TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



# ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-14833-1
TestAmerica Sample Delivery Group: SL2011
Client Project/Site: X15-063

For:
CH2M Hill Plateau Remediation Company
PO BOX 1600, MS H8-41
Richland, Washington 99352

Attn: Mr. Scot Fitzgerald

*Authorized for release by:*
*1/13/2016 4:04:58 PM*

Jayna Awalt, Project Manager II
(314)298-8566
jayna.awalt@testamericainc.com



*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

# Table of Contents

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Job ID: 160-14833-1

### Laboratory: TestAmerica St. Louis

**Narrative**

**CASE NARRATIVE**

CH2MHill Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352
January 13, 2016
Attention: Scot Fitzgerald

| | |
|---|---|
| SDG | : SL2011 |
| Number of Samples | : 14 samples |
| Sample Matrix | : Water |
| Data Deliverable | : Summary |
| Date SDG Closed | : November 13, 2015 |

II. Introduction

On November 13, 14 samples were received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and receipt checklists for documentation of any variations on receipt conditions and temperature. Upon receipt, samples were given laboratory Ids to correspond with specific client Ids. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

**Due to a large backlog for ICP, metals requests were run by ICPMS per SIR16-163**.

The following SAFs are associated with this SDG: X15-063

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits. All results are based upon samples as they were received, i.e. wet weight, unless otherwise noted on the data sheets. See the attached Methods Summary Form for the methods used in this SDG.

MS/MSD/Dup analysis was done per the client requirements. Analytical batches that did not contain matrix QC were analyzed with an LCS/LCS duplicate.

Note: For Metals analyses, per standard practice, all 6020 water and soil samples are initially prepared at 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate flagging unless otherwise noted in the case narrative.

For Anion analysis, samples have been started at a 2x dilution per CHPRC direction. The samples are flagged accordingly with a “D” flag if sample concentration is above the MDL/RL. Non-conformance will be included in the below section only if dilution is greater than 2x.

For WTPH methods, the lab utilizes method 8015B. Per CHPRC direction, the method name in the electronic data has been modified to read WTPH in the place of 8015B.

Per CHPRC direction (June 2014), Boron will be reported for Metals using method 6010. Boron will no longer be reported by method 6020.

Per CHPRC direction, due to the short hold times for Nitrate, Nitrite and Phosphate by IC (48 hours) as well as pH analysis (24 hours), a SIR request is not needed when samples are run outside 1x hold but within 2x hold. A narrative comment will be included below if a sample is run outside the lab-specified hold time for waters.

Per CHPRC direction, data for pH analysis will be reported outside 1x 24 hour hold time due to this being a field parameter.

## Job ID: 160-14833-1 (Continued)

### Laboratory: TestAmerica St. Louis (Continued)

IV. Definitions

QCBLK- Quality Control Blank, Method Blank
QCLCS- Quality Control Laboratory Control Sample, Blank Spike
DUP- Laboratory Duplicate
MS- Matrix Spike
MSD- Matrix Spike Duplicate

The term “Detection Limit” used in the analytical data report refers to either the lab’s standard reporting limits or contractually required reporting limits, whichever is applicable.

The following data qualifiers may be applicable to the results in this report, as appropriate.

- **B** - For inorganic analyses, the sample result is greater than the MDL but less than the RL.
- **B** - For organic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **J** - For organic analyses, the sample is estimated and less than the RL.
- **C** - For inorganic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **D** - For all analyses, the sample result was obtained from the analysis of a dilution. For Metals analyses, per standard practice, all solid samples are initially prepared at a 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate qualification unless otherwise noted in the case narrative.
- **N** - For inorganics and GC analyses, the spike/spike duplicate recoveries are outside QC limits.
- **T** - For GCMS analyses, the spike/spike duplicate recoveries are outside QC limits.
- **O**- For all analyses, the LCS (LCSD) recoveries are outside QC limits.
- **M**- For inorganic analyses, the precision was outside control limits.
- **P -** For organic analyses (PCB/Pests only), the aroclor target analyte has greater than 25% difference for detected concentrations between the two GC columns.

**ICPMS Metals**

**Batch: 232110**

Sodium was detected in method blank MB 160-225828/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged “B”. If the associated sample reported a result above the MDL and/or RL and is not greater than 5x the method blank, the result has been flagged “C”.

The CCVL was outside upper QC limits for sodium. The concentration of this analyte in the samples was at such a high level as to make the CCVL unnecessary. (CCVL 160-232110/42)

The following samples were diluted to bring the concentration of target analytes within the calibration range: B32YV6 (160-14833-3), B32YV7 (160-14833-4), B32YW1 (160-14833-5), B32YW0 (160-14833-6), B32YX6 (160-14833-13) and B32YX7 (160-14833-14). Elevated reporting limits (RLs) are provided. These analytes have been qualified accordingly with a "D" flag in the associated samples.

**Batch: 227046**

The following samples were diluted to bring the concentration of target analytes within the calibration range: B32YV6 (160-14833-3) and B32YV7 (160-14833-4). Elevated reporting limits (RLs) are provided. These analytes have been qualified accordingly with a "D" flag in the associated samples.

There were no observations or non-conformances associated with the following methods:

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Job ID: 160-14833-1 (Continued)

### Laboratory: TestAmerica St. Louis (Continued)

**Alkalinity**

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager or designee and the laboratory's client services representative as verified by their signature on this report.

Reviewed and approved:

Jayna Awalt
St. Louis Project Manager

# SAMPLE ISSUE RESOLUTION

| | |
|---|---|
| **SIR NUM** | SIR16-163 |
| **REV NUM** | 0 |
| **DATE INITIATED** | 1/7/2016 |

## SAMPLE EVENT INFORMATION

| | |
|---|---|
| **SAF NUM(S)** | X15-063 |
| **OPERABLE UNIT(S)** | 300-FF-5 |
| **PROJECT(S)** | CERC15 |
| **SAMPLE EVENT TITLE(S)** | CERC15 |
| **LABORATORY** | TestAmerica St. Louis |

## SAMPLING INFORMATION

| | |
|---|---|
| **NUMBER OF SAMPLES** | 14 |
| **SAMPLE NUMBERS** | B32YV2, B32YV3, B32YV6, B32YV7, B32YW0, B32YW1, B32YW4, B32YW5, B32YW8, B32YW9, B32YX2, B32YX3, B32YX6, B32YX7 |
| **SAMPLE MATRIX** | WATER |
| **COLLECTION DATE** | 11/12/2015 - 11/12/2015 |
| **SDG NUM** | SL2011 |

## ISSUE BACKGROUND

| | |
|---|---|
| **CLASS** | Sample Management Issues |
| **TYPE** | Method Correction |
| **DESCRIPTION** | The laboratory has a backlog for ICP and has requested permission to subtitute ICP-MS. |

## DISPOSITION

| | |
|---|---|
| **DESCRIPTION** | Report requested analytes (sodium, calcium) by 6020. |
| **JUSTIFICATION** | Final Disposition: Accept proposed resolution.<br><br>SUBMITTED BY: Jayna Awalt DATE: 01/07/2016<br>ACCEPTED BY: Karen Waters-Husted DATE: 01/08/2016 |

# Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-14833-1
SDG Number: SL2011

**Login Number: 14833**
**List Number: 1**
**Creator: Clarke, Jill C**

**List Source: TestAmerica St. Louis**

| 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 | 0.7° |
| 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. | 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"). | N/A | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |

| CH2MHill Plateau Remediation Company SL2011 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | C.O.C. # X15-063-015 |
|---|---|---|
| | | Page 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | S.W. King/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 81 / 30 | **Ice Chest No.** | GWS-484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YV2 | Y | W | NOV 12 2015 | 0915 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YV3 | N | W | ↓ | ↓ | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YV3 | N | W | NOV 12 2015 | 0915 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| S.W. King/CHPRC | S.W. King | NOV 12 2015 1115 | L.D. Wall CHPRC | L.D. Wall | NOV 12 2015 1115 |
| L.D. Wall CHPRC | L.D. Wall | NOV 12 2015 1400 | FEDEX | | |
| FED EX | | | Jill Clark | Jill Clark | 11.13.15 0925 |
| | | | | | |

Matrix *

| | | | | | |
|---|---|---|---|---|---|
| S | = Soil | DS | = Drum Solids | | |
| SE | = Sediment | DL | = Drum Liquids | | |
| SO | = Solid | T | = Tissue | | |
| SL | = Sludge | WI | = Wipe | | |
| W | = Water | L | = Liquid | | |
| O | = Oil | V | = Vegetation | | |
| A | = Air | X | = Other | | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

**PRINTED ON** 9/16/2015 **FSR ID = FSR6208** A-6004-842 (REV 2)

**CH2MHill Plateau Remediation Company** SL2011

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **X15-063-016**



| | | | | | |
|---|---|---|---|---|---|
| **Collector** | S.W. King/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 81 / 31 | **Ice Chest No.** | GWS 484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YV6 | Y | W | NOV 12 2015 | 1031 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YV7 | N | W | ↓ | ↓ | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YV7 | N | W | NOV 12 2015 | 1031 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |

| Relinquished By | Print / Sign | Date/Time | Received By | Print / Sign | Date/Time |
|---|---|---|---|---|---|
| S.W. King/CHPRC | | NOV 12 2015 1115 | L.D. Wall CHPRC | L.D. Wall | NOV 12 2015 1115 |
| L.D. Wall CHPRC | L.D. Wall | NOV 12 2015 1400 | | FEDEX | |
| | FED EX | | | J. Clark | 11.13.15 0925 |

Matrix *

| | | | |
|---|---|---|---|
| S = Soil | | DS = Drum Solids | |
| SE = Sediment | | DL = Drum Liquids | |
| SO = Solid | | T = Tissue | |
| SL = Sludge | | WI = Wipe | |
| W = Water | | L = Liquid | |
| O = Oil | | V = Vegetation | |
| A = Air | | X = Other | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

PRINTED ON 9/16/2015 | FSR ID = FSR6186 | A-6004-842 (REV 2)

**CH2MHill Plateau Remediation Company** SL2011

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **X15-063-017**



| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 80/26 | **Ice Chest No.** | GWS-484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | **30 Days** **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YW1 | N | W | NOV 12 2015 | 1062 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YW1 | N | W | NOV 12 2015 | 1002 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |
| B32YW0 | Y | W | NOV 12 2015 | 1002 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| D.L. Floyd/CHPRC | | | NOV 12 2015 1400 | | FEDEX | | NOV 12 2015 11-12 |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| | FED EX | | | Jill Clark | Jill Clark | | 11.13.15 0925 |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |

Matrix *

| | | | |
|---|---|---|---|
| S = Soil | | DS = Drum Solids | |
| SE = Sediment | | DL = Drum Liquids | |
| SO = Solid | | T = Tissue | |
| SL = Sludge | | WI = Wipe | |
| W = Water | | L = Liquid | |
| O = Oil | | V = Vegetation | |
| A = Air | | X = Other | |

| **FINAL SAMPLE DISPOSITION** | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|

**PRINTED ON** 9/16/2015 **FSR ID = FSR6241** A-6004-842 (REV 2)

| CH2MHill Plateau Remediation Company SL2011 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | C.O.C. # X15-063-018 Page 1 of 1 |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 80 / 26 | **Ice Chest No.** | GLS 484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YW5 | N | W | NOV 12 2015 | 0930 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YW5 | N | W | NOV 12 2015 | 0930 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |
| B32YW4 | Y | W | NOV 12 2015 | 0930 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| D.L. Floyd/CHPRC | | | NOV 12 2015 0945 | L.D. Wall CHPRC | L.D. Wall | L.D. Wall | NOV 12 2015 0945 |
| L.D. Wall CHPRC | L.D. Wall | L.D. Wall | NOV 12 2015 1400 | FEDEX | | | NOV 12 2015 11/13/15 |
| | FED EX | | | Jill Clark | Jill Clark | | 11.13.15 0925 |

Matrix *

| | | | |
|---|---|---|---|
| S = Soil | | DS = Drum Solids | |
| SE = Sediment | | DL = Drum Liquids | |
| SO = Solid | | T = Tissue | |
| SL = Sludge | | WI = Wipe | |
| W = Water | | L = Liquid | |
| O = Oil | | V = Vegetation | |
| A = Air | | X = Other | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time

PRINTED ON 9/16/2015 FSR ID = FSR6161 A-6004-842 (REV 2)

| CH2MHill Plateau Remediation Company SL2011 | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | C.O.C. # X15-063-019 Page 1 of 1 |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 80/24 | **Ice Chest No.** | GWS-484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YW9 | N | W | NOV 12 2015 | 1102 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YW9 | N | W | NOV 12 2015 | 1102 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |
| B32YW8 | Y | W | NOV 12 2015 | 1102 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| D.L. Floyd/CHPRC | | | NOV 12 2015 1400 | | FEDEX | | NOV 12 2015 1122 |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| | FED EX | | | Jill Clark Jill Clark 11.13.15 0925 | | | |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |

Matrix *

| | | | |
|---|---|---|---|
| S = Soil | DS = Drum Solids | | |
| SE = Sediment | DL = Drum Liquids | | |
| SO = Solid | T = Tissue | | |
| SL = Sludge | WI = Wipe | | |
| W = Water | L = Liquid | | |
| O = Oil | V = Vegetation | | |
| A = Air | X = Other | | |

| **FINAL SAMPLE DISPOSITION** | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|

**PRINTED ON** 9/16/2015 **FSR ID = FSR6231** A-6004-842 (REV 2)

**CH2MHill Plateau Remediation Company** SL2011

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **X15-063-020**



| | | | | | |
|---|---|---|---|---|---|
| **Collector** | D.L. Floyd/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 80/26 | **Ice Chest No.** | GWS-484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | **30 Days** **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YX3 | N | W | NOV 12 2015 | 1134 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YX3 | N | W | NOV 12 2015 | 1134 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |
| B32YX2 | Y | W | NOV 12 2015 | 1134 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |

| Relinquished By | Print | Sign | Date/Time | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|---|---|---|
| D.L. Floyd/CHPRC | | | NOV 12 2015 1400 | | FEDEX | | NOV 12 2015 1624 |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| | FED EX | | | Jill Clark | Jill Clark | 11.13.15 | 0925 |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |
| Relinquished By | | | Date/Time | Received By | | | Date/Time |

**Matrix ***

| | | | |
|---|---|---|---|
| S = Soil | DS = Drum Solids | | |
| SE = Sediment | DL = Drum Liquids | | |
| SO = Solid | T = Tissue | | |
| SL = Sludge | WI = Wipe | | |
| W = Water | L = Liquid | | |
| O = Oil | V = Vegetation | | |
| A = Air | X = Other | | |

| **FINAL SAMPLE DISPOSITION** | Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time |
|---|---|---|---|

**PRINTED ON** 9/16/2015 **FSR ID = FSR6066** A-6004-842 (REV 2)





13 of 26
1/13/2016

**CH2MHill Plateau Remediation Company** SL2011

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # **X15-063-021**



| | | | | | |
|---|---|---|---|---|---|
| **Collector** | S.W. King/CHPRC | **Contact/Requester** | WHITLEY, KM | **Telephone No.** | 373-4929 |
| **SAF No.** | X15-063 | **Sampling Origin** | HANFORD SITE | **Purchase Order/Charge Code** | 300205 |
| **Project Title** | Uranium Sequestration - Day 7 | **Logbook No.** | HNF-N-506 81 / 30 | **Ice Chest No.** | GWS-484 |
| **Shipped To (Lab)** | TestAmerica St. Louis | **Method of Shipment** | Commercial Carrier | **Bill of Lading/Air Bill No.** | 774966605637 |
| **Protocol** | CERCLA | **Priority:** | 30 Days **PRIORITY** | **Offsite Property No.** | N/A |

**POSSIBLE SAMPLE HAZARDS/REMARKS**

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

**SPECIAL INSTRUCTIONS** **Hold Time** Total Activity Exemption: Yes ☑ No ☐

| Sample No. | Filter | * | Date | Time | No/Type Container | Sample Analysis | Holding Time | Preservative |
|---|---|---|---|---|---|---|---|---|
| B32YX6 | Y | W | NOV 12 2015 | 0840 | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YX7 | N | W | ↓ | ↓ | 1x500-mL G/P | 6020_METALS_ICPMS: Uranium (1); 6010_METALS_ICP: COMMON | 6 Months | HNO3 to pH <2 |
| B32YX7 | N | W | NOV 12 2015 | 0840 | 1x500-mL G/P | 310.1_ALKALINITY: GW 01 | 14 Days | Cool <=6C |

| | Relinquished By | Print | Sign | Date/Time |
|---|---|---|---|---|
| Relinquished By | S.W. King/CHPRC | | | NOV 12 2015 1115 |
| Relinquished By | L.D. Wall CHPRC | | | NOV 12 2015 1400 |
| Relinquished By | | | | Date/Time |
| Relinquished By | | | | Date/Time |

| | Received By | Print | Sign | Date/Time |
|---|---|---|---|---|
| Received By | L.D. Wall CHPRC | | | NOV 12 2015 1115 |
| Received By | FEDEX | | | Date/Time |
| Received By | Jill Clarke | Jill Clarke | | 11.13.15 0925 |
| Received By | | | | Date/Time |

Matrix *

| | | | |
|---|---|---|---|
| S = Soil | | DS = Drum Solids | |
| SE = Sediment | | DL = Drum Liquids | |
| SO = Solid | | T = Tissue | |
| SL = Sludge | | WI = Wipe | |
| W = Water | | L = Liquid | |
| O = Oil | | V = Vegetation | |
| A = Air | | X = Other | |

**FINAL SAMPLE DISPOSITION** Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

**PRINTED ON** 9/16/2015 **FSR ID = FSR6169** A-6004-842 (REV 2)

# FedEx ® Tracking

**774966605637**

| Ship date | | Actual delivery |
|---|---|---|
| **Thu 11/12/2015** | | **Fri 11/13/2015 9:18 am** |
| RICHLAND, WA US | **Delivered**<br>*Signed for by: J.CLARKE* | EARTH CITY, MO US |

## Travel History

| Date/Time | Activity | Location |
|---|---|---|
| - 11/13/2015 - Friday | | |
| 9:18 am | Delivered | EARTH CITY, MO |
| 7:15 am | On FedEx vehicle for delivery | EARTH CITY, MO |
| 7:08 am | At local FedEx facility | EARTH CITY, MO |
| 5:02 am | At destination sort facility | BERKELEY, MO |
| 4:16 am | Departed FedEx location | MEMPHIS, TN |
| 12:22 am | Arrived at FedEx location | MEMPHIS, TN |
| - 11/12/2015 - Thursday | | |
| 5:02 pm | Left FedEx origin facility | PASCO, WA |
| 3:40 pm | Shipment information sent to FedEx | |
| 3:25 pm | Picked up | PASCO, WA |

## Shipment Facts

| | | | |
|---|---|---|---|
| **Tracking number** | 774966605637 | **Service** | FedEx Priority Overnight |
| **Weight** | 74 lbs / 33.57 kgs | **Delivered To** | Shipping/Receiving |
| **Total pieces** | 1 | **Total shipment weight** | 74 lbs / 33.57 kgs |
| **Shipper reference** | gws-484 | **Packaging** | Your Packaging |
| **Special handling section** | Deliver Weekday | | |

# Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Qualifiers

### Metals

| Qualifier | Qualifier Description |
|---|---|
| D | The reported value is from a dilution. |
| U | Analyzed for but not detected. |
| B | Estimated result. Result is less than the RL, but greater than MDL |

### General Chemistry

| Qualifier | Qualifier Description |
|---|---|
| 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, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision level concentration |
| MDA | Minimum detectable activity |
| EDL | Estimated Detection Limit |
| MDC | Minimum detectable concentration |
| 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 |
| 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) |

# Method Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6020A | Metals (ICP/MS) | SW846 | TAL SL |
| 310.1 | Alkalinity | MCAWW | TAL SL |

**Protocol References:**

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

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

# Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 160-14833-1 | B32YV2 | Water | 11/12/15 09:15 | 11/13/15 09:25 |
| 160-14833-2 | B32YV3 | Water | 11/12/15 09:15 | 11/13/15 09:25 |
| 160-14833-3 | B32YV6 | Water | 11/12/15 10:31 | 11/13/15 09:25 |
| 160-14833-4 | B32YV7 | Water | 11/12/15 10:31 | 11/13/15 09:25 |
| 160-14833-5 | B32YW1 | Water | 11/12/15 10:02 | 11/13/15 09:25 |
| 160-14833-6 | B32YW0 | Water | 11/12/15 10:02 | 11/13/15 09:25 |
| 160-14833-7 | B32YW5 | Water | 11/12/15 09:30 | 11/13/15 09:25 |
| 160-14833-8 | B32YW4 | Water | 11/12/15 09:30 | 11/13/15 09:25 |
| 160-14833-9 | B32YW9 | Water | 11/12/15 11:02 | 11/13/15 09:25 |
| 160-14833-10 | B32YW8 | Water | 11/12/15 11:02 | 11/13/15 09:25 |
| 160-14833-11 | B32YX3 | Water | 11/12/15 11:34 | 11/13/15 09:25 |
| 160-14833-12 | B32YX2 | Water | 11/12/15 11:34 | 11/13/15 09:25 |
| 160-14833-13 | B32YX6 | Water | 11/12/15 08:40 | 11/13/15 09:25 |
| 160-14833-14 | B32YX7 | Water | 11/12/15 08:40 | 11/13/15 09:25 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Method: 6020A - Metals (ICP/MS)

**Client Sample ID: B32YV3**
**Date Collected: 11/12/15 09:15**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-2**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 721 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:09 | 2 |
| Sodium | 64600 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 18:48 | 2 |
| Calcium | 80300 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 18:48 | 2 |

**Client Sample ID: B32YV7**
**Date Collected: 11/12/15 10:31**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-4**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 5400 | D | 2.5 | 0.58 | ug/L | | 12/07/15 13:21 | 12/13/15 14:42 | 5 |
| Sodium | 240000 | D | 250 | 119 | ug/L | | 12/07/15 13:21 | 01/12/16 18:57 | 10 |
| Calcium | 250000 | D | 500 | 341 | ug/L | | 12/07/15 13:21 | 01/12/16 18:57 | 10 |

**Client Sample ID: B32YW1**
**Date Collected: 11/12/15 10:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-5**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 9.8 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:22 | 2 |
| Sodium | 158000 | D | 125 | 59.3 | ug/L | | 12/07/15 13:21 | 01/12/16 19:14 | 5 |
| Calcium | 50100 | D | 250 | 170 | ug/L | | 12/07/15 13:21 | 01/12/16 19:14 | 5 |

**Client Sample ID: B32YW5**
**Date Collected: 11/12/15 09:30**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-7**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 182 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:44 | 2 |
| Sodium | 61800 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:23 | 2 |
| Calcium | 99100 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:23 | 2 |

**Client Sample ID: B32YW9**
**Date Collected: 11/12/15 11:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-9**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 30.8 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:52 | 2 |
| Sodium | 46200 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:31 | 2 |
| Calcium | 69200 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:31 | 2 |

**Client Sample ID: B32YX3**
**Date Collected: 11/12/15 11:34**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-11**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 97.1 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 22:01 | 2 |
| Sodium | 47500 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:40 | 2 |
| Calcium | 89700 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:40 | 2 |

**Client Sample ID: B32YX7**
**Date Collected: 11/12/15 08:40**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-14**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 364 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 22:14 | 2 |
| Sodium | 298000 | D | 250 | 119 | ug/L | | 12/07/15 13:21 | 01/12/16 19:53 | 10 |
| Calcium | 90100 | D | 500 | 341 | ug/L | | 12/07/15 13:21 | 01/12/16 19:53 | 10 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Method: 6020A - Metals (ICP/MS) - Dissolved

**Client Sample ID: B32YV2**
**Date Collected: 11/12/15 09:15**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-1**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 536 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 20:53 | 2 |
| Sodium | 53800 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 18:32 | 2 |
| Calcium | 67600 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 18:32 | 2 |

**Client Sample ID: B32YV6**
**Date Collected: 11/12/15 10:31**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-3**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 5310 | D | 2.5 | 0.58 | ug/L | | 12/07/15 13:21 | 12/13/15 14:37 | 5 |
| Sodium | 243000 | D | 250 | 119 | ug/L | | 12/07/15 13:21 | 01/12/16 18:52 | 10 |
| Calcium | 260000 | D | 500 | 341 | ug/L | | 12/07/15 13:21 | 01/12/16 18:52 | 10 |

**Client Sample ID: B32YW0**
**Date Collected: 11/12/15 10:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-6**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 9.4 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:40 | 2 |
| Sodium | 175000 | D | 125 | 59.3 | ug/L | | 12/07/15 13:21 | 01/12/16 19:18 | 5 |
| Calcium | 52500 | D | 250 | 170 | ug/L | | 12/07/15 13:21 | 01/12/16 19:18 | 5 |

**Client Sample ID: B32YW4**
**Date Collected: 11/12/15 09:30**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-8**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 198 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:48 | 2 |
| Sodium | 61300 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:27 | 2 |
| Calcium | 99300 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:27 | 2 |

**Client Sample ID: B32YW8**
**Date Collected: 11/12/15 11:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-10**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 31.7 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 21:57 | 2 |
| Sodium | 45200 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:35 | 2 |
| Calcium | 68700 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:35 | 2 |

**Client Sample ID: B32YX2**
**Date Collected: 11/12/15 11:34**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-12**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 99.6 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 22:05 | 2 |
| Sodium | 44900 | | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 19:44 | 2 |
| Calcium | 84600 | | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 19:44 | 2 |

**Client Sample ID: B32YX6**
**Date Collected: 11/12/15 08:40**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-13**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 369 | | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 22:10 | 2 |
| Sodium | 291000 | D | 250 | 119 | ug/L | | 12/07/15 13:21 | 01/12/16 19:48 | 10 |
| Calcium | 88200 | D | 500 | 341 | ug/L | | 12/07/15 13:21 | 01/12/16 19:48 | 10 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## General Chemistry

**Client Sample ID: B32YV3**
**Date Collected: 11/12/15 09:15**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-2**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **178** | | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |

**Client Sample ID: B32YV7**
**Date Collected: 11/12/15 10:31**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-4**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **538** | | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |

**Client Sample ID: B32YW1**
**Date Collected: 11/12/15 10:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-5**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **213** | | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

**Client Sample ID: B32YW5**
**Date Collected: 11/12/15 09:30**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-7**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **126** | | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

**Client Sample ID: B32YW9**
**Date Collected: 11/12/15 11:02**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-9**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **164** | | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

**Client Sample ID: B32YX3**
**Date Collected: 11/12/15 11:34**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-11**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **158** | | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

**Client Sample ID: B32YX7**
**Date Collected: 11/12/15 08:40**
**Date Received: 11/13/15 09:25**
**Lab Sample ID: 160-14833-14**
**Matrix: Water**

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Bicarbonate Alkalinity** | **292** | | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Method: 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 160-225828/1-A**
**Matrix: Water**
**Analysis Batch: 226920**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 225828**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 0.23 | U | 1.0 | 0.23 | ug/L | | 12/07/15 13:21 | 12/11/15 20:44 | 2 |

**Lab Sample ID: MB 160-225828/1-A**
**Matrix: Water**
**Analysis Batch: 232110**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 225828**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Sodium | 44.06 | B | 50.0 | 23.7 | ug/L | | 12/07/15 13:21 | 01/12/16 18:23 | 2 |
| Calcium | 68.1 | U | 100 | 68.1 | ug/L | | 12/07/15 13:21 | 01/12/16 18:23 | 2 |

**Lab Sample ID: LCS 160-225828/2-A**
**Matrix: Water**
**Analysis Batch: 226920**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 225828**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Uranium | 1000 | 911.0 | | ug/L | | 91 | 80 - 120 |

**Lab Sample ID: LCS 160-225828/2-A**
**Matrix: Water**
**Analysis Batch: 232110**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 225828**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Sodium | 10000 | 9989 | | ug/L | | 100 | 80 - 120 |
| Calcium | 10000 | 10460 | | ug/L | | 105 | 80 - 120 |

**Lab Sample ID: 160-14833-1 MS**
**Matrix: Water**
**Analysis Batch: 226920**

**Client Sample ID: B32YV2**
**Prep Type: Dissolved**
**Prep Batch: 225828**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Uranium | 536 | | 1000 | 1522 | | ug/L | | 99 | 75 - 125 |

**Lab Sample ID: 160-14833-1 MS**
**Matrix: Water**
**Analysis Batch: 232110**

**Client Sample ID: B32YV2**
**Prep Type: Dissolved**
**Prep Batch: 225828**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Sodium | 53800 | | 10000 | 63430 | | ug/L | | 96 | 75 - 125 |
| Calcium | 67600 | | 10000 | 77480 | | ug/L | | 98 | 75 - 125 |

**Lab Sample ID: 160-14833-1 MSD**
**Matrix: Water**
**Analysis Batch: 226920**

**Client Sample ID: B32YV2**
**Prep Type: Dissolved**
**Prep Batch: 225828**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Uranium | 536 | | 1000 | 1540 | | ug/L | | 100 | 75 - 125 | 1 | 20 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Method: 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: 160-14833-1 MSD**
**Matrix: Water**
**Analysis Batch: 232110**

**Client Sample ID: B32YV2**
**Prep Type: Dissolved**
**Prep Batch: 225828**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sodium | 53800 | | 10000 | 61870 | | ug/L | | 81 | 75 - 125 | 2 | 20 |
| Calcium | 67600 | | 10000 | 76950 | | ug/L | | 93 | 75 - 125 | 1 | 20 |

## Method: 310.1 - Alkalinity

**Lab Sample ID: MB 160-222233/1**
**Matrix: Water**
**Analysis Batch: 222233**

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

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/16/15 12:26 | 1 |

**Lab Sample ID: HLCS 160-222233/3**
**Matrix: Water**
**Analysis Batch: 222233**

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

| Analyte | Spike Added | HLCS Result | HLCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 400 | 374.0 | | mg/L | | 93 | 90 - 110 |

**Lab Sample ID: LCS 160-222233/2**
**Matrix: Water**
**Analysis Batch: 222233**

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

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 200 | 189.0 | | mg/L | | 94 | 90 - 110 |

**Lab Sample ID: 160-14798-A-15 MS**
**Matrix: Water**
**Analysis Batch: 222233**

**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 |
|---|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 96.0 | | 100 | 185.0 | | mg/L | | 89 | 80 - 120 |

**Lab Sample ID: 160-14798-A-15 DU**
**Matrix: Water**
**Analysis Batch: 222233**

**Client Sample ID: Duplicate**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 96.0 | | 96.00 | | mg/L | | 0 | 20 |
| Carbonate Alkalinity | 0.54 | U | 0.54 | U | mg/L | | NC | 20 |

**Lab Sample ID: MB 160-222867/1**
**Matrix: Water**
**Analysis Batch: 222867**

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

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |
| Carbonate Alkalinity | 0.54 | U | 5.0 | 0.54 | mg/L | | | 11/20/15 09:17 | 1 |

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Method: 310.1 - Alkalinity (Continued)

**Lab Sample ID: HLCS 160-222867/3**
**Matrix: Water**
**Analysis Batch: 222867**

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

| Analyte | Spike Added | HLCS Result | HLCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 400 | 370.0 | | mg/L | | 92 | 90 - 110 |

**Lab Sample ID: LCS 160-222867/2**
**Matrix: Water**
**Analysis Batch: 222867**

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

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 200 | 187.0 | | mg/L | | 93 | 90 - 110 |

**Lab Sample ID: 160-14833-5 MS**
**Matrix: Water**
**Analysis Batch: 222867**

**Client Sample ID: B32YW1**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 213 | | 100 | 306.0 | | mg/L | | 93 | 80 - 120 |

**Lab Sample ID: 160-14833-5 DU**
**Matrix: Water**
**Analysis Batch: 222867**

**Client Sample ID: B32YW1**
**Prep Type: Total/NA**

| Analyte | Sample Result | Sample Qualifier | DU Result | DU Qualifier | Unit | D | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|
| Bicarbonate Alkalinity | 213 | | 214.0 | | mg/L | | 0.5 | 20 |
| Carbonate Alkalinity | 0.54 | U | 0.54 | U | mg/L | | NC | 20 |

# QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Metals

### Prep Batch: 225828

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-1 | B32YV2 | Dissolved | Water | 3010A | |
| 160-14833-1 MS | B32YV2 | Dissolved | Water | 3010A | |
| 160-14833-1 MSD | B32YV2 | Dissolved | Water | 3010A | |
| 160-14833-2 | B32YV3 | Total/NA | Water | 3010A | |
| 160-14833-3 | B32YV6 | Dissolved | Water | 3010A | |
| 160-14833-4 | B32YV7 | Total/NA | Water | 3010A | |
| 160-14833-5 | B32YW1 | Total/NA | Water | 3010A | |
| 160-14833-6 | B32YW0 | Dissolved | Water | 3010A | |
| 160-14833-7 | B32YW5 | Total/NA | Water | 3010A | |
| 160-14833-8 | B32YW4 | Dissolved | Water | 3010A | |
| 160-14833-9 | B32YW9 | Total/NA | Water | 3010A | |
| 160-14833-10 | B32YW8 | Dissolved | Water | 3010A | |
| 160-14833-11 | B32YX3 | Total/NA | Water | 3010A | |
| 160-14833-12 | B32YX2 | Dissolved | Water | 3010A | |
| 160-14833-13 | B32YX6 | Dissolved | Water | 3010A | |
| 160-14833-14 | B32YX7 | Total/NA | Water | 3010A | |
| LCS 160-225828/2-A | Lab Control Sample | Total/NA | Water | 3010A | |
| MB 160-225828/1-A | Method Blank | Total/NA | Water | 3010A | |

### Analysis Batch: 226920

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-1 | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-1 MS | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-1 MSD | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-2 | B32YV3 | Total/NA | Water | 6020A | 225828 |
| 160-14833-5 | B32YW1 | Total/NA | Water | 6020A | 225828 |
| 160-14833-6 | B32YW0 | Dissolved | Water | 6020A | 225828 |
| 160-14833-7 | B32YW5 | Total/NA | Water | 6020A | 225828 |
| 160-14833-8 | B32YW4 | Dissolved | Water | 6020A | 225828 |
| 160-14833-9 | B32YW9 | Total/NA | Water | 6020A | 225828 |
| 160-14833-10 | B32YW8 | Dissolved | Water | 6020A | 225828 |
| 160-14833-11 | B32YX3 | Total/NA | Water | 6020A | 225828 |
| 160-14833-12 | B32YX2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-13 | B32YX6 | Dissolved | Water | 6020A | 225828 |
| 160-14833-14 | B32YX7 | Total/NA | Water | 6020A | 225828 |
| LCS 160-225828/2-A | Lab Control Sample | Total/NA | Water | 6020A | 225828 |
| MB 160-225828/1-A | Method Blank | Total/NA | Water | 6020A | 225828 |

### Analysis Batch: 227046

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-3 | B32YV6 | Dissolved | Water | 6020A | 225828 |
| 160-14833-4 | B32YV7 | Total/NA | Water | 6020A | 225828 |

### Analysis Batch: 232110

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-1 | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-1 MS | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-1 MSD | B32YV2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-2 | B32YV3 | Total/NA | Water | 6020A | 225828 |
| 160-14833-3 | B32YV6 | Dissolved | Water | 6020A | 225828 |
| 160-14833-4 | B32YV7 | Total/NA | Water | 6020A | 225828 |

# QC Association Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X15-063

TestAmerica Job ID: 160-14833-1
SDG: SL2011

## Metals (Continued)

### Analysis Batch: 232110 (Continued)

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-5 | B32YW1 | Total/NA | Water | 6020A | 225828 |
| 160-14833-6 | B32YW0 | Dissolved | Water | 6020A | 225828 |
| 160-14833-7 | B32YW5 | Total/NA | Water | 6020A | 225828 |
| 160-14833-8 | B32YW4 | Dissolved | Water | 6020A | 225828 |
| 160-14833-9 | B32YW9 | Total/NA | Water | 6020A | 225828 |
| 160-14833-10 | B32YW8 | Dissolved | Water | 6020A | 225828 |
| 160-14833-11 | B32YX3 | Total/NA | Water | 6020A | 225828 |
| 160-14833-12 | B32YX2 | Dissolved | Water | 6020A | 225828 |
| 160-14833-13 | B32YX6 | Dissolved | Water | 6020A | 225828 |
| 160-14833-14 | B32YX7 | Total/NA | Water | 6020A | 225828 |
| LCS 160-225828/2-A | Lab Control Sample | Total/NA | Water | 6020A | 225828 |
| MB 160-225828/1-A | Method Blank | Total/NA | Water | 6020A | 225828 |

## General Chemistry

### Analysis Batch: 222233

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14798-A-15 DU | Duplicate | Total/NA | Water | 310.1 | |
| 160-14798-A-15 MS | Matrix Spike | Total/NA | Water | 310.1 | |
| 160-14833-2 | B32YV3 | Total/NA | Water | 310.1 | |
| 160-14833-4 | B32YV7 | Total/NA | Water | 310.1 | |
| HLCS 160-222233/3 | Lab Control Sample | Total/NA | Water | 310.1 | |
| LCS 160-222233/2 | Lab Control Sample | Total/NA | Water | 310.1 | |
| MB 160-222233/1 | Method Blank | Total/NA | Water | 310.1 | |

### Analysis Batch: 222867

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 160-14833-5 | B32YW1 | Total/NA | Water | 310.1 | |
| 160-14833-5 DU | B32YW1 | Total/NA | Water | 310.1 | |
| 160-14833-5 MS | B32YW1 | Total/NA | Water | 310.1 | |
| 160-14833-7 | B32YW5 | Total/NA | Water | 310.1 | |
| 160-14833-9 | B32YW9 | Total/NA | Water | 310.1 | |
| 160-14833-11 | B32YX3 | Total/NA | Water | 310.1 | |
| 160-14833-14 | B32YX7 | Total/NA | Water | 310.1 | |
| HLCS 160-222867/3 | Lab Control Sample | Total/NA | Water | 310.1 | |
| LCS 160-222867/2 | Lab Control Sample | Total/NA | Water | 310.1 | |
| MB 160-222867/1 | Method Blank | Total/NA | Water | 310.1 | |