | UNK  | 11/21/18 03:11:10 pm | 7.603       | 82017  | 1.30  |          |       | N/A        |
| CRA 180-263550/9-A  | CRDL | 11/21/18 03:13:23 pm | 0.149       | 2310   | 2.06  |          |       | 74.52      |
| CCV 180-263550/10-A | CCV  | 11/21/18 03:14:22 pm | 4.702       | 50993  | 0.60  |          |       | 94.03      |
| CCB 180-263550/11-A | CCB  | 11/21/18 03:15:21 pm | -0.055      | 125    | 1.64  |          |       | N/A        |

FORM III  
HPLC/IC MATRIX SPIKE RECOVERY

Lab Name: TestAmerica Pittsburgh Job No.: 180-84161-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Solid (Soluble) Level: Low Lab File ID: 11-19-2018-49.d  
 Lab ID: 180-84161-7 MS Client ID: BRF-BS-BG04-0.0/0.5-20181116 MS

**75-125**

| COMPOUND | SPIKE<br>ADDED<br>(mg/Kg) | SAMPLE<br>CONCENTRATION<br>(mg/Kg) | MS<br>CONCENTRATION<br>(mg/Kg) | MS<br>%<br>REC | QC<br>LIMITS<br>REC | #  |
|----------|---------------------------|------------------------------------|--------------------------------|----------------|---------------------|----|
| Chloride | 308                       | ND                                 | 292.8 ✓                        | 95 ✓           | 80-120              |    |
| Fluoride | 15.4                      | 1.91                               | 13.87 ✓                        | 78 ✓           | 80-120              | F1 |
| Sulfate  | 308                       | 9.24 J                             | 291.9                          | 92 ✓           | 80-120              |    |

# Column to be used to flag recovery and RPD values  
 FORM III EPA 9056A

FORM III  
HPLC/IC MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: TestAmerica Pittsburgh Job No.: 180-84161-1  
 SDG No.: \_\_\_\_\_  
 Matrix: Solid (Soluble) Level: Low Lab File ID: 11-19-2018-50.d  
 Lab ID: 180-84161-7 MSD Client ID: BRF-BS-BG04-0.0/0.5-20181116 MS

| COMPOUND | SPIKE ADDED (mg/Kg) | MSD CONCENTRATION (mg/Kg) | MSD % |      | QC LIMITS |        | #     |
|----------|---------------------|---------------------------|-------|------|-----------|--------|-------|
|          |                     |                           | REC   | RPD  | RPD       | REC    |       |
| Chloride | 301                 | 262.9 ✓                   | 87 ✓  | 11 ✓ | 15        | 80-120 |       |
| Fluoride | 15.1                | 11.38 ✓                   | 63    | 20   | 15        | 80-120 | F1 F2 |
| Sulfate  | 301                 | 256.6                     | 82 ✓  | 13 ✓ | 15        | 80-120 |       |

J/W, M = 1-3, 5, 7

# Column to be used to flag recovery and RPD values

**SECTION 4**

**CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD**

# Case Narrative

Client: Environmental Standards Inc.  
Project/Site: BRF\_BS\_20181116\_1A

TestAmerica Job ID: 180-84161-1

**Job ID: 180-84161-1**

**Laboratory: TestAmerica Pittsburgh**

## Narrative

**Job Narrative**  
**180-84161-1**

### Comments

No additional comments.

### Receipt

The samples were received on 11/17/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.1° C and 2.2° C. ✓

### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

### Metals

Method(s) 7471B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-263456 and analytical batch 180-263580 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. ✓

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



# Sample Summary

Client: Environmental Standards Inc.  
Project/Site: BRF\_BS\_20181116\_1A

TestAmerica Job ID: 180-84161-1

| Lab Sample ID | Client Sample ID               | Matrix | Collected        | Received       |
|---------------|--------------------------------|--------|------------------|----------------|
| 180-84161-1   | BRF-BS-BG04-1.2/3.2-20181116   | Solid  | 11/16/18 11:23 ✓ | 11/17/18 09:30 |
| 180-84161-2   | BRF-BS-DUP02-20181116          | Solid  | 11/16/18 00:00 ✓ | 11/17/18 09:30 |
| 180-84161-3   | BRF-BS-BG04-6.5/8.5-20181116   | Solid  | 11/16/18 11:31 ✓ | 11/17/18 09:30 |
| 180-84161-4   | BRF-BS-FB08-20181116           | Water  | 11/16/18 11:10 ✓ | 11/17/18 09:30 |
| 180-84161-5   | BRF-BS-BG04-10.3/12.3-20181116 | Solid  | 11/16/18 11:43 ✓ | 11/17/18 09:30 |
| 180-84161-6   | BRF-BS-EB03-20181116           | Water  | 11/16/18 12:22 ✓ | 11/17/18 09:30 |
| 180-84161-7   | BRF-BS-BG04-0.0/0.5-20181116 ✓ | Solid  | 11/16/18 12:04 ✓ | 11/17/18 09:30 |







## Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-84161-1

**Login Number: 84161**  
**List Number: 1**  
**Creator: Say, Thomas C**

**List Source: TestAmerica Pittsburgh**

| Question   | Answer | Comment |
|--|--------|---------|
| Radioactivity wasn't checked or is <= background as measured by a survey meter.  | True   |         |
| The cooler's custody seal, if present, is intact.                                | True   |         |
| Sample custody seals, if present, are intact.                                    | True   |         |
| The cooler or samples do not appear to have been compromised or tampered with.   | True   |         |
| Samples were received on ice.  | True   |         |
| Cooler Temperature is acceptable.  | True   |         |
| Cooler Temperature is recorded.  | True   |         |
| COC is present.  | True   |         |
| COC is filled out in ink and legible.  | True   |         |
| COC is filled out with all pertinent information.                                | True   |         |
| Is the Field Sampler's name present on COC?                                      | True   |         |
| There are no discrepancies between the containers received and the COC.          | True   |         |
| Samples are received within Holding Time (excluding tests with immediate HTs)    | True   |         |
| Sample containers have legible labels.   | True   |         |
| Containers are not broken or leaking.  | True   |         |
| Sample collection date/times are provided.                                       | True   |         |
| Appropriate sample containers are used.  | True   |         |
| Sample bottles are completely filled.  | True   |         |
| Sample Preservation Verified.  | True   |         |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True   |         |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").  | True   |         |
| Multiphasic samples are not present.   | True   |         |
| Samples do not require splitting or compositing.                                 | True   |         |
| Residual Chlorine Checked.   | N/A    | ✓       |

**SECTION 5**

**PROJECT CORRESPONDENCE**

## Andrew Piasecki

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Tuesday, December 4, 2018 6:33 PM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables  
**Subject:** RE: BRF BGS - Request for 180-84161-1

Andrew –

1. Revised L4 uploaded to TotalAccess
2. Yes, Y-89 was used for sample 180-84161-3

Thanks

### **GAIL A LAGE**

Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Drive  
Nashville, TN 37204  
Tel 615-301-5741 | Fax 615-726-3404  
[www.testamericainc.com](http://www.testamericainc.com)

---

**From:** Andrew Piasecki [mailto:[apiasecki@envstd.com](mailto:apiasecki@envstd.com)]  
**Sent:** Tuesday, December 04, 2018 7:56 AM  
**To:** CSO – TVA Projects  
**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables  
**Subject:** BRF BGS - Request for 180-84161-1

### **-External Email-**

---

Hi Gail,

Please address the following for Job 180-84161-1:

1. In the anions fraction, the raw data and summary forms for the CCVLs analyzed on 11/19/18 at 7:52 and 20:56 (batch 263220) were missing from the data package. Please provide a revised data package to include this information.
2. Y-89 was summarized on the internal standard summary form for sample 180-84161-3 (see attached). Was Y-89 used to quantitate any analytes in this sample? I know you had mentioned previously that Rh-103 is generally used for soil samples, but I just wanted to double check.

Thanks!

Andrew L. Piasecki  
Quality Assurance Chemist  
**Environmental Standards, Inc.**

1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482  
610.935.5577 ext. 433 • [www.envstd.com](http://www.envstd.com) • [apiasecki@envstd.com](mailto:apiasecki@envstd.com)

**Emergency Response Quality Assurance Hotline: 855.374.7272**



## Andrew Piasecki

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Wednesday, December 5, 2018 10:36 PM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables  
**Subject:** RE: BRF BGS - Request for 180-84161-1

Andrew – it turns out Y-89 was not used and should not have been included in the report – I will have a revised report for you tomorrow (Thursday).

Thanks

**GAIL A LAGE**  
Project Manager  
TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Drive  
Nashville, TN 37204  
Tel 615-301-5741 | Fax 615-726-3404  
[www.testamericainc.com](http://www.testamericainc.com)

---

**From:** Andrew Piasecki [mailto:[apiasecki@envstd.com](mailto:apiasecki@envstd.com)]  
**Sent:** Tuesday, December 04, 2018 5:45 PM  
**To:** Lage, Gail; CSO – TVA Projects  
**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables  
**Subject:** Re: BRF BGS - Request for 180-84161-1

**-External Email-**

---

Hi Gail,

Thanks! Which analyte(s) in 180-84161-3 were quantitated with Y-89? Molybdenum?

Andrew

---

**From:** Lage, Gail <Gail.Lage@testamericainc.com>  
**Sent:** Tuesday, December 4, 2018 6:32:30 PM  
**To:** Andrew Piasecki; CSO – TVA Projects  
**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables  
**Subject:** RE: BRF BGS - Request for 180-84161-1

Andrew –

1. Revised L4 uploaded to TotalAccess
2. Yes, Y-89 was used for sample 180-84161-3

Thanks

**GAIL A LAGE**

Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

2960 Foster Creighton Drive

Nashville, TN 37204

Tel 615-301-5741 | Fax 615-726-3404

[www.testamericainc.com](http://www.testamericainc.com)

---

**From:** Andrew Piasecki [mailto:[apiasecki@envstd.com](mailto:apiasecki@envstd.com)]

**Sent:** Tuesday, December 04, 2018 7:56 AM

**To:** CSO – TVA Projects

**Cc:** Amanda Cover; Danielle Coles; TVA\_Deliverables

**Subject:** BRF BGS - Request for 180-84161-1

**-External Email-**

---

Hi Gail,

Please address the following for Job 180-84161-1:

1. In the anions fraction, the raw data and summary forms for the CCVLs analyzed on 11/19/18 at 7:52 and 20:56 (batch 263220) were missing from the data package. Please provide a revised data package to include this information.
2. Y-89 was summarized on the internal standard summary form for sample 180-84161-3 (see attached). Was Y-89 used to quantitate any analytes in this sample? I know you had mentioned previously that Rh-103 is generally used for soil samples, but I just wanted to double check.

Thanks!

Andrew L. Piasecki

Quality Assurance Chemist

**Environmental Standards, Inc.**

1140 Valley Forge Road • PO Box 810 • Valley Forge, PA 19482

610.935.5577 ext. 433 • [www.envstd.com](http://www.envstd.com) • [apiasecki@envstd.com](mailto:apiasecki@envstd.com)

**Emergency Response Quality Assurance Hotline: 855.374.7272**

