

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Richland
2800 George Washington Way
Richland, WA 99352
Tel: (509)375-3131

TestAmerica Job ID: 300-6518-1
TestAmerica Sample Delivery Group: WC2580
Client Project/Site: I18-003

For:
CH2M Hill Plateau Remediation Company
825 Jadwin Avenue
Richland, Washington 99352

Attn: Bruce Hey

Kristine D. Allen

Authorized for release by:
12/22/2017 2:38:56 PM
Kristine Allen, Manager of Project Management
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Designee for
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LINKS

Review your project results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this package. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the attached signature.

The reported results are not blank corrected

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Client: CH2M Hill Plateau Remediation Company
 Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
 SDG: WC2580

Qualifiers

HPLC/IC

| Qualifier | Qualifier Description |
|-----------|--|
| D | The reported value is from a dilution. |
| U | Analyzed for but not detected. |

Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|----------------|---|
| ▫ | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains No Free Liquid |
| DER | Duplicate Error Ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative Error Ratio (Radiochemistry) |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |



Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

Job ID: 300-6518-1

Laboratory: TestAmerica Richland

Narrative

**Job Narrative
300-6518-1**

Comments

No additional comments.

Receipt

The sample was received on 12/6/2017 1:07 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 8.0° C.

HPLC/IC

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



CH2MHill Plateau
Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #
I18-003-214
Page 1 of 1

Collector: **KATHY TURNER** Contact/Requester: Karen Waters-Husted Telephone No.: 509-376-4650

SAF No.: I18-003 Sampling Origin: Hanford Site Purchase Order/Charge Code: 300071

Project Title: AEA, DECEMBER 2017 Logbook No.: HNF-N-506 -96 pg. 67 Ice Chest No.: N/A

Shipped To (Lab): TestAmerica Incorporated, Rich Method of Shipment GOVERNMENT VEHICLE Bill of Lading/Air Bill No.: N/A

Protocol: SUPRV Priority: 15 Days PRIORITY Offsite Property No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARK
** * Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

SPECIAL INSTRUCTIONS
N/A

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|------------|--------|---|---------|------|-------------------|--------------------------|--------------|--------------|
| B3FFM4 | N | W | 12/6/17 | 1338 | 1X125-mL P | 300.0_ANTIONS_IC: COMMON | 48 Hours | COOL <=6C |

60518
W02580



December 22, 2017

| | | |
|---|--|--|
| Relinquished By: TURNER, Kathy Signature: <i>[Signature]</i> Date/Time: DEC 06 2017 1307 | Received By: B. Jorgenson, TARL Signature: <i>[Signature]</i> Date/Time: 12-06-17 1307 | <p>Matrix *</p> <p>S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquid SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Vegetation A = Air X = Other</p> |
| Relinquished By: _____ Signature: _____ Date/Time: _____ | Received By: _____ Signature: _____ Date/Time: _____ | |
| Relinquished By: _____ Signature: _____ Date/Time: _____ | Received By: _____ Signature: _____ Date/Time: _____ | |
| Relinquished By: _____ Signature: _____ Date/Time: _____ | Received By: _____ Signature: _____ Date/Time: _____ | |
| Relinquished By: _____ Signature: _____ Date/Time: _____ | Received By: _____ Signature: _____ Date/Time: _____ | |
| <p>FINAL SAMPLE DISPOSITION</p> <p>Disposal Method (e.g., Return to customer, per lab procedure, used in process): _____</p> <p>Disposed By: _____</p> <p>Date/Time: _____</p> | | |

Client: CH2M Hill Plateau Remediation Company
 Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
 SDG: WC2580

Client Sample ID: B3FFM4

Lab Sample ID: 300-6518-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|--------------|--------|-----------|-------|-------|------|---------|---|--------|-----------|
| Chloride | 19 | D | 0.40 | 0.20 | mg/L | 2 | | 300.0 | Total/NA |
| Nitrate as N | 8.2 | D | 0.056 | 0.028 | mg/L | 2 | | 300.0 | Total/NA |
| Fluoride | 0.31 | D | 0.10 | 0.050 | mg/L | 2 | | 300.0 | Total/NA |
| Nitrite as N | 0.093 | D | 0.076 | 0.038 | mg/L | 2 | | 300.0 | Total/NA |
| Sulfate | 46 | D | 0.50 | 0.25 | mg/L | 2 | | 300.0 | Total/NA |

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This Detection Summary does not include radiochemical test results.

Client: CH2M Hill Plateau Remediation Company
 Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
 SDG: WC2580

Client Sample ID: B3FFM4

Lab Sample ID: 300-6518-1

Date Collected: 12/06/17 12:38

Matrix: Water

Date Received: 12/06/17 13:07

Method: 300.0 - Anions, Ion Chromatography

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------|--------|-----------|-------|-------|------|---|----------|----------------|---------|
| Chloride | 19 | D | 0.40 | 0.20 | mg/L | | | 12/06/17 21:02 | 2 |
| Nitrate as N | 8.2 | D | 0.056 | 0.028 | mg/L | | | 12/06/17 21:02 | 2 |
| Fluoride | 0.31 | D | 0.10 | 0.050 | mg/L | | | 12/06/17 21:02 | 2 |
| Nitrite as N | 0.093 | D | 0.076 | 0.038 | mg/L | | | 12/06/17 21:02 | 2 |
| Sulfate | 46 | D | 0.50 | 0.25 | mg/L | | | 12/06/17 21:02 | 2 |

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Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 300-9874/15
Matrix: Water
Analysis Batch: 9874

Client Sample ID: Method Blank
Prep Type: Total/NA

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------|-----------|--------------|-------|-------|------|---|----------|----------------|---------|
| Nitrate as N | <0.028 | U | 0.028 | 0.014 | mg/L | | | 12/06/17 17:31 | 1 |
| Nitrite as N | <0.038 | U | 0.038 | 0.019 | mg/L | | | 12/06/17 17:31 | 1 |

Lab Sample ID: LCS 300-9874/16
Matrix: Water
Analysis Batch: 9874

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|--------------|-------------|------------|---------------|------|---|------|--------------|
| Nitrate as N | 2.26 | 2.18 | | mg/L | | 97 | 80 - 120 |
| Nitrite as N | 3.04 | 3.12 | | mg/L | | 103 | 80 - 120 |

Lab Sample ID: 300-6509-A-7 MS
Matrix: Water
Analysis Batch: 9874

Client Sample ID: Matrix Spike
Prep Type: Total/NA

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|--------------|---------------|------------------|-------------|-----------|--------------|------|---|------|--------------|
| Nitrate as N | 2.9 | D | 0.452 | 3.38 | D | mg/L | | 115 | 75 - 125 |
| Nitrite as N | 0.082 | D | 0.609 | 0.610 | D | mg/L | | 87 | 75 - 125 |

Lab Sample ID: 300-6509-A-7 DU
Matrix: Water
Analysis Batch: 9874

Client Sample ID: Duplicate
Prep Type: Total/NA

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|--------------|---------------|------------------|-----------|--------------|------|---|-----|-----------|
| Nitrate as N | 2.9 | D | 2.87 | D | mg/L | | 0.3 | 20 |
| Nitrite as N | 0.082 | D | 0.0826 | D | mg/L | | 0.3 | 20 |

Lab Sample ID: MB 300-9875/15
Matrix: Water
Analysis Batch: 9875

Client Sample ID: Method Blank
Prep Type: Total/NA

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|----------|-----------|--------------|-------|-------|------|---|----------|----------------|---------|
| Chloride | <0.20 | U | 0.20 | 0.10 | mg/L | | | 12/06/17 17:31 | 1 |
| Fluoride | <0.050 | U | 0.050 | 0.025 | mg/L | | | 12/06/17 17:31 | 1 |
| Sulfate | <0.25 | U | 0.25 | 0.13 | mg/L | | | 12/06/17 17:31 | 1 |

Lab Sample ID: LCS 300-9875/16
Matrix: Water
Analysis Batch: 9875

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|----------|-------------|------------|---------------|------|---|------|--------------|
| Chloride | 16.0 | 15.9 | | mg/L | | 99 | 80 - 120 |
| Fluoride | 4.00 | 4.02 | | mg/L | | 100 | 80 - 120 |
| Sulfate | 20.0 | 19.9 | | mg/L | | 99 | 80 - 120 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 300-6509-A-7 MS
Matrix: Water
Analysis Batch: 9875

Client Sample ID: Matrix Spike
Prep Type: Total/NA

| Analyte | Sample | Sample | Spike | MS | MS | Unit | D | %Rec | %Rec. | Limits |
|----------|--------|-----------|-------|--------|-----------|------|---|------|----------|--------|
| | Result | Qualifier | | Result | Qualifier | | | | | |
| Chloride | 6.4 | D | 3.20 | 9.87 | D | mg/L | | 107 | 75 - 125 | |
| Fluoride | 0.40 | D | 0.800 | 1.20 | D | mg/L | | 101 | 75 - 125 | |
| Sulfate | 31 | D | 4.00 | 35.8 | D | mg/L | | 111 | 75 - 125 | |

Lab Sample ID: 300-6509-A-7 DU
Matrix: Water
Analysis Batch: 9875

Client Sample ID: Duplicate
Prep Type: Total/NA

| Analyte | Sample | Sample | DU | DU | Unit | D | RPD | RPD | Limit |
|----------|--------|-----------|--------|-----------|------|---|-----|-----|-------|
| | Result | Qualifier | Result | Qualifier | | | | | |
| Chloride | 6.4 | D | 6.43 | D | mg/L | | 0.3 | 20 | |
| Fluoride | 0.40 | D | 0.395 | D | mg/L | | 0.9 | 20 | |
| Sulfate | 31 | D | 30.9 | D | mg/L | | 2 | 20 | |

Client: CH2M Hill Plateau Remediation Company
 Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
 SDG: WC2580

HPLC/IC

Analysis Batch: 9874

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|-----------------|--------------------|-----------|--------|--------|------------|
| 300-6518-1 | B3FFM4 | Total/NA | Water | 300.0 | |
| MB 300-9874/15 | Method Blank | Total/NA | Water | 300.0 | |
| LCS 300-9874/16 | Lab Control Sample | Total/NA | Water | 300.0 | |
| 300-6509-A-7 MS | Matrix Spike | Total/NA | Water | 300.0 | |
| 300-6509-A-7 DU | Duplicate | Total/NA | Water | 300.0 | |

Analysis Batch: 9875

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|-----------------|--------------------|-----------|--------|--------|------------|
| 300-6518-1 | B3FFM4 | Total/NA | Water | 300.0 | |
| MB 300-9875/15 | Method Blank | Total/NA | Water | 300.0 | |
| LCS 300-9875/16 | Lab Control Sample | Total/NA | Water | 300.0 | |
| 300-6509-A-7 MS | Matrix Spike | Total/NA | Water | 300.0 | |
| 300-6509-A-7 DU | Duplicate | Total/NA | Water | 300.0 | |

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Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

Client Sample ID: B3FFM4
Date Collected: 12/06/17 12:38
Date Received: 12/06/17 13:07

Lab Sample ID: 300-6518-1
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 2 | | | 9874 | 12/06/17 21:02 | RTQ | TAL RCH |
| Total/NA | Analysis | 300.0 | | 2 | | | 9875 | 12/06/17 21:02 | RTQ | TAL RCH |

Client Sample ID: Method Blank
Date Collected: N/A
Date Received: N/A

Lab Sample ID: MB 300-9874/15
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 1 | | | 9874 | 12/06/17 17:31 | RTQ | TAL RCH |

Client Sample ID: Method Blank
Date Collected: N/A
Date Received: N/A

Lab Sample ID: MB 300-9875/15
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 1 | | | 9875 | 12/06/17 17:31 | RTQ | TAL RCH |

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 300-9874/16
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 1 | | | 9874 | 12/06/17 17:46 | RTQ | TAL RCH |

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 300-9875/16
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 1 | | | 9875 | 12/06/17 17:46 | RTQ | TAL RCH |

Client Sample ID: Matrix Spike
Date Collected: 12/05/17 09:12
Date Received: 12/05/17 14:15

Lab Sample ID: 300-6509-A-7 MS
Matrix: Water

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|--------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Analysis | 300.0 | | 2 | | | 9874 | 12/06/17 18:16 | RTQ | TAL RCH |
| Total/NA | Analysis | 300.0 | | 2 | | | 9875 | 12/06/17 18:16 | RTQ | TAL RCH |

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131

Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

| Method | Method Description | Protocol | Laboratory |
|--------|----------------------------|----------|------------|
| 300.0 | Anions, Ion Chromatography | MCAWW | TAL RCH |

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL RCH = TestAmerica Richland, 2800 George Washington Way, Richland, WA 99352, TEL (509)375-3131



Client: CH2M Hill Plateau Remediation Company
Project/Site: I18-003

TestAmerica Job ID: 300-6518-1
SDG: WC2580

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|--------|----------------|----------------|
| 300-6518-1 | B3FFM4 | Water | 12/06/17 12:38 | 12/06/17 13:07 |

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Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 300-6518-1

SDG Number: WC2580

Login Number: 6518

List Number: 1

Creator: Jorgenson, Briana F

List Source: TestAmerica Richland

| Question | Answer | Comment |
|--|--------|---------|
| Radioactivity wasn't checked or is \leq background as measured by a survey meter. | True | |
| The cooler's custody seal, if present, is intact. | N/A | |
| 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 $<6\text{mm}$ (1/4"). | N/A | |
| Multiphasic samples are not present. | N/A | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |