# SAF-RC-238
# Characterization of Surface Soils
# At 100-K-64 & 100-K-111
# FINAL DATA PACKAGE

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt H4-21 KW 8/13/13
INITIAL/DATE

**COMMENTS:**

**SDG J01880 SAF-RC-238**

Rad only Chem only ☑ Rad & Chem

☑ Complete Partial

**Sample Location: 100-K-111 – 100-K-111 West Sample Area**

Analytical Data Package Prepared For

# Washington Closure Hanford

Radiochemical Analysis By

## TestAmerica Inc

*2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.*

Assigned Laboratory Code: TARL

*Data Package Contains* 61 *Pages*

Report No.: 56481

Results in this report relate only to the sample(s) analyzed.

| SDG No. | Order No. | Client Sample ID (List Order) | Lot-Sa No. | Work Order | Report DB ID | Batch No. |
|---|---|---|---|---|---|---|
| J01880 | RC-238 | J1RPY8 | J3G240439-1 | M1F7C1AG | 9M1F7C10 | 3206031 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AC | 9M1F7C10 | 3206032 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AH | 9M1F7C10 | 3206033 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AF | 9M1F7C10 | 3206034 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AD | 9M1F7C10 | 3206035 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AE | 9M1F7C10 | 3206036 |
| | | J1RPY8 | J3G240439-1 | M1F7C1AA | 9M1F7C10 | 3213025 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AG | 9M1F7D10 | 3206031 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AC | 9M1F7D10 | 3206032 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AH | 9M1F7D10 | 3206033 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AF | 9M1F7D10 | 3206034 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AD | 9M1F7D10 | 3206035 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AE | 9M1F7D10 | 3206036 |
| | | J1RPY9 | J3G240439-2 | M1F7D1AA | 9M1F7D10 | 3213025 |

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

August 9, 2013

Attention: Joan Kessner

| | | |
|---|---|---|
| SAF Number | : | RC-238 |
| Date SDG Closed | : | July 24, 2013 |
| Number of Samples | : | Two (2) |
| Sample Type | : | Soil |
| SDG Number | : | J01880 |
| Data Deliverable | : | 15– Day / Summary |

## CASE NARRATIVE

### I. Introduction

On July 24, 2013, two soil samples were received at TestAmerica for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID number to correspond with the Washington Closure Hanford (WCH) specific ID:

| WCH ID# | TARL ID# | MATRIX | DATE OF RECEIPT |
|---|---|---|---|
| J1RPY8 | M1F7C | SOIL | 07/24/13 |
| J1RPY9 | M1F7D | SOIL | 07/24/13 |

### II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

**Alpha Spectroscopy**
Plutonium-238, -239/240 by method RL-ALP-002
**Gas Proportional Counting**
Strontium-90 by method RL-GPC-010
**Gamma Spectroscopy**

Gamma Spec by method RL-GAM-001
**Liquid Scintillation Counting**
Tritium by method RL-LSC-005
Carbon-14 by method RL-LSC-008
Nickel-63 by method RL-LCS-017
**Chemical Analysis**
Hexavalent Chromium by EPA method 7196A

## IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

## V. Comments

**Alpha Spectroscopy**
Plutonium-238, -239/240 by method RL-ALP-002:
The LCS, batch blank, samples and sample duplicate (J1RPY8) results are within contractual requirements.

**Gas Proportional Counting**
Strontium-90 by method RL-GPC-010:
The LCS, batch blank, samples and sample duplicate (J1RPY9) results are within contractual requirements.

**Gamma Spectroscopy**
Gamma Spec by method RL-GAM-001:
The CRDL was not met for some of the analytes. Except as noted, the LCS, batch blank, samples and sample duplicate (J1RPY9) results are within contractual requirements.

**Liquid Scintillation Counting**
Tritium by method RL-LSC-005:
The LCS, batch blank, samples and sample duplicate (J1RPY9) results are within contractual requirements.

Carbon-14 by method RL-LSC-008:
During review of the data results it was noted that there was an apparent switch of the batch blank and LCS. A physical review of the vials was performed and it was noted that the switch likely occurred during the analysis. The data was edited accordingly and recalculated for acceptable results. Except as noted; the LCS, batch blank, samples and sample duplicate (J1RPY8) results are within contractual requirements.

Nickel-63 by method RL-LCS-017:
The LCS, batch blank, samples and sample duplicate (J1RPY9) results are within contractual requirements.

**Chemical Analysis**
Hexavalent Chromium by EPA method 7196A
The LCS, batch blank, samples, sample duplicate (J1RPY8) and sample matrix spike (J1RPY8) results are within contractual requirements.

Washington Closure Hanford
August 9, 2013

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. 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 following signature.

Reviewed and approved:

Rhonda Wagar
Project Manager

## Drinking Water Method Cross References

| | | |
|---|---|---|
| | DRINKING WATER ASTM METHOD CROSS REFERENCES | |
| **Referenced Method** | **Isotope(s)** | **TestAmerica Richland's SOP No.** |
| EPA 901.1 | Cs-134, I-131 | RL-GAM-001 |
| EPA 900.0 | Alpha & Beta | RL-GPC-001 |
| EPA 00-02 | Gross Alpha (Coprecipitation) | RL-GPC-002 |
| EPA 903.0 | Total Alpha Radium (Ra-226) | RL-RA-002 |
| EPA 903.1 | Ra-226 | RL-RA-001 |
| EPA 904.0 | Ra-228 | RL-RA-001 |
| EPA 905.0 | Sr-89/90 | RL-GPC-003 |
| ASTM D5174 | Uranium | RL-KPA-003 |
| EPA 906.0 | Tritium | RL-LSC-005 |

## Results in this report relate only to the sample(s) analyzed.

## Uncertainty Estimation

TestAmerica Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ($u_i$) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ($u_c$) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/?n), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

## Report Definitions

| | |
|---|---|
| **Action Lev** | An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit. |
| **Batch** | The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together. |
| **Bias** | Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30. |
| **COC No** | Chain of Custody Number assigned by the Client or TestAmerica. |
| **Count Error (#s)** | Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background. |
| **Total Uncert (#s)** ***$u_c$ - Combined Uncertainty.*** | All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *$u_c$ the combined uncertainty*. The uncertainty is absolute and in the same units as the result. |
| **(#s), Coverage Factor** | The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations. |
| **CRDL (RL)** | Contractual Required Detection Limit as defined in the Client's Statement Of Work or TestAmerica "default" nominal detection limit. Often referred to the reporting level (RL) |
| **Lc** | Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero. |
| **Lot-Sample No** | The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot. |
| **MDC\|MDA** | Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. |
| **Primary Detector** | The instrument identifier associated with the analysis of the sample aliquot. |
| **Ratio U-234/U-238** | The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038. |
| **Rst/MDC** | Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Rst/TotUcert** | Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. |
| **Report DB No** | Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number. |
| **RER** | The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample. |
| **SDG** | Sample Delivery Group Number assigned by the Client or assigned by TestAmerica upon sample receipt. |
| **Sum Rpt Alpha Spec Rst(s)** | The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units. |
| **Work Order** | The LIMS software assign test specific identifier. |
| **Yield** | The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method. |

# Sample Results Summary

## TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

**Date:** 09-Aug-13

**Report No. :** 56481

**SDG No:** J01880

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | MDL | CRDL | RPD |
|---|---|---|---|---|---|---|---|---|---|
| **3206033 C14_LSC** | | | | | | | | | |
| **J1RPY8** | | | | | | | | | |
| | M1F7C1AH | C-14 | 6.94E-03 +- 2.3E-01 | U | pCi/g | 100% | 4.40E-01 | 5.00E+01 | |
| **J1RPY8 DUP** | | | | | | | | | |
| | M1F7C1AJ | C-14 | 1.03E-01 +- 2.4E-01 | U | pCi/g | 100% | 4.50E-01 | 5.00E+01 | 174.6 |
| **J1RPY9** | | | | | | | | | |
| | M1F7D1AH | C-14 | 1.57E-01 +- 2.4E-01 | U | pCi/g | 100% | 4.51E-01 | 5.00E+01 | |
| **3206036 PUISO_PLATE_AEA** | | | | | | | | | |
| **J1RPY8** | | | | | | | | | |
| | M1F7C1AE | Pu-238 | -6.65E-03 +- 3.1E-02 | U | pCi/g | 95% | 8.76E-02 | 1.00E+00 | |
| | | PU239/40 | -6.05E-04 +- 3.0E-02 | U | pCi/g | 95% | 5.50E-02 | 1.00E+00 | |
| **J1RPY8 DUP** | | | | | | | | | |
| | M1F7C1AK | Pu-238 | 0.00E+00 +- 2.9E-02 | U | pCi/g | 100% | 5.28E-02 | 1.00E+00 | -200.0 |
| | | PU239/40 | 0.00E+00 +- 2.9E-02 | U | pCi/g | 100% | 5.28E-02 | 1.00E+00 | -200.0 |
| **J1RPY9** | | | | | | | | | |
| | M1F7D1AE | Pu-238 | 9.52E-03 +- 2.8E-02 | U | pCi/g | 97% | 7.47E-02 | 1.00E+00 | |
| | | PU239/40 | 1.40E-02 +- 2.8E-02 | U | pCi/g | 97% | 5.09E-02 | 1.00E+00 | |
| **3206031 GAMMA_GS** | | | | | | | | | |
| **J1RPY8** | | | | | | | | | |
| | M1F7C1AG | CO-60 | 8.04E-03 +- 1.9E-02 | U | pCi/g | | 3.52E-02 | 5.00E-02 | |
| | | CS-137 | 3.31E-03 +- 1.9E-02 | U | pCi/g | | 3.29E-02 | 1.00E-01 | |
| | | EU-152 | 1.07E-02 +- 4.4E-02 | U | pCi/g | | 7.65E-02 | 1.00E-01 | |
| | | EU-154 | 2.53E-02 +- 6.1E-02 | U | pCi/g | | 1.10E-01 | 1.00E-01 | |
| | | EU-155 | 1.32E-02 +- 4.4E-02 | U | pCi/g | | 7.48E-02 | 1.00E-01 | |
| | | K-40 | 1.87E+01 +- 2.2E+00 | | pCi/g | | 1.98E-01 | | |
| **J1RPY9** | | | | | | | | | |
| | M1F7D1AG | CO-60 | 4.79E-03 +- 1.8E-02 | U | pCi/g | | 3.30E-02 | 5.00E-02 | |
| | | CS-137 | 1.57E-01 +- 3.6E-02 | | pCi/g | | 2.72E-02 | 1.00E-01 | |
| | | EU-152 | 1.60E-02 +- 3.6E-02 | U | pCi/g | | 6.39E-02 | 1.00E-01 | |
| | | EU-154 | -4.84E-02 +- 6.0E-02 | U | pCi/g | | 9.67E-02 | 1.00E-01 | |
| | | EU-155 | 5.89E-02 +- 4.4E-02 | | pCi/g | | 5.55E-02 | 1.00E-01 | |
| | | K-40 | 1.89E+01 +- 2.2E+00 | | pCi/g | | 2.56E-01 | | |
| **J1RPY9 DUP** | | | | | | | | | |
| | M1F7D1AJ | CO-60 | -4.79E-03 +- 1.9E-02 | U | pCi/g | | 3.24E-02 | 5.00E-02 | 1966100 |
| | | CS-137 | 1.57E-01 +- 3.8E-02 | | pCi/g | | 2.95E-02 | 1.00E-01 | 0.2 |
| | | EU-152 | -1.81E-03 +- 3.8E-02 | U | pCi/g | | 6.44E-02 | 1.00E-01 | 251.0 |
| | | EU-154 | 1.77E-02 +- 6.2E-02 | U | pCi/g | | 1.09E-01 | 1.00E-01 | -431.5 |
| | | EU-155 | 8.87E-02 +- 3.8E-02 | U | pCi/g | | 6.50E-02 | 1.00E-01 | 40.4 |
| | | K-40 | 1.94E+01 +- 2.3E+00 | | pCi/g | | 2.70E-01 | | 2.4 |

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.23 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# Sample Results Summary

## TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

**Date:** 09-Aug-13

**Report No. :** 56481

**SDG No:** J01880

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | MDL | CRDL | RPD |
|---|---|---|---|---|---|---|---|---|---|
| 3206032 SRTOT_SEP_PRECIP_GPC | | | | | | | | | |
| J1RPY8 | | | | | | | | | |
| | M1F7C1AC | STRONTIUM | -1.75E-02 +- 8.2E-02 | U | pCi/g | 90% | 2.02E-01 | | |
| J1RPY9 | | | | | | | | | |
| | M1F7D1AC | STRONTIUM | 7.08E-02 +- 9.6E-02 | U | pCi/g | 88% | 2.04E-01 | | |
| J1RPY9 DUP | | | | | | | | | |
| | M1F7D1AK | STRONTIUM | 3.48E-02 +- 8.9E-02 | U | pCi/g | 87% | 2.01E-01 | | 68.3 |
| 3206034 906.0_H3_LSC | | | | | | | | | |
| J1RPY8 | | | | | | | | | |
| | M1F7C1AF | H-3 | -1.60E-02 +- 1.7E-02 | U | pCi/g | 100% | 3.85E-02 | 4.00E+02 | |
| J1RPY9 | | | | | | | | | |
| | M1F7D1AF | H-3 | -3.35E-03 +- 2.8E-02 | U | pCi/g | 100% | 6.29E-02 | 4.00E+02 | |
| J1RPY9 DUP | | | | | | | | | |
| | M1F7D1AL | H-3 | -1.82E-02 +- 2.6E-02 | U | pCi/g | 100% | 6.06E-02 | 4.00E+02 | -137.8 |
| 3206035 NI63_LSC | | | | | | | | | |
| J1RPY8 | | | | | | | | | |
| | M1F7C1AD | NI-63 | 4.97E+00 +- 5.7E+00 | U | pCi/g | 91% | 1.14E+01 | 3.00E+01 | |
| J1RPY9 | | | | | | | | | |
| | M1F7D1AD | NI-63 | 2.21E+01 +- 7.2E+00 | | pCi/g | 91% | 1.15E+01 | 3.00E+01 | |
| J1RPY9 DUP | | | | | | | | | |
| | M1F7D1AM | NI-63 | 6.92E+00 +- 5.9E+00 | U | pCi/g | 91% | 1.14E+01 | 3.00E+01 | 104.7 |
| 3213025 7196_CR6 | | | | | | | | | |
| J1RPY8 | | | | | | | | | |
| | M1F7C1AA | HEXCHROME | 2.43E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |
| | M1F7C1AM | HEXCHROME | 2.61E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | 7.1 |
| J1RPY9 | | | | | | | | | |
| | M1F7D1AA | HEXCHROME | 3.95E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |

**No. of Results:** 39

TestAmerica Inc

rptSTLRchSaSummary2 V5.2.23 A2002

RPD - Relative Percent Difference.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# QC Results Summary

**Date:** 09-Aug-13

## TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

**Report No. :** 56481

**SDG No.:** J01880

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | LCS Recovery | Bias | MDL |
|---|---|---|---|---|---|---|---|---|
| **C14_LSC** | | | | | | | | |
| 3206033 BLANK QC, | | | | | | | | |
| M1GA01AA | C-14 | 1.36E-01 +- 2.4E-01 | U | pCi/g | 100% | | | 4.48E-01 |
| 3206033 LCS, | | | | | | | | |
| M1GA01AC | C-14 | 7.61E+00 +- 7.7E-01 | | pCi/g | 100% | 102% | 0.0 | 4.55E-01 |
| **PUISO_PLATE_AEA** | | | | | | | | |
| 3206036 BLANK QC, | | | | | | | | |
| M1GA31AA | Pu-238 | -6.27E-04 +- 3.1E-02 | U | pCi/g | 92% | | | 5.70E-02 |
| | PU239/40 | -1.88E-03 +- 3.1E-02 | U | pCi/g | 92% | | | 6.77E-02 |
| 3206036 LCS, | | | | | | | | |
| M1GA31AC | PU239/40 | 6.72E+00 +- 1.4E+00 | | pCi/g | 88% | 100% | 0.0 | 5.70E-02 |
| **GAMMA_GS** | | | | | | | | |
| 3206031 BLANK QC, | | | | | | | | |
| M1GAW1AA | CO-60 | -9.41E-04 +- 8.6E-03 | U | pCi/g | | | | 1.58E-02 |
| | CS-137 | -3.05E-03 +- 7.5E-03 | U | pCi/g | | | | 1.29E-02 |
| | EU-152 | -3.21E-03 +- 1.8E-02 | U | pCi/g | | | | 3.14E-02 |
| | EU-154 | -1.20E-03 +- 2.3E-02 | U | pCi/g | | | | 4.38E-02 |
| | EU-155 | 9.57E-03 +- 1.2E-02 | U | pCi/g | | | | 2.26E-02 |
| | K-40 | -3.44E-01 +- 2.3E-01 | U | pCi/g | | | | 4.55E-01 |
| 3206031 LCS, | | | | | | | | |
| M1GAW1AC | CS-137 | 1.01E+00 +- 1.4E-01 | | pCi/g | | 98% | 0.0 | 2.31E-02 |
| | RA-226 | 9.49E-01 +- 1.4E-01 | | pCi/g | | 83% | -0.2 | 4.17E-02 |
| | RA-228 | 7.61E-01 +- 1.3E-01 | | pCi/g | | 107% | 0.1 | 8.44E-02 |
| | U-238 | 9.84E-01 +- 1.3E-01 | | pCi/g | | 82% | -0.2 | 4.17E-02 |
| **SRTOT_SEP_PRECIP_GPC** | | | | | | | | |
| 3206032 BLANK QC, | | | | | | | | |
| M1GAX1AA | STRONTIUM | 1.93E-02 +- 1.0E-01 | U | pCi/g | 75% | | | 2.43E-01 |
| 3206032 LCS, | | | | | | | | |
| M1GAX1AC | STRONTIUM | 2.56E+00 +- 6.7E-01 | | pCi/g | 72% | 114% | 0.1 | 2.75E-01 |
| **906.0_H3_LSC** | | | | | | | | |
| 3206034 BLANK QC, | | | | | | | | |
| M1GA11AA | H-3 | -5.93E-03 +- 2.5E-02 | U | pCi/g | 100% | | | 5.60E-02 |
| 3206034 LCS, | | | | | | | | |
| M1GA11AC | H-3 | 3.17E-01 +- 3.7E-02 | | pCi/g | 100% | 103% | 0.0 | 4.87E-02 |
| **NI63_LSC** | | | | | | | | |
| 3206035 BLANK QC, | | | | | | | | |
| M1GA21AA | NI-63 | 1.46E+01 +- 6.9E+00 | | pCi/g | 79% | | | 1.31E+01 |
| 3206035 LCS, | | | | | | | | |
| M1GA21AC | NI-63 | 4.90E+02 +- 5.2E+01 | | pCi/g | 75% | 96% | 0.0 | 1.37E+01 |
| **7196_CR6** | | | | | | | | |
| 3213025 MATRIX SPIKE, J1RPY8 | | | | | | | | |
| M1F7C1AL | HEXCHROME | 2.58E+01 +- 0.0E+00 | | mg/kg | N/A | 89% | -0.1 | 1.55E-01 |
| 3213025 LCS, | | | | | | | | |

TestAmerica Inc

rptSTLRchQcSummary V5.2.23
A2002

**Bias** - (Result/Expected)-1 as defined by ANSI N13.30.

**U Qual** - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# QC Results Summary

**Date:** 09-Aug-13

## TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

**Report No. :** 56481

**SDG No.:** J01880

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | LCS Recovery | Bias | MDL |
|---|---|---|---|---|---|---|---|---|
| M1H101AC | HEXCHROME | 1.75E+01 +- 0.0E+00 | | mg/kg | N/A | 92% | -0.1 | 1.55E-01 |
| 3213025 BLANK QC, | | | | | | | | |
| M1H101AA | HEXCHROME | 1.55E-01 +- 0.0E+00 | U | mg/kg | N/A | | | 1.55E-01 |

**No. of Results:** 24

TestAmerica Inc

rptSTLRchQcSummary V5.2.23 A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# FORM I

## SAMPLE RESULTS

**Date:** 09-Aug-13

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:25:00 PM |
| **Lot-Sample No.:** | J3G240439-1 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY8 | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206031 | GAMMA_GS | | | **Work Order:** M1F7C1AG | | | **Report DB ID:** 9M1F7C10 | | | | | |
| CO-60 | **8.04E-03** | U | 1.9E-02 | 1.9E-02 | 3.52E-02 | pCi/g | | *0.23* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | 5.00E-02 | *0.84* | | | g | |
| CS-137 | **3.31E-03** | U | 1.9E-02 | 1.9E-02 | 3.29E-02 | pCi/g | | *0.1* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | 1.00E-01 | *0.35* | | | g | |
| EU-152 | **1.07E-02** | U | 4.4E-02 | 4.4E-02 | 7.65E-02 | pCi/g | | *0.14* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | 1.00E-01 | *0.49* | | | g | |
| EU-154 | **2.53E-02** | U | 6.1E-02 | 6.1E-02 | 1.10E-01 | pCi/g | | *0.23* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | 1.00E-01 | *0.83* | | | g | |
| EU-155 | **1.32E-02** | U | 4.4E-02 | 4.4E-02 | 7.48E-02 | pCi/g | | *0.18* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | 1.00E-01 | *0.59* | | | g | |
| K-40 | **1.87E+01** | | 2.2E+00 | 2.2E+00 | 1.98E-01 | pCi/g | | *(94.1)* | 7/26/13 12:12 p | | 309.7 | GER15$1 |
| | | | | | | | | *(16.9)* | | | g | |
| **Batch:** 3206032 | SRTOT_SEP_PRECIP_GPC | | | **Work Order:** M1F7C1AC | | | **Report DB ID:** 9M1F7C10 | | | | | |
| STRONTIUM | **-1.75E-02** | U | 8.2E-02 | 8.2E-02 | 2.02E-01 | pCi/g | 90% | *-0.09* | 8/3/13 05:59 p | | 3.03 | GPC32A |
| | | | | | | 9.36E-02 | | *-0.43* | | | g | |
| **Batch:** 3206033 | C14_LSC | | | **Work Order:** M1F7C1AH | | | **Report DB ID:** 9M1F7C10 | | | | | |
| C-14 | **6.94E-03** | U | 1.8E-01 | 2.3E-01 | 4.40E-01 | pCi/g | 100% | *0.02* | 7/31/13 08:22 p | | 5.092 | LSC9 |
| | | | | | | 2.10E-01 | 5.00E+01 | *0.06* | | | g | |
| **Batch:** 3206034 | 906.0_H3_LSC | | | **Work Order:** M1F7C1AF | | | **Report DB ID:** 9M1F7C10 | | | | | |
| H-3 | **-1.60E-02** | U | 1.4E-02 | 1.7E-02 | 3.85E-02 | pCi/g | 100% | *-0.41* | 8/7/13 06:47 p | | 64.1 | LSC8 |
| | | | | | | 1.80E-02 | 4.00E+02 | *-(1.9)* | | | g | |

**TestAmerica Inc**
**rptSTLRchSample**
**V5.2.23 A2002**

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 09-Aug-13

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:25:00 PM |
| **Lot-Sample No.:** | J3G240439-1 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY8 | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206035 | NI63_LSC | | | **Work Order:** | M1F7C1AD | | **Report DB ID:** | 9M1F7C10 | | | | |
| NI-63 | **4.97E+00** | U | 4.7E+00 | 5.7E+00 | 1.14E+01 | pCi/g | 91% | *0.44* | 8/7/13 04:25 a | | 0.25 | LSC4 |
| | | | | | | 5.32E+00 | 3.00E+01 | *(1.7)* | | | g | |
| **Batch:** 3206036 | PUISO_PLATE_AEA | | | **Work Order:** | M1F7C1AE | | **Report DB ID:** | 9M1F7C10 | | | | |
| Pu-238 | **-6.65E-03** | U | 3.1E-02 | 3.1E-02 | 8.76E-02 | pCi/g | 95% | *-0.08* | 8/1/13 07:55 p | | 1.01 | ALP422 |
| | | | | | | 2.33E-02 | 1.00E+00 | *-0.44* | | | g | |
| PU239/40 | **-6.05E-04** | U | 3.0E-02 | 3.0E-02 | 5.50E-02 | pCi/g | 95% | *-0.01* | 8/1/13 07:55 p | | 1.01 | ALP422 |
| | | | | | | 7.03E-03 | 1.00E+00 | *-0.04* | | | g | |
| **Batch:** 3213025 | 7196_CR6 | | | **Work Order:** | M1F7C1AA | | **Report DB ID:** | 9M1F7C10 | | | | |
| HEXCHROME | **2.43E-01** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(1.6)* | 8/7/13 01:45 p | | 2.501 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

**No. of Results:** 13 **Comments:**

**TestAmerica Inc**
**rptSTLRchSample**
**V5.2.23 A2002**

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 09-Aug-13

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:35:00 PM |
| **Lot-Sample No.:** | J3G240439-2 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY9 | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206031 | GAMMA_GS | | | **Work Order:** M1F7D1AG | | | **Report DB ID:** 9M1F7D10 | | | | | |
| CO-60 | **4.79E-03** | U | 1.8E-02 | 1.8E-02 | 3.30E-02 | pCi/g | | *0.15* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | 5.00E-02 | *0.53* | | | g | |
| CS-137 | **1.57E-01** | | 3.6E-02 | 3.6E-02 | 2.72E-02 | pCi/g | | *(5.8)* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | 1.00E-01 | *(8.8)* | | | g | |
| EU-152 | **1.60E-02** | U | 3.6E-02 | 3.6E-02 | 6.39E-02 | pCi/g | | *0.25* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | 1.00E-01 | *0.89* | | | g | |
| EU-154 | **-4.84E-02** | U | 6.0E-02 | 6.0E-02 | 9.67E-02 | pCi/g | | *-0.5* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | 1.00E-01 | *-(1.6)* | | | g | |
| EU-155 | **5.89E-02** | | 4.4E-02 | 4.4E-02 | 5.55E-02 | pCi/g | | *(1.1)* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | 1.00E-01 | *(2.6)* | | | g | |
| K-40 | **1.89E+01** | | 2.2E+00 | 2.2E+00 | 2.56E-01 | pCi/g | | *(74.)* | 7/26/13 12:13 p | | 305.9 | GER17$1 |
| | | | | | | | | *(17.)* | | | g | |
| **Batch:** 3206032 | SRTOT_SEP_PRECIP_GPC | | | **Work Order:** M1F7D1AC | | | **Report DB ID:** 9M1F7D10 | | | | | |
| STRONTIUM | **7.08E-02** | U | 9.4E-02 | 9.6E-02 | 2.04E-01 | pCi/g | 88% | *0.35* | 8/3/13 07:10 p | | 3.03 | GPC32A |
| | | | | | | 9.47E-02 | | *(1.5)* | | | g | |
| **Batch:** 3206033 | C14_LSC | | | **Work Order:** M1F7D1AH | | | **Report DB ID:** 9M1F7D10 | | | | | |
| C-14 | **1.57E-01** | U | 1.9E-01 | 2.4E-01 | 4.51E-01 | pCi/g | 100% | *0.35* | 7/31/13 09:04 p | | 4.933 | LSC9 |
| | | | | | | 2.16E-01 | 5.00E+01 | *(1.3)* | | | g | |
| **Batch:** 3206034 | 906.0_H3_LSC | | | **Work Order:** M1F7D1AF | | | **Report DB ID:** 9M1F7D10 | | | | | |
| H-3 | **-3.35E-03** | U | 2.5E-02 | 2.8E-02 | 6.29E-02 | pCi/g | 100% | *-0.05* | 8/7/13 07:29 p | | 45.9 | LSC8 |
| | | | | | | 2.94E-02 | 4.00E+02 | *-0.24* | | | g | |

**TestAmerica Inc**
**rptSTLRchSample**
**V5.2.23 A2002**

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 09-Aug-13

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:35:00 PM |
| **Lot-Sample No.:** | J3G240439-2 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY9 | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206035 | NI63_LSC | | | **Work Order:** M1F7D1AD | | **Report DB ID:** 9M1F7D10 | | | | | | |
| NI-63 | **2.21E+01** | | 5.6E+00 | 7.2E+00 | 1.15E+01 | pCi/g | 91% | *(1.9)* | 8/7/13 04:48 a | | 0.25 | LSC4 |
| | | | | | | 5.38E+00 | 3.00E+01 | *(6.1)* | | | g | |
| **Batch:** 3206036 | PUISO_PLATE_AEA | | | **Work Order:** M1F7D1AE | | **Report DB ID:** 9M1F7D10 | | | | | | |
| Pu-238 | **9.52E-03** | U | 2.8E-02 | 2.8E-02 | 7.47E-02 | pCi/g | 97% | *0.13* | 8/1/13 07:55 p | | 1.04 | ALP424 |
| | | | | | | 1.84E-02 | 1.00E+00 | *0.67* | | | g | |
| PU239/40 | **1.40E-02** | U | 2.8E-02 | 2.8E-02 | 5.09E-02 | pCi/g | 97% | *0.27* | 8/1/13 07:55 p | | 1.04 | ALP424 |
| | | | | | | 6.51E-03 | 1.00E+00 | *1.* | | | g | |
| **Batch:** 3213025 | 7196_CR6 | | | **Work Order:** M1F7D1AA | | **Report DB ID:** 9M1F7D10 | | | | | | |
| HEXCHROME | **3.95E-01** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(2.5)* | 8/7/13 01:45 p | | 2.5069 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

**No. of Results:** 13 **Comments:**



TestAmerica Inc
rptSTLRchSample
V5.2.23 A2002

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM II

Date: 09-Aug-13

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | **TestAmerica Inc** | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:25:00 PM |
| **Lot-Sample No.:** | **J3G240439-1** | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | **J1RPY8** | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3213025 | 7196_CR6 | | | **Work Order:** M1F7C1AM | | **Report DB ID:** M1F7C1ER | | | **Orig Sa DB ID:** 9M1F7C10 | | | |
| HEXCHROME | 2.61E-01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | (1.7) | 8/7/13 01:45 p | | 2.5004 | |
| | 2.43E-01 | | **RPD** | **7.1** | | 1.55E-01 | | N/A | | | g | |

**No. of Results:** 1 **Comments:**

**TestAmerica Inc** **RPD** - Relative Percent Difference.

**rptSTLRchDupV5.2.23 A2002** **MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**

# FORM II

Date: 09-Aug-13

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | **TestAmerica Inc** | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:25:00 PM |
| **Lot-Sample No.:** | **J3G240439-1** | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | **J1RPY8 DUP** | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206033 | C14_LSC | | | **Work Order:** M1F7C1AJ | | **Report DB ID:** M1F7C1JR | | | **Orig Sa DB ID:** 9M1F7C10 | | | |
| C-14 | 1.03E-01 | U | 1.9E-01 | 2.4E-01 | 4.50E-01 | pCi/g | 100% | 0.23 | 7/31/13 08:43 p | | 4.963 | LSC9 |
| | 6.94E-03 | U | **RPD** | **174.6** | | 5.00E+01 | | 0.86 | | | g | |
| **Batch:** 3206036 | PUISO_PLATE_AEA | | | **Work Order:** M1F7C1AK | | **Report DB ID:** M1F7C1KR | | | **Orig Sa DB ID:** 9M1F7C10 | | | |
| Pu-238 | 0.00E+00 | U | 0.0E+00 | 2.9E-02 | 5.28E-02 | pCi/g | 100% | 0. | 8/1/13 07:55 p | | 1.01 | ALP423 |
| | -6.65E-03 | U | **RPD** | **-200.0** | | 1.00E+00 | | 0. | | | g | |
| PU239/40 | 0.00E+00 | U | 0.0E+00 | 2.9E-02 | 5.28E-02 | pCi/g | 100% | 0. | 8/1/13 07:55 p | | 1.01 | ALP423 |
| | -6.05E-04 | U | **RPD** | **-200.0** | | 1.00E+00 | | 0. | | | g | |

**No. of Results:** 3 **Comments:**





RPD - Relative Percent Difference.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# FORM II

Date: 09-Aug-13

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:35:00 PM |
| **Lot-Sample No.:** | J3G240439-2 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY9 DUP | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3206031 | GAMMA_GS | | | **Work Order:** M1F7D1AJ | | **Report DB ID:** M1F7D1JR | | | **Orig Sa DB ID:** 9M1F7D10 | | | |
| CO-60 | -4.79E-03 | U | 1.9E-02 | 1.9E-02 | 3.24E-02 | pCi/g | | -0.15 | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | 4.79E-03 | U | **RPD** | **-11966100.0** | | 5.00E-02 | | -0.52 | | | g | |
| CS-137 | 1.57E-01 | | 3.8E-02 | 3.8E-02 | 2.95E-02 | pCi/g | | (5.3) | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | 1.57E-01 | | **RPD** | **0.2** | | 1.00E-01 | | (8.3) | | | g | |
| EU-152 | -1.81E-03 | U | 3.8E-02 | 3.8E-02 | 6.44E-02 | pCi/g | | -0.03 | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | 1.60E-02 | U | **RPD** | **251.0** | | 1.00E-01 | | -0.1 | | | g | |
| EU-154 | 1.77E-02 | U | 6.2E-02 | 6.2E-02 | 1.09E-01 | pCi/g | | 0.16 | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | -4.84E-02 | U | **RPD** | **-431.5** | | 1.00E-01 | | 0.57 | | | g | |
| EU-155 | 8.87E-02 | U | 3.8E-02 | 3.8E-02 | 6.50E-02 | pCi/g | | (1.4) | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | 5.89E-02 | | **RPD** | **40.4** | | 1.00E-01 | | (4.6) | | | g | |
| K-40 | 1.94E+01 | | 2.3E+00 | 2.3E+00 | 2.70E-01 | pCi/g | | (71.8) | 7/26/13 11:58 p | | 305.9 | GER19$1 |
| | 1.89E+01 | | **RPD** | **2.4** | | | | (17.) | | | g | |
| **Batch:** 3206032 | SRTOT_SEP_PRECIP_GPC | | | **Work Order:** M1F7D1AK | | **Report DB ID:** M1F7D1KR | | | **Orig Sa DB ID:** 9M1F7D10 | | | |
| STRONTIUM | 3.48E-02 | U | 8.8E-02 | 8.9E-02 | 2.01E-01 | pCi/g | 87% | 0.17 | 8/3/13 07:10 p | | 3.04 | GPC32B |
| | 7.08E-02 | U | **RPD** | **68.3** | | | | 0.78 | | | g | |
| **Batch:** 3206034 | 906.0_H3_LSC | | | **Work Order:** M1F7D1AL | | **Report DB ID:** M1F7D1LR | | | **Orig Sa DB ID:** 9M1F7D10 | | | |
| H-3 | -1.82E-02 | U | 2.3E-02 | 2.6E-02 | 6.06E-02 | pCi/g | 100% | -0.3 | 8/7/13 08:10 p | | 48.4 | LSC8 |
| | -3.35E-03 | U | **RPD** | **-137.8** | | 4.00E+02 | | -(1.4) | | | g | |
| **Batch:** 3206035 | NI63_LSC | | | **Work Order:** M1F7D1AM | | **Report DB ID:** M1F7D1MR | | | **Orig Sa DB ID:** 9M1F7D10 | | | |

TestAmerica Inc
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2.23 A2002

RPD - Relative Percent Difference.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# FORM II

Date: 09-Aug-13

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | J01880 | **Collection Date:** | 7/23/2013 12:35:00 PM |
| **Lot-Sample No.:** | J3G240439-2 | **Report No. :** | 56481 | **Received Date:** | 7/24/2013 3:34:00 PM |
| **Client Sample ID:** | J1RPY9 DUP | **COC No. :** | RC-238-003 | **Matrix:** | SOIL |

| Parameter | Result, Orig Rst | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Action Lev | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NI-63 | 6.92E+00 | U | 4.8E+00 | 5.9E+00 | 1.14E+01 | pCi/g | 91% | 0.61 | 8/7/13 05:11 a | | 0.25 | LSC4 |
| | 2.21E+01 | | RPD | 104.7 | | 3.00E+01 | | (2.3) | | | g | |

No. of Results: 9 Comments:

TestAmerica Inc
rptSTLRchDupV5.2.23 A2002

RPD - Relative Percent Difference.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.

# FORM II

## BLANK RESULTS

**Date:** 09-Aug-13

**Lab Name:** TestAmerica Inc **SDG:** J01880

**Matrix:** SOIL **Report No. :** 56481

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Lc | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3213025 | 7196_CR6 | | | **Work Order:** | M1H101AA | | **Report DB ID:** | M1H101AB | | | | |
| HEXCHROME | 1.55E-01 | U | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 1. | 8/7/13 01:45 p | | 2.5 | |
| | | | | | | 1.55E-01 | | N/A | | | g | |
| **Batch:** 3206033 | C14_LSC | | | **Work Order:** | M1GA01AA | | **Report DB ID:** | M1GA01AB | | | | |
| C-14 | 1.36E-01 | U | 1.9E-01 | 2.4E-01 | 4.48E-01 | pCi/g | 100% | 0.3 | 7/31/13 09:46 p | | 4.996 | LSC9 |
| | | | | | 2.14E-01 | 5.00E+01 | | (1.1) | | | g | |
| **Batch:** 3206036 | PUISO_PLATE_AEA | | | **Work Order:** | M1GA31AA | | **Report DB ID:** | M1GA31AB | | | | |
| Pu-238 | -6.27E-04 | U | 3.1E-02 | 3.1E-02 | 5.70E-02 | pCi/g | 92% | -0.01 | 8/1/13 07:56 p | | 1.01 | ALP447 |
| | | | | | 7.29E-03 | 1.00E+00 | | -0.04 | | | g | |
| PU239/40 | -1.88E-03 | U | 3.1E-02 | 3.1E-02 | 6.77E-02 | pCi/g | 92% | -0.03 | 8/1/13 07:56 p | | 1.01 | ALP447 |
| | | | | | 1.26E-02 | 1.00E+00 | | -0.12 | | | g | |
| **Batch:** 3206035 | NI63_LSC | | | **Work Order:** | M1GA21AA | | **Report DB ID:** | M1GA21AB | | | | |
| NI-63 | 1.46E+01 | | 5.6E+00 | 6.9E+00 | 1.31E+01 | pCi/g | 79% | (1.1) | 8/7/13 05:33 a | | 0.25 | LSC4 |
| | | | | | 6.13E+00 | 3.00E+01 | | (4.3) | | | g | |
| **Batch:** 3206034 | 906.0_H3_LSC | | | **Work Order:** | M1GA11AA | | **Report DB ID:** | M1GA11AB | | | | |
| H-3 | -5.93E-03 | U | 2.2E-02 | 2.5E-02 | 5.60E-02 | pCi/g | 100% | -0.11 | 8/7/13 08:52 p | | 77.7 | LSC8 |
| | | | | | 2.62E-02 | 4.00E+02 | | -0.48 | | | g | |
| **Batch:** 3206031 | GAMMA_GS | | | **Work Order:** | M1GAW1AA | | **Report DB ID:** | M1GAW1AB | | | | |
| CO-60 | -9.41E-04 | U | 8.6E-03 | 8.6E-03 | 1.58E-02 | pCi/g | | -0.06 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | 5.00E-02 | | -0.22 | | | g | |
| CS-137 | -3.05E-03 | U | 7.5E-03 | 7.5E-03 | 1.29E-02 | pCi/g | | -0.24 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | 1.00E-01 | | -0.81 | | | g | |

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V5.2.23 A2002

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM II

## BLANK RESULTS

**Date:** 09-Aug-13

**Lab Name:** TestAmerica Inc

**Matrix:** SOIL

**SDG:** J01880

**Report No. :** 56481

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL, Lc | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EU-152 | -3.21E-03 | U | 1.8E-02 | 1.8E-02 | 3.14E-02 | pCi/g | | -0.1 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | 1.00E-01 | | -0.35 | | | g | |
| EU-154 | -1.20E-03 | U | 2.3E-02 | 2.3E-02 | 4.38E-02 | pCi/g | | -0.03 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | 1.00E-01 | | -0.1 | | | g | |
| EU-155 | 9.57E-03 | U | 1.2E-02 | 1.2E-02 | 2.26E-02 | pCi/g | | 0.42 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | 1.00E-01 | | (1.6) | | | g | |
| K-40 | -3.44E-01 | U | 2.3E-01 | 2.3E-01 | 4.55E-01 | pCi/g | | -0.76 | 7/26/13 12:14 p | | 348.0 | GER18$1 |
| | | | | | | | | -(3.) | | | g | |
| **Batch:** 3206032 | SRTOT_SEP_PRECIP_GPC | | | **Work Order:** | M1GAX1AA | | **Report DB ID:** | M1GAX1AB | | | | |
| STRONTIUM | 1.93E-02 | U | 1.0E-01 | 1.0E-01 | 2.43E-01 | pCi/g | 75% | 0.08 | 8/3/13 07:10 p | | 3.03 | GPC32C |
| | | | | | 1.13E-01 | | | 0.37 | | | g | |

**No. of Results:** 13 **Comments:**

TestAmerica Inc
rptSTLRchBlank
V5.2.23 A2002

**MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.**
**U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda/Mdl, Total Uncert, CRDL, RDL or not identified by gamma scan software.**

# FORM II

## LCS RESULTS

**Date:** 09-Aug-13

**Lab Name:** TestAmerica Inc

**SDG:** J01880

**Matrix:** SOIL

**Report No. :** 56481

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 3213025 | 7196_CR6 | | | **Work Order:** | M1H101AC | | **Report DB ID:** | M1H101AS | | | | | |
| HEXCHROME | 1.75E+01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 1.90E+01 | | 92% | 8/7/13 01:45 p | 2.5 | |
| | | | | | | | **Rec Limits:** | 80 | 120 | -0.1 | | g | |
| **Batch:** 3206033 | C14_LSC | | | **Work Order:** | M1GA01AC | | **Report DB ID:** | M1GA01CS | | | | | |
| C-14 | 7.61E+00 | | 4.4E-01 | 7.7E-01 | 4.55E-01 | pCi/g | 100% | 7.48E+00 | 1.5E-01 | 102% | 7/31/13 09:25 p | 4.915 | LSC9 |
| | | | | | | | **Rec Limits:** | | | 0.0 | | g | |
| **Batch:** 3206036 | PUISO_PLATE_AEA | | | **Work Order:** | M1GA31AC | | **Report DB ID:** | M1GA31CS | | | | | |
| PU239/40 | 6.72E+00 | | 6.5E-01 | 1.4E+00 | 5.70E-02 | pCi/g | 88% | 6.74E+00 | 2.0E-01 | 100% | 8/1/13 07:57 p | 1.02 | ALP448 |
| | | | | | | | **Rec Limits:** | 70 | 130 | 0.0 | | g | |
| **Batch:** 3206035 | NI63_LSC | | | **Work Order:** | M1GA21AC | | **Report DB ID:** | M1GA21CS | | | | | |
| NI-63 | 4.90E+02 | | 1.9E+01 | 5.2E+01 | 1.37E+01 | pCi/g | 75% | 5.10E+02 | 8.5E+00 | 96% | 8/7/13 05:56 a | 0.25 | LSC4 |
| | | | | | | | **Rec Limits:** | 70 | 130 | 0.0 | | g | |
| **Batch:** 3206034 | 906.0_H3_LSC | | | **Work Order:** | M1GA11AC | | **Report DB ID:** | M1GA11CS | | | | | |
| H-3 | 3.17E-01 | | 3.4E-02 | 3.7E-02 | 4.87E-02 | pCi/g | 100% | 3.08E-01 | 9.2E-03 | 103% | 8/7/13 09:34 p | 87.4 | LSC8 |
| | | | | | | | **Rec Limits:** | 70 | 130 | 0.0 | | g | |
| **Batch:** 3206031 | GAMMA_GS | | | **Work Order:** | M1GAW1AC | | **Report DB ID:** | M1GAW1CS | | | | | |
| CS-137 | 1.01E+00 | | 1.4E-01 | 1.4E-01 | 2.31E-02 | pCi/g | | 1.03E+00 | 1.1E-02 | 98% | 7/26/13 12:15 p | 350.1 | GER19$1 |
| | | | | | | | **Rec Limits:** | 70 | 130 | 0.0 | | g | |
| RA-226 | 9.49E-01 | | 1.4E-01 | 1.4E-01 | 4.17E-02 | pCi/g | | 1.14E+00 | 1.2E-02 | 83% | 7/26/13 12:15 p | 350.1 | GER19$1 |
| | | | | | | | **Rec Limits:** | 70 | 130 | -0.2 | | g | |
| RA-228 | 7.61E-01 | | 1.3E-01 | 1.3E-01 | 8.44E-02 | pCi/g | | 7.11E-01 | 7.3E-03 | 107% | 7/26/13 12:15 p | 350.1 | GER19$1 |
| | | | | | | | **Rec Limits:** | 70 | 130 | 0.1 | | g | |

**TestAmerica Inc** **Bias** **- (Result/Expected)-1 as defined by ANSI N13.30.**

**rptSTLRchLcs**
**V5.2.23 A2002**

# FORM II

## LCS RESULTS

**Date:** 09-Aug-13

**Lab Name:** TestAmerica Inc

**Matrix:** SOIL

**SDG:** J01880

**Report No. :** 56481

| Parameter | Result | Qual | Count Error ( 2 s) | Total Uncert( 2 s) | MDL | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U-238 | 9.84E-01 | | 1.3E-01 | 1.3E-01 | 4.17E-02 | pCi/g | | 1.20E+00 | 1.2E-02 | 82% | 7/26/13 12:15 p | 350.1 | GER19$1 |
| | | | | | | | Rec Limits: | 70 | 130 | -0.2 | | g | |
| **Batch:** 3206032 | SRTOT_SEP_PRECIP_GPC | | | **Work Order:** | M1GAX1AC | | **Report DB ID:** | M1GAX1CS | | | | | |
| STRONTIUM | 2.56E+00 | | 2.9E-01 | 6.7E-01 | 2.75E-01 | pCi/g | 72% | 2.24E+00 | 8.6E-02 | 114% | 8/3/13 07:10 p | 3.01 | GPC32D |
| | | | | | | | Rec Limits: | 70 | 130 | 0.1 | | g | |

**No. of Results:** 10 **Comments:**

# FORM II

## MATRIX SPIKE RESULTS

Date: 09-Aug-13

**Lab Name:** TestAmerica Inc **SDG:** J01880

**Lot-Sample No.:** J3G240439-1, J1RPY8 **Report No. :** 56481 **Matrix:** SOIL

| Parameter | SpikeResult, Orig Rst | Qual | Count Error (2 s) | Total Uncert(2 s) | MDC\|MDA | Rpt Unit, CRDL | Yield | Rec-overy | Expected, Uncert | Analysis, Prep Date | Aliquot Size | Analy Method, Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Batch: 3213025 | Work Order: | M1F7C1AL | | Report DB ID: | M1F7C1CW | | Orig Sa DB ID: | 9M1F7C10 | | | | |
| HEXCHROME | 2.58E+01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 89.04% | 2.89E+01 | 8/7/13 01:45 p | 2.5024 | 7196_CR6 |
| | 2.43E-01 | | | | | | | | | | g | |

**Number of Results:** 1

**Comments:**

TestAmerica Inc
rptSTLRchMs
V5.2.23 A2002

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
Bias - (Result/Expected)-1 as defined by ANSI N13.30.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/2/2013 11:08:21 AM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206036; RPUISO Pulso by ALP
**SDG, Matrix:** J01880; SOIL

## 1.0 COC

| | Yes | No | N/A |
|---|---|---|---|
| 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | ✓ | | |

## 2.0 QC Batch

| | Yes | No | N/A |
|---|---|---|---|
| 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | ✓ | | |
| 2.2 Are the QC appropriate for the analysis included in the batch? | ✓ | | |
| 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | ✓ | | |
| 2.4 Does the Worksheets include a Tracer Vial label for each sample? | ✓ | | |

## 3.0 QC & Samples

| | Yes | No | N/A |
|---|---|---|---|
| 3.1 Is the blank results, yield, and MDA within contract limits? | ✓ | | |
| 3.2 Is the LCS result, yield, and MDA within contract limits? | ✓ | | |
| 3.3 Are the MS/MSD results, yields, and MDA within contract limits? | | | ✓ |
| 3.4 Are the duplicate result, yields, and MDAs within contract limits? | ✓ | | |
| 3.5 Are the sample yields and MDAs within contract limits? | ✓ | | |

## 4.0 Raw Data

| | Yes | No | N/A |
|---|---|---|---|
| 4.1 Were results calculated in the correct units? | ✓ | | |
| 4.2 Were analysis volumes entered correctly? | ✓ | | |
| 4.3 Were Yields entered correctly? | | | ✓ |
| 4.4 Were spectra reviewed/meet contractual requirements? | ✓ | | |
| 4.5 Were raw counts reviewed for anomalies? | ✓ | | |

## 5.0 Other

| | Yes | No | N/A |
|---|---|---|---|
| 5.1 Are all nonconformances included and noted? | | | ✓ |
| 5.2 Are all required forms filled out? | ✓ | | |
| 5.3 Was the correct methodology used? | ✓ | | |
| 5.4 Was transcription checked? | ✓ | | |
| 5.5 Were all calculations checked at a minimum frequency? | | | ✓ |
| 5.6 Are worksheet entries complete and correct? | ✓ | | |

6.0 Comments on any No response:

**First Level** Lisa Antoniou **Date** 8/2/13

TestAmerica Richland
QAS_RADCALCv4.8.44

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist

## RADIOCHEMISTRY

### Second Level Review

**Batch Number:** 32060036

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | ✓ | | |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | | | ✓ |
| 2. Are all required forms filled out? | ✓ | | |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: CRDL = 1.0 pCi/L

Second Level Review: [signature] Date: 8/5/15

LS-038B, Rev. 10, 9/07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/5/2013 12:21:39 PM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206032; RSRTOT SrTot by GPC
**SDG, Matrix:** J01880; SOIL

| | |
|---|---|
| **1.0 COC** | |
| 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | Yes ✓ No N/A |
| **2.0 QC Batch** | |
| 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | Yes ✓ No N/A |
| 2.2 Are the QC appropriate for the analysis included in the batch? | Yes ✓ No N/A |
| 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | Yes ✓ No N/A |
| 2.4 Does the Worksheets include a Tracer Vial label for each sample? | Yes ✓ No N/A |
| **3.0 QC & Samples** | |
| 3.1 Is the blank results, yield, and MDA within contract limits? | Yes ✓ No N/A |
| 3.2 Is the LCS result, yield, and MDA within contract limits? | Yes ✓ No N/A |
| 3.3 Are the MS/MSD results, yields, and MDA within contract limits? | Yes No N/A ✓ |
| 3.4 Are the duplicate result, yields, and MDAs within contract limits? | Yes ✓ No N/A |
| 3.5 Are the sample yields and MDAs within contract limits? | Yes ✓ No N/A |
| **4.0 Raw Data** | |
| 4.1 Were results calculated in the correct units? | Yes ✓ No N/A |
| 4.2 Were analysis volumes entered correctly? | Yes ✓ No N/A |
| 4.3 Were Yields entered correctly? | Yes ✓ No N/A |
| 4.4 Were spectra reviewed/meet contractual requirements? | Yes No N/A ✓ |
| 4.5 Were raw counts reviewed for anomalies? | Yes ✓ No N/A |
| **5.0 Other** | |
| 5.1 Are all nonconformances included and noted? | Yes No N/A ✓ |
| 5.2 Are all required forms filled out? | Yes ✓ No N/A |
| 5.3 Was the correct methodology used? | Yes ✓ No N/A |
| 5.4 Was transcription checked? | Yes ✓ No N/A |
| 5.5 Were all calculations checked at a minimum frequency? | Yes No N/A ✓ |
| 5.6 Are worksheet entries complete and correct? | Yes ✓ No N/A |
| 6.0 Comments on any No response: | |

Thomas DM: [illegible]

**First Level** _____ **Date** 8/5/13

TestAmerica Richland
QAS_RADCALCv4.8.44

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist
## RADIOCHEMISTRY
### Second Level Review

**Batch Number:** 3206032

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | ✓ | | |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | | | ✓ |
| 2. Are all required forms filled out? | ✓ | | |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: SRDL = 1.0pCi/g

Second Level Review: [signature] Date: 8/5/13

LS-038B, Rev. 10, 9/07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/5/2013 2:20:12 PM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206031; RGAMMA Gamma by GER
**SDG, Matrix:** J01880; SOIL

## 1.0 COC

| | Yes | No | N/A |
|---|---|---|---|
| 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | ✓ | | |

## 2.0 QC Batch

| | Yes | No | N/A |
|---|---|---|---|
| 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | ✓ | | |
| 2.2 Are the QC appropriate for the analysis included in the batch? | ✓ | | |
| 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | ✓ | | |
| 2.4 Does the Worksheets include a Tracer Vial label for each sample? | | | ✓ |

## 3.0 QC & Samples

| | Yes | No | N/A |
|---|---|---|---|
| 3.1 Is the blank results, yield, and MDA within contract limits? | ✓ | | |
| 3.2 Is the LCS result, yield, and MDA within contract limits? | ✓ | | |
| 3.3 Are the MS/MSD results, yields, and MDA within contract limits? | | | ✓ |
| 3.4 Are the duplicate result, yields, and MDAs within contract limits? | | ✓ | |
| 3.5 Are the sample yields and MDAs within contract limits? | | ✓ | |

## 4.0 Raw Data

| | Yes | No | N/A |
|---|---|---|---|
| 4.1 Were results calculated in the correct units? | ✓ | | |
| 4.2 Were analysis volumes entered correctly? | ✓ | | |
| 4.3 Were Yields entered correctly? | | | ✓ |
| 4.4 Were spectra reviewed/meet contractual requirements? | ✓ | | |
| 4.5 Were raw counts reviewed for anomalies? | ✓ | | |

## 5.0 Other

| | Yes | No | N/A |
|---|---|---|---|
| 5.1 Are all nonconformances included and noted? | ✓ | | |
| 5.2 Are all required forms filled out? | ✓ | | |
| 5.3 Was the correct methodology used? | ✓ | | |
| 5.4 Was transcription checked? | ✓ | | |
| 5.5 Were all calculations checked at a minimum frequency? | | | ✓ |
| 5.6 Are worksheet entries complete and correct? | ✓ | | |

6.0 Comments on any No response:

First Level Lisa Antonsen Date 8/5/13

TestAmerica Richland
QAS_RADCALCv4.8.44

Page 1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist

## RADIOCHEMISTRY

### Second Level Review

**Batch Number:** 3206031

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | | | ✓ |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | ✓ | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | ✓ | | ✓ |
| 2. Are all required forms filled out? | ✓ | | RWY 8/6/13 |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: CRDL = 0.1pCi/g

Second Level Review: [signature] Date: 8/5/13

LS-038B, Rev. 10, 9/07

# Clouseau
# Nonconformance Memo

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

NCM #: **10-24191**
NCM Initiated By: Lisa Antonson
Date Opened: 08/05/2013
Date Closed:

Classification: **Anomaly**
Status: **PMREVIEW**
Production Area: Counting
Tests: Gamma by GER
Lot #'s (Sample #'s): J3G240439 (1,2), J3G250000 (31),
QC Batches: 3206031,

Nonconformance: MDA not met
Subcategory: Data accepted

## Problem Description / Root Cause

| Name | Date | Description |
|---|---|---|
| Lisa Antonson | 08/05/2013 | MDA slightly exceeds CRDL for Eu-154 in samples M1F7C and M1F7d1AJ |

## Corrective Action

| Name | Date | Corrective Action |
|---|---|---|
| Lisa Antonson | 08/05/2013 | None |

## Client Notification Summary

| Client | Project Manager | Notified | Response | How Notified | Note | Response | Response Note |
|---|---|---|---|---|---|---|---|

## Quality Assurance Verification

| Verified By | Due Date | Status | Notes |
|---|---|---|---|
| | | This section not yet completed by QA. | |

## Approval History

| Date Approved | Approved By | Position |
|---|---|---|

Date Printed: 8/5/2013

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/8/2013 9:38:09 AM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206034; RTRITIUM H-3 by LSC
**SDG, Matrix:** J01880; SOIL

| | | Yes | No | N/A |
|---|---|---|---|---|
| **1.0 COC** | | | | |
| 1.1 | Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | ✓ | | |
| **2.0 QC Batch** | | | | |
| 2.1 | Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | ✓ | | |
| 2.2 | Are the QC appropriate for the analysis included in the batch? | ✓ | | |
| 2.3 | Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | ✓ | | |
| 2.4 | Does the Worksheets include a Tracer Vial label for each sample? | | | ✓ |
| **3.0 QC & Samples** | | | | |
| 3.1 | Is the blank results, yield, and MDA within contract limits? | ✓ | | |
| 3.2 | Is the LCS result, yield, and MDA within contract limits? | ✓ | | |
| 3.3 | Are the MS/MSD results, yields, and MDA within contract limits? | | | ✓ |
| 3.4 | Are the duplicate result, yields, and MDAs within contract limits? | ✓ | | |
| 3.5 | Are the sample yields and MDAs within contract limits? | ✓ | | |
| **4.0 Raw Data** | | | | |
| 4.1 | Were results calculated in the correct units? | ✓ | | |
| 4.2 | Were analysis volumes entered correctly? | ✓ | | |
| 4.3 | Were Yields entered correctly? | | | ✓ |
| 4.4 | Were spectra reviewed/meet contractual requirements? | | | ✓ |
| 4.5 | Were raw counts reviewed for anomalies? | ✓ | | |
| **5.0 Other** | | | | |
| 5.1 | Are all nonconformances included and noted? | | | ✓ |
| 5.2 | Are all required forms filled out? | ✓ | | |
| 5.3 | Was the correct methodology used? | ✓ | | |
| 5.4 | Was transcription checked? | ✓ | | |
| 5.5 | Were all calculations checked at a minimum frequency? | | | ✓ |
| 5.6 | Are worksheet entries complete and correct? | ✓ | | |

6.0 Comments on any No response:

**First Level** Lisa Gustafson **Date** 8/8/13

TestAmerica Richland
QAS_RADCALCv4.8.44

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist

## RADIOCHEMISTRY

### Second Level Review

**Batch Number:** 32d0034

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | | | ✓ |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | | | ✓ |
| 2. Are all required forms filled out? | ✓ | | |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: CRDL = 400 pCi/g

Second Level Review: [signature] Date: 8/7/13

LS-038B, Rev. 10, 9/07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/5/2013 12:26:41 PM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206033; RC14LSCC C-14 Digestion
**SDG, Matrix:** J01880; SOIL

| | |
|---|---|
| **1.0 COC** | |
| 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | Yes ✓ No N/A |
| **2.0 QC Batch** | |
| 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | Yes ✓ No N/A |
| 2.2 Are the QC appropriate for the analysis included in the batch? | Yes ✓ No N/A |
| 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | Yes ✓ No N/A |
| 2.4 Does the Worksheets include a Tracer Vial label for each sample? | Yes No N/A ✓ |
| **3.0 QC & Samples** | |
| 3.1 Is the blank results, yield, and MDA within contract limits? | Yes ✓ No N/A |
| 3.2 Is the LCS result, yield, and MDA within contract limits? | Yes ✓ No N/A |
| 3.3 Are the MS/MSD results, yields, and MDA within contract limits? | Yes No N/A ✓ |
| 3.4 Are the duplicate result, yields, and MDAs within contract limits? | Yes ✓ No N/A |
| 3.5 Are the sample yields and MDAs within contract limits? | Yes ✓ No N/A |
| **4.0 Raw Data** | |
| 4.1 Were results calculated in the correct units? | Yes ✓ No N/A |
| 4.2 Were analysis volumes entered correctly? | Yes ✓ No N/A |
| 4.3 Were Yields entered correctly? | Yes No N/A ✓ |
| 4.4 Were spectra reviewed/meet contractual requirements? | Yes No N/A ✓ |
| 4.5 Were raw counts reviewed for anomalies? | Yes ✓ No N/A |
| **5.0 Other** | |
| 5.1 Are all nonconformances included and noted? | Yes ✓ No N/A |
| 5.2 Are all required forms filled out? | Yes ✓ No N/A |
| 5.3 Was the correct methodology used? | Yes ✓ No N/A |
| 5.4 Was transcription checked? | Yes ✓ No N/A |
| 5.5 Were all calculations checked at a minimum frequency? | Yes No N/A ✓ |
| 5.6 Are worksheet entries complete and correct? | Yes ✓ No N/A |
| 6.0 Comments on any No response: NCM 10-24189 | |

Thomas DM [signature]

**First Level** _____ **Date** 8/5/13

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist

## RADIOCHEMISTRY

### Second Level Review

**Batch Number:** 3206033

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | | | ✓ |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | ✓ | | ✓ |
| 2. Are all required forms filled out? | ✓ | RWR 5/13 | |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: CRDL = 50.0 pCi/g
SOP NCM HF210-24189

Second Level Review: [signature] Date: 3/8/13

LS-038B, Rev. 10, 9/07

# Clouseau
# Nonconformance Memo

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

NCM #: **10-24189**
NCM Initiated By: Tom Mcginnis
Date Opened: 08/05/2013
Date Closed:

Classification: **Deficiency**
Status: PMREVIEW
Production Area: Reporting
Tests: C-14 Digestion
Lot #'s (Sample #'s): J3G240439 (1,2), J3G250000 (33),
QC Batches: 3206033,

Nonconformance: Other (describe in detail)
Subcategory: Other (explanation required)

## Problem Description / Root Cause

| Name | Date | Description |
|---|---|---|
| Tom Mcginnis | 08/05/2013 | During review of data results it was noted that there was an apparent switch of the blank and LCS analysis. A physical review of the vials was performed and it was noted that the switch likely occured during the analysis. The data was edited accordingly and recalculated. Final batch results meet acceptance criteria. |

## Corrective Action

| Name | Date | Corrective Action |
|---|---|---|
| Tom Mcginnis | 08/05/2013 | The PM was notified of the batch issues. |

## Client Notification Summary

| Client | Project Manager | Notified | Response | How Notified | Note | Response | Response Note |
|---|---|---|---|---|---|---|---|

## Quality Assurance Verification

| Verified By | Due Date | Status | Notes |
|---|---|---|---|
| | | This section not yet completed by QA. | |

## Approval History

| Date Approved | Approved By | Position |
|---|---|---|

Date Printed: 8/5/2013

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/8/2013 7:48:09 AM

**Lot No., Due Date:** J3G240439; 08/08/2013
**Client, Site:** 127642; S00X235B00 HANFORD
**QC Batch No., Method Test:** 3206035; RNI63 Ni-63 by LSC
**SDG, Matrix:** J01880; SOIL

| | | | |
|---|---|---|---|
| **1.0 COC** | | | |
| 1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions? | Yes ✓ | No | N/A |
| **2.0 QC Batch** | | | |
| 2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet? | Yes ✓ | No | N/A |
| 2.2 Are the QC appropriate for the analysis included in the batch? | Yes ✓ | No | N/A |
| 2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc? | Yes ✓ | No | N/A |
| 2.4 Does the Worksheets include a Tracer Vial label for each sample? | Yes ✓ | No | N/A |
| **3.0 QC & Samples** | | | |
| 3.1 Is the blank results, yield, and MDA within contract limits? | Yes ✓ | No | N/A |
| 3.2 Is the LCS result, yield, and MDA within contract limits? | Yes ✓ | No | N/A |
| 3.3 Are the MS/MSD results, yields, and MDA within contract limits? | Yes | No | N/A ✓ |
| 3.4 Are the duplicate result, yields, and MDAs within contract limits? | Yes ✓ | No | N/A |
| 3.5 Are the sample yields and MDAs within contract limits? | Yes ✓ | No | N/A |
| **4.0 Raw Data** | | | |
| 4.1 Were results calculated in the correct units? | Yes ✓ | No | N/A |
| 4.2 Were analysis volumes entered correctly? | Yes ✓ | No | N/A |
| 4.3 Were Yields entered correctly? | Yes ✓ | No | N/A |
| 4.4 Were spectra reviewed/meet contractual requirements? | Yes | No | N/A ✓ |
| 4.5 Were raw counts reviewed for anomalies? | Yes ✓ | No | N/A |
| **5.0 Other** | | | |
| 5.1 Are all nonconformances included and noted? | Yes | No | N/A ✓ |
| 5.2 Are all required forms filled out? | Yes ✓ | No | N/A |
| 5.3 Was the correct methodology used? | Yes ✓ | No | N/A |
| 5.4 Was transcription checked? | Yes ✓ | No | N/A |
| 5.5 Were all calculations checked at a minimum frequency? | Yes | No | N/A ✓ |
| 5.6 Are worksheet entries complete and correct? | Yes ✓ | No | N/A |

6.0 Comments on any No response:

**First Level** Thomas D McE **Date** 8/8/13

TestAmerica Richland
QAS_RADCALCv4.8.44

Page 1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# Data Review Checklist
## RADIOCHEMISTRY
### Second Level Review

**Batch Number:** 3206035

| Review Item | Yes (√) | No (√) | NA (√) |
|---|---|---|---|
| **A. Sample Analysis**<br>1. Are the sample yields within acceptance criteria? | ✓ | | |
| 2. Is the sample Minimum Detectable Activity < the Contract Detection Limit? | ✓ | | |
| 3. Are the correct isotopes reported? | ✓ | | |
| **B. QC Samples**<br>1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? | ✓ | | |
| 2. Does the blank result meet the Contract criteria? | ✓ | | |
| 3. Is the blank result < the Contract Detection Limit? | ✓ | | |
| 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? | | | ✓ |
| 5. Is the LCS recovery within contract acceptance criteria? | ✓ | | |
| 6. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? | ✓ | | |
| 7. Do the MS/MSD results and yields meet acceptance criteria? | | | ✓ |
| 8. Do the duplicate sample results and yields meet acceptance criteria? | ✓ | | |
| **C. Other**<br>1. Are all Non-conformances included and noted? | | | ✓ |
| 2. Are all required forms filled out? | ✓ | | |
| 3. Was the correct methodology used? | ✓ | | |
| 4. Was transcription checked? | ✓ | | |
| 5. Were all calculations checked at a minimum frequency? | ✓ | | |
| 6. Were units checked? | ✓ | | |

Comments on any "No" response: CRDL = 30 pci/g

Second Level Review: Rhonda [illegible] Date: 8/8/13

LS-038B, Rev. 10, 9/07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Richland Laboratory
# Data Review Check List
# Hexavalent Chromium

| Batch Number(s): | 3213025 | Lab Sample Numbers or SDG: | J01880 |
|---|---|---|---|
| Method/Test/Parameter: Cr+6 ☐ RL-WC-003(Aqueous) ☒ RL-WC-004(Solid) | | | |

| Review Item | Yes (✓) | No (✓) | N/A (✓) | 2nd Level Review (✓) |
|---|---|---|---|---|
| **A. Initial Calibration**<br>1. Performed at required frequency with required number of levels? | ✓ | | | ✓ |
| 2. Correlation coefficient greater than 0.97? | ✓ | | | ✓ |
| 3. Initial calibration verification (ICV) analyzed immediately after calibration and results within 10% of expected? | ✓ | | | ✓ |
| 4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit? | ✓ | | | ✓ |
| **B. Continuing Calibration**<br>1. CCV analyzed at required frequency and all parameters within 10% of expected? | ✓ | | | ✓ |
| 2. CCB analyzed at required frequency and all results ≤ reporting limit? | ✓ | | | ✓ |
| **C. Sample Analysis**<br>1. Were any samples with concentrations above the linear range diluted and reanalyzed? | | | ✓ | ✓ |
| 2. Were all sample holding times met? | ✓ | | | ✓ |
| **D. QC Samples**<br>1. All results for the preparation blank below limits? | ✓ | | | ✓ |
| 2. LCS percent recovery within 85-115% | ✓ | | | ✓ |
| 3. $PbCrO_4$ percent recovery within 75-125%? | ✓ | | | ✓ |
| 4. Sample and Duplicate within 20% (aqueous) or 35% (solid) RPD? | ✓ | | | ✓ |
| 5. MS or MS/MSD recoveries within 85-115% (aqueous) or 75-125% (solid)? | ✓ | | | ✓ |
| 6. On MS failure, PDMS within 85-115%? | | | ✓ | ✓ |
| **E. Other**<br>1. Are all nonconformances included and noted? | | | ✓ | ✓ |
| 2. Is the correct date and time of analysis shown? | ✓ | | | ✓ |
| 3. Did the analyst sign and date the front page of the analytical run? | ✓ | | | ✓ |
| 4. Correct methodology used? | ✓ | | | ✓ |
| 5. Transcriptions checked? | ✓ | | | ✓ |
| 6. Calculations checked at minimum frequency? | ✓ | | | ✓ |
| 7. Units checked? | ✓ | | | ✓ |

Comments on any "No" response or list NCM number:

Analyst [signature] Date 8/8/13 2nd Review [signature] Date 8/08/2013

CG-231 Rev 1/5/12

# Washington Closure Hanford

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-003



| | | | |
|---|---|---|---|
| Collector: WHITE, EC | Company Contact: Joan Kessner | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8C | Data Turnaround: 15 Days | | |
| Project Designation: 100K Shoreline Characterization | Sampling Location: 100-K-111 - 100-K-111 West Sample Area | | SAF No.: RC-238 |
| Ice Chest No.: NA | Field Logbook No.: EL-1668 | COA: 0ESKSH6520 | Method of Shipment: Local Delivery |
| Shipped To: TestAmerica - Richland | Offsite Property No.: NA | | Bill of Lading/Air Bill No.: NA |

POSSIBLE SAMPLE HAZARDS/REMARKS

NA

Special Handling and/or Storage

*All Test america Cr-VI analyses must be preformed at the Richland facility*

J3G240439

J01880
Due 8-8-13

SAMPLE ANALYSIS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation | Cool 4C | None | None | None | | | | | | |
| | | | Type of Container | G/P | G/P | G/P | G/P | | | | | | |
| | | | No. of Container(s) | 1 | 1 | 1 | 1 | | | | | | |
| | | | Volume | 250mL | 500mL | 250mL | 250mL | | | | | | |
| | | | | Chromium Hex - 7196 {Hexavalent Chromium} | See item (2) in Special Instructions | Isotopic Plutonium; Nickel-63; Strontium-89,90 -- Total Sr | Carbon-14; Tritium - H3 | | | | | | |
| Sample No. | Matrix | Sample Date | Sample Time | | | | | | | | | | |
| JIRPY8 | SOIL | 7-23-13 | 1225 | X | X | X | X | | W-92 | MIFNC | | | |
| JIRPY9 | SOIL | 7-23-13 | 1235 | X | X | X | X | | W-94 | MIFND | | | |
| | SOIL | | | | | | | | | | | | |
| | SOIL | | | | | | | | | | | | |
| | SOIL | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| E. White | 7-23-13 1312 | Doug Bowers/Doug Bowers | 7-23-13/1312 |
| Doug Bowers/Doug Bowers | 7-23-13 1645 | Cindia Bingham | 7-23-13 1645 |
| Cindia Bingham | 7-23-13 1655 | Frig #3C 1060 Battelle | 7-23-13 1655 |
| Frig #3C 1060 Battelle | 7-24-13 1520 | Cindia Bingham | 7-24-13 1520 |
| Cindia Bingham | 7-24-13 1525 | John Harris | 7-24-13 1525 |
| John Harris | 7-24-13 1534 | J. Beck/Beck TALL | 7-24-13 1534 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |
|---|---|---|---|
| | | | |

SPECIAL INSTRUCTIONS

All Test America Cr-VI snalyses must be preformed at the Richland facility.
The 500 ml GEA samples will be sent to RCF for shipping screen then fowarded on to the rad lab.

(2) Gamma Spec (Client List) {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

J3G240439

WCH-EE-011

Generated Date/Time: 06/26/2013 16:21, PDT

# Washington Closure Hanford — CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RC-238-003 | Page 2 of 2

| | | | |
|---|---|---|---|
| Collector: WHITE, EC | Company Contact: Joan Kessner | Telephone No.: 375-4688 | Project Coordinator: KESSNER, JH |
| Price Code: 8C | Data Turnaround: 15 Days | | |
| Project Designation: 100K Shoreline Characterization | Sampling Location: 100-K-111 - 100-K-111 West Sample Area | | SAF No.: RC-238 |
| Ice Chest No.: NA | Field Logbook No.: EL-1668 | COA: 0ESKSH6520 | Method of Shipment: Local Delivery |
| Shipped To: Radiological Counting Facility / TAI-R | Offsite Property No.: NA | | Bill of Lading/Air Bill No.: NA |

POSSIBLE SAMPLE HAZARDS/REMARKS 7-23-13 CMB

NA

**Special Handling and/or Storage**

*All Test america Cr-VI analyses must be preformed at the Richland facility*

J36240439

J01880

Due 8-8-13

**SAMPLE ANALYSIS**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Preservation | None | | | | | | | | | | | | |
| Type of Container | G/P | | | | | | | | | | | | |
| No. of Container(s) | 1 | | | | | | | | | | | | |
| Volume | ~~500 ml~~ 500g / 7-23-13 CMB | | | | | | | | | | | | |
| | ~~8X8~~ RCF GEA Shipping Screen * | | | | | | | | | | | | |

| Sample No. | Matrix | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 8 | 7-24-13 RCF | | | | |
| J1RPY8 | SOIL | 7-23-13 | 1225 | X | | W-9L | ~~35654~~ | 35804 | 445g | | | | |
| J1RPY9 | SOIL | 7-23-13 | 1235 | X | | W-9L | 35655 | 35805 | 432g | | | | |
| | SOIL | | | | | | 8 DM 7-24-13 | | | | | | |
| | SOIL | | | | | | | | | | | | |
| | SOIL | | | | | | | | | | | | |

**CHAIN OF POSSESSION** — **Sign/Print Names**

| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
|---|---|---|---|
| E. White | 7-23-13 1312 | Doug Bowers / Doug Bowers | 7-23-13 1312 |
| Doug Bowers / Doug Bowers | 7-23-13 1645 | Cinda Bingham | 7-23-13 1645 |
| Cinda Bingham | 7-23-13 1655 | JH 7-23-13 Frig #24 3C 1060 Battelle | 7-23-13 1655 |
| Frig 3C, 1060 Battelle | 7-24-13 0740 | Cinda Bingham | 7-24-13 0740 |
| Cinda Bingham | 7-24-13 0741 | John Harrie | 7-24-13 0741 |
| John Harrie | 7-24-13 0935 | RCF / John D. Miller | 7-24-13 0935 |
| RCF / John D. Miller | 7-24-13 1335 | John Harrie | 7-24-13 1335 |

**FINAL SAMPLE DISPOSITION**

| Disposal Method | Relinquished By | Disposed By | Date/Time |
|---|---|---|---|
| JH 7-24-13 WCH | JH 7-24-13 / John Harrie 7-24-13 1534 | JH 7-24-13 Received By J. Beck / J. Beck TAIR | 7-24-13 1534 * |

**SPECIAL INSTRUCTIONS**

All Test America Cr-VI snalyses must be preformed at the Richland facility.
The 500 ml GEA samples will be sent to RCF for shipping screen then fowarded on to the rad lab.

* Samples from RCF Relinquished to TALR for Gamma Spec on Page 1 of this COC. JH 7.24.13

WCH-EE-011

Generated Date/Time: 06/26/2013 16:21, PDT

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Sample Check-in List

Date/Time Received: 7-24-13/1534 Container GM Screen Result: (Airlock) 60 cpm Initials [ ]
Sample GM Screen Result (Sample Receiving) 40 cpm Initials [ ]

Client: WCH SDG #: J01880 SAF #: RC-238 NA [ ]

Lot Number: J3L240439

Chain of Custody # RC-238-003

Shipping Container ID or Air Bill Number : hand delivered NA [✓]

Samples received inside shipping container/cooler/box Yes [✓] Continue with 1 through 4. Initial appropriate response.
No [ ] Go to 5, add comment to #16.

1. Custody Seals on shipping container intact? Yes [ ] No [ ] No Custody Seal [✓]
2. Custody Seals dated and signed? Yes [ ] No [ ] No Custody Seal [✓]
3. Cooler temperature: 4.0 °C on Ice NA [ ]
4. Vermiculite/packing materials is NA [✓] Wet [ ] Dry [ ]

Item 5 through 16 for samples. Initial appropriate response.

5. Chain of Custody record present? Yes [✓] No [ ]
6. Number of samples received (Each sample may contain multiple bottles): 2
7. Containers received: 2x500mLP; 6x250mLAG
8. Sample holding times exceeded? NA [ ] Yes [ ] No [✓]
9. Samples have: ____tape ____hazard labels [✓] custody seals [✓] appropriate sample labels
10. Matrix: [✓] A (FLT, Wipe, Solid, Soil) ____I (Water) ____S (Air, Niosh 7400) ____T (Biological, Ni-63)
11. Samples:
    [✓] are in good condition ____are leaking ____are broken
    ____have air bubbles (Only for samples requiring no head space) ____Other
12. Sample pH appropriate for analysis requested Yes [ ] No [ ] NA [✓]
    (If acidification is necessary go to pH area & document sample ID, initial pH, amount of $HNO_3$ added and pH after addition on table)
13. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
14. Description of anomalies (include sample numbers): NA [✓]
15. Sample Location, Sample Collector Listed on COC? * Yes [✓] No [ ]
    *For documentation only. No corrective action needed.
16. Additional Information: N/A

[ ] Client/Courier denied temperature check. [ ] Client/Courier unpack cooler.

Sample Check-in List completed by Sample Custodian:
Signature: [signature] Date: 7-24-13

Client Notification needed? Yes [ ] No [ ] Date:
By:
Person contacted:

[✓] No action necessary; process as is

Project Manager [signature] Date 7/25/13

LS-023 Rev. 17, 05/13

7/26/2013 11:02:21 AM

# Sample Preparation/Analysis

Balance Id:1120373922

127642, Washington Closure Hanford LLC ,
Bechtel Hanford, Inc.

6A Pu Prp PRP003/PRP005, Sep ALP002(ALP015)
SO Plutonium-238,239/40 by Alpha Spec
5I CLIENT: HANFORD

Pipet #: _____

**AnalyDueDate: 08/08/2013**

Sep1 DT/Tm Tech:

**Batch: 3206036 SOIL pCi/g** PM, Quote: RW2, 27038

SEQ Batch, Test: None

Sep2 DT/Tm Tech:

Prep Tech: SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 M1F7C-1-AE<br>J3G240439-1-SAMP<br>07/23/2013 12:25 | | | 1.01g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 1.01g<br>#Containers: 4 | PUTC13611<br>07/18/13,pd<br>01/01/10,r | | | | 100 Min<br>Scr: | 422<br>Alpha: | | | Beta: |
| 2 M1F7C-1-AK-X<br>J3G240439-1-DUP<br>07/23/2013 12:25 | | | 1.01g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 1.01g<br>#Containers: 4 | PUTC13612<br>07/18/13,pd<br>01/01/10,r | | | | Scr: | 423<br>Alpha: | | | Beta: |
| 3 M1F7D-1-AE<br>J3G240439-2-SAMP<br>07/23/2013 12:35 | | | 1.04g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 1.04g<br>#Containers: 4 | PUTC13613<br>07/18/13,pd<br>01/01/10,r | | | | Scr: | 424<br>Alpha: | | | Beta: |
| 4 M1GA3-1-AA-B<br>J3G250000-36-BLK<br>07/25/2013 11:01 pd | | | 1.01g,in<br>AmtRec: | 1.01g<br>#Containers: 1 | PUTC13614<br>07/18/13,pd<br>01/01/10,r | | | | Scr: | 447<br>Alpha: | | | Beta: |
| 5 M1GA3-1-AC-C<br>J3G250000-36-LCS<br>07/25/2013 11:01 pd | | | 1.02g,in<br>AmtRec: | 1.02g<br>#Containers: 1 | PUSK1004<br>07/18/13,pd<br>01/01/10,r | | | | Scr: | 448<br>Alpha: | | | Beta: |

7/26/2013 11:02:22 AM

# Sample Preparation/Analysis

6A Pu Prp PRP003/PRP005, Sep ALP002(ALP015)
SO Plutonium-238,239/40 by Alpha Spec
5I CLIENT: HANFORD

Balance Id:1120373922

Pipet #: _____

AnalyDueDate: 08/08/2013

Sep1 DT/Tm Tech:

Batch: 3206036 pCi/g

SEQ Batch, Test: None

Sep2 DT/Tm Tech:

Prep Tech: ,SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"

All Clients for Batch:
127642, Washington Closure Hanford LLC Bechtel Hanford, Inc. , RW2, 27038

M1F7C1AE-SAMP Constituent List:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PU-238 | RDL:1 | pCi/g | LCL: | UCL: | RPD: | PU-239 | RDL:1 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| Pu-242 | RDL: | pCi/g | LCL:20 | UCL:105 | RPD:35 | | | | | | |

M1GA31AA-BLK:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PU-238 | RDL:1 | pCi/g | LCL: | UCL: | RPD: | PU-239 | RDL:1 | pCi/g | LCL: | UCL: | RPD: |
| Pu-242 | RDL: | pCi/g | LCL:20 | UCL:105 | RPD:35 | | | | | | |

M1GA31AC-LCS:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PU-239 | RDL:1 | pCi/g | LCL:70 | UCL:130 | RPD:35 | Pu-242 | RDL: | pCi/g | LCL:20 | UCL:105 | RPD:35 |

M1F7C1AE-SAMP Calc Info:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

M1GA31AA-BLK:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

M1GA31AC-LCS:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

8/2/2013 11:07:31 AM

# ICOC Fraction Transfer/Status Report

ByDate: 8/2/2012, 8/7/2013, Batch: '3206036', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| 3206036 | | | | | | |
| *AC* | | **Rev1C** | **SannohS** | 7/26/2013 10:56:40 | | |
| *SC* | | | mcginnist | IsBatched | 7/25/2013 11:06:27 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | SannohS | InPrep | 7/26/2013 10:56:40 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | SannohS | Prep1C | 7/29/2013 9:44:08 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | JorgensonD | Sep1C | 7/31/2013 2:59:07 PM | RL-ALP-001 REVISION 3 |
| *SC* | | | JorgensonD | Sep2C | 8/1/2013 4:29:43 PM | RL-ALP-016 REVISION 2 |
| *SC* | | | DawkinsO | InCnt1 | 8/1/2013 6:53:05 PM | RL-CI-008 REVISION 3 |
| *SC* | | | DawkinsO | CalcC | 8/2/2013 4:19:03 AM | RL-CI-008 REVISION 3 |
| *SC* | | | antonsonl | Rev1C | 8/2/2013 11:07:22 AM | RL-DR-001 Rev 2 |
| *AC* | | | **SannohS** | 7/29/2013 9:44:08 | | |
| *AC* | | | **JorgensonD** | 7/31/2013 2:59:07 PM | | |
| *AC* | | | **JorgensonD** | 8/1/2013 4:29:43 PM | | |
| *AC* | | | **DawkinsO** | 8/1/2013 6:53:05 PM | | |
| *AC* | | | **DawkinsO** | 8/2/2013 4:19:03 AM | | |
| *AC* | | | **antonsonl** | 8/2/2013 11:07:22 | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

Page 1

Grp Rec Cnt: 7

ICOCFractions v4.8.44

8/2/2013 5:44:21 PM

# Sample Preparation/Analysis

Balance Id:1120373922

127642, Washington Closure Hanford LLC
Bechtel Hanford, Inc.

CH Sr-Total Prp PRP003, Sep ~~GPC003~~
~~TH~~ Total Strontium by GPC GPC010
5I CLIENT: HANFORD

Pipet #: _____

**AnalyDueDate: 08/08/2013**

Sep1 DT/Tm Tech: 1805 8/1/13 APA

**Batch: 3206032 SOIL pCi/g** PM, Quote: RW2, 27038

SEQ Batch, Test: None

Sep2 DT/Tm Tech:

Prep Tech: SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 M1F7C-1-AC<br>J3G240439-1-SAMP<br>07/23/2013 12:25 | | | 3.03g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 3.03g<br>#Containers: 4 | SRTC1139<br>07/18/13 | | 1.5" | 10.9mg | 50 | | Scr: Alpha: Beta: | 32A 1824 8/3/13 | |
| 2 M1F7D-1-AC<br>J3G240439-2-SAMP<br>07/23/2013 12:35 | | | 3.03g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 3.03g<br>#Containers: 4 | SRTC1140<br>07/18/13 | | | 10.7mg | | | Scr: Alpha: Beta: | 32A 1935 | |
| 3 M1F7D-1-AK-X<br>J3G240439-2-DUP<br>07/23/2013 12:35 | | | 3.04g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 3.04g<br>#Containers: 4 | SRTC1141<br>07/18/13 | | | 10.5mg | | | Scr: Alpha: Beta: | 32B | |
| 4 M1GAX-1-AA-B<br>J3G250000-32-BLK<br>07/25/2013 11:01 pd | | | 3.03g,in<br>AmtRec: | 3.03g<br>#Containers: 1 | SRTC1142<br>07/18/13 | | | 9.1mg | | | Scr: Alpha: Beta: | C 32D 8/3/13 | |
| 5 M1GAX-1-AC-C<br>J3G250000-32-LCS<br>07/25/2013 11:01 pd | | | 3.01g,in<br>AmtRec: | 3.01g<br>#Containers: 1 | STSF0278<br>05/21/13 | | | 8.7mg | | | Scr: Alpha: Beta: | D 32D 8/3/13 | |

TestAmerica Richland Wa.

Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 Page 1
pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added

ISV - Insufficient Volume for Analysis

WO Cnt: 5
Prep_SamplePrep v4.8.61

8/2/2013 5:44:22 PM

# Sample Preparation/Analysis

CH Sr-Total Prp PRP003, Sep GPC003
TH Total Strontium by GPC
5I CLIENT: HANFORD

Balance Id:1120373922

Pipet #: _____

AnalyDueDate: 08/08/2013

Sep1 DT/Tm Tech:

Batch: 3206032 pCi/g

Sep2 DT/Tm Tech:

SEQ Batch, Test: None

Prep Tech: ,SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"

All Clients for Batch:
127642, Washington Closure Hanford LLC Bechtel Hanford, Inc. , RW2, 27038

M1F7C1AC-SAMP Constituent List:

| | | | | | |
|---|---|---|---|---|---|
| Sr-90 | RDL:1 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| M1GAX1AA-BLK: | | | | | |
| Sr-90 | RDL:1 | pCi/g | LCL: | UCL: | RPD: |
| M1GAX1AC-LCS: | | | | | |
| Sr-90 | RDL:1 | pCi/g | LCL:70 | UCL:130 | RPD:35 |

M1F7C1AC-SAMP Calc Info:

| | | | | |
|---|---|---|---|---|
| Uncert Level (#s).: 2 | Decay to SaDt: Y | Blk Subt.: N | Sci.Not.: Y | ODRs: B |
| M1GAX1AA-BLK: | | | | |
| Uncert Level (#s).: 2 | Decay to SaDt: Y | Blk Subt.: N | Sci.Not.: Y | ODRs: B |
| M1GAX1AC-LCS: | | | | |
| Uncert Level (#s).: 2 | Decay to SaDt: Y | Blk Subt.: N | Sci.Not.: Y | ODRs: B |

8/5/2013 12:21:07 PM

# ICOC Fraction Transfer/Status Report

ByDate: 8/5/2012, 8/10/2013, Batch: '3206032', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| **3206032** | | | | | | |
| *AC* | | **Rev1C** | **SannohS** | 7/26/2013 8:01:53 | | |
| *SC* | | | mcginnist | IsBatched | 7/25/2013 11:05:48 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | SannohS | InPrep | 7/26/2013 8:01:53 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | SannohS | Prep1C | 7/29/2013 9:44:47 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | AshworthA | Sep2C | 8/2/2013 5:51:45 PM | RL-GPC-010 REVISION 3 |
| *SC* | | | NortonJ | InCnt1 | 8/3/2013 10:22:05 AM | RL-CI-006 REVISION 3 |
| *SC* | | | DawkinsO | CalcC | 8/4/2013 11:11:25 PM | RL-CI-006 REVISION 4 |
| *SC* | | | mcginnist | Rev1C | 8/5/2013 12:21:01 PM | RL-DR-001 Rev 2 |
| *AC* | | | **SannohS** | 7/29/2013 9:44:47 | | |
| *AC* | | | **AshworthA** | 8/2/2013 5:51:45 PM | | |
| *AC* | | | **NortonJ** | 8/3/2013 10:22:05 | | |
| *AC* | | | **DawkinsO** | 8/4/2013 11:11:25 PM | | |
| *AC* | | | **mcginnist** | 8/5/2013 12:21:01 PM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

Page 1

Grp Rec Cnt: 6

ICOCFractions v4.8.44

BHI

7/26/2013 10:04:04 AM

# Sample Preparation/Analysis

Balance Id:1120421763

127642, Washington Closure Hanford LLC
Bechtel Hanford, Inc.

AX Gamma Prp PRP003/GAM001
TA Gamma by HPGE
5I CLIENT: HANFORD

Pipet #: _____

**AnalyDueDate: 08/08/2013**

Sep1 DT/Tm Tech:

**Batch: 3206031** **SOIL** **pCi/g** **PM, Quote: RW2, 27038**

Sep2 DT/Tm Tech:

SEQ Batch, Test: None All Tests: DWEA, 3206031 AXTA, 3206032 CHTH, 3206033 5STC, 3206034 ATS6, 3206035 AFS4, 3206036 6ASO,

Prep Tech: SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 M1F7C-1-AG<br>J3G240439-1-SAMP<br>07/23/2013 12:25 | | | 309.70g,in | 309.70g | | | | | S200 | 200min | G15 | 1532 | 7/26/13HC |
| | | | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | | | | | | | Scr: | Alpha: | Beta: |
| 2 M1F7D-1-AG<br>J3G240439-2-SAMP<br>07/23/2013 12:35 | | | 305.90g,in | 305.90g | | | | | | | G17 | 1533 | 7/26/13HC |
| | | | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | | | | | | | Scr: | Alpha: | Beta: |
| 3 M1F7D-1-AJ-X<br>J3G240439-2-DUP<br>07/23/2013 12:35 | | | | | | | | | | | G19 | 0318 | 7/26/13 05 |
| | | | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | | | | | | | Scr: | Alpha: | Beta: |
| 4 M1GAW-1-AA-B<br>J3G250000-31-BLK<br>07/25/2013 11:01 pd | | | 348.00g,in | 348.00g | | | | | | | G18 | 1534 | 7/26/13HC |
| | | | AmtRec: | #Containers: 1 | | | | | | | Scr: | Alpha: | Beta: |
| 5 M1GAW-1-AC-C<br>J3G250000-31-LCS<br>07/25/2013 11:01 pd | | | 350.10g,in | 350.10g | QC20009<br>08/04/09,pd<br>09/01/09,r | | | | | | G14 | 1535 | 7/26/13HC |
| | | | AmtRec: | #Containers: 1 | | | | | | | Scr: | Alpha: | Beta: |

I S V

TestAmerica Richland Wa.

Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added

Page 1

ISV - Insufficient Volume for Analysis

WO Cnt: 5

Prep_SamplePrep v4.8.61

7/26/2013 10:04:05 AM

# Sample Preparation/Analysis

AX Gamma Prp PRP003/GAM001
TA Gamma by HPGE
5I CLIENT: HANFORD

Balance Id:1120421763

Pipet #: _____

AnalyDueDate: 08/08/2013

Sep1 DT/Tm Tech:

Batch: 3206031 pCi/g

SEQ Batch, Test: None

Sep2 DT/Tm Tech:

Prep Tech: ,SannohS

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"

All Clients for Batch:
127642, Washington Closure Hanford LLC Bechtel Hanford, Inc. , RW2, 27038

M1F7C1AG-SAMP Constituent List:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Co-60 | RDL:5.00E-02 | pCi/g | LCL: | UCL: | RPD: | Cs-137 | RDL:1.00E-01 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| Cs-137DA | RDL:1.00E-01 | pCi/g | LCL:70 | UCL:130 | RPD:35 | Eu-152 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: |
| Eu-154 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: | Eu-155 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: |
| K-40 | RDL: | pCi/g | LCL: | UCL: | RPD: | | | | | | |

M1GAW1AA-BLK:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Co-60 | RDL:5.00E-02 | pCi/g | LCL: | UCL: | RPD: | Cs-137 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: |
| Cs-137DA | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: | Eu-152 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: |
| Eu-154 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: | Eu-155 | RDL:1.00E-01 | pCi/g | LCL: | UCL: | RPD: |
| K-40 | RDL: | pCi/g | LCL: | UCL: | RPD: | | | | | | |

M1GAW1AC-LCS:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cs-137 | RDL:0.1 | pCi/g | LCL:70 | UCL:130 | RPD:35 | Cs-137DA | RDL:0.1 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| K-40 | RDL:-- | pCi/g | LCL:70 | UCL:130 | RPD:35 | Ra-226 | RDL:0.1 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| RA-228 | RDL:0.2 | pCi/g | LCL:70 | UCL:130 | RPD:35 | RA-228DA | RDL:0.2 | pCi/g | LCL:70 | UCL:130 | RPD:35 |
| U-238 | RDL: | pCi/g | LCL:70 | UCL:130 | RPD:35 | | | | | | |

M1F7C1AG-SAMP Calc Info:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

M1GAW1AA-BLK:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

M1GAW1AC-LCS:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

8/5/2013 2:01:40 PM

# ICOC Fraction Transfer/Status Report

ByDate: 8/5/2012, 8/10/2013, Batch: '3206031', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| 3206031 | | | | | | |
| *AC* | | **Rev1C** | **SannohS** | 7/25/2013 3:15:39 PM | | |
| *SC* | | | mcginnist | IsBatched | 7/25/2013 11:05:43 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | SannohS | InPrep | 7/25/2013 3:15:39 PM | RL-GAM-001 REV.002 |
| *SC* | | | SannohS | Prep1C | 7/26/2013 11:41:35 AM | RL-GAM-001 REVISION 2 |
| *SC* | | | CarnesH | InCnt1 | 7/26/2013 12:04:05 PM | RL-CI-007 REVISION 3 |
| *SC* | | | DawkinsO | CalcC | 7/29/2013 2:40:11 AM | RL-CI-007 REVISION 3 |
| *SC* | | | antonsonl | Rev1C | 8/5/2013 2:01:27 PM | RL-DR-001 Rev 2 |
| *AC* | | | **SannohS** | 7/26/2013 11:41:35 | | |
| *AC* | | | **CarnesH** | 7/26/2013 12:04:05 | | |
| *AC* | | | **DawkinsO** | 7/29/2013 2:40:11 | | |
| *AC* | | | **antonsonl** | 8/5/2013 2:01:27 PM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

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Grp Rec Cnt: 5

ICOCFractions v4.8.44

7/25/2013 11:01:57 AM

# Sample Preparation/Analysis

PRIORITY

127642, Washington Closure Hanford LLC ,
Bechtel Hanford, Inc.

**AnalyDueDate: 08/08/2013**

**AT H-3 Prp/Sep LSC002**
**S6 Tritium by Liquid Scint**
**5I CLIENT: HANFORD**

**Balance Id:**
**Pipet #:** _____
**Sep1 DT/Tm Tech:**
**Sep2 DT/Tm Tech:**
**Prep Tech:**

**Batch: 3206034** **SOIL** **pCi/g** **PM, Quote: RW2, 27038**
SEQ Batch, Test: None

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 M1F7C-1-AF** J3G240439-1-SAMP 07/23/2013 12:25 | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | Scr: | Alpha: | Beta: | | | | | | | | |
| **2 M1F7D-1-AF** J3G240439-2-SAMP 07/23/2013 12:35 | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | Scr: | Alpha: | Beta: | | | | | | | | |
| **3 M1F7D-1-AL-X** J3G240439-2-DUP 07/23/2013 12:35 | AmtRec: 1X500MLAG;3X250MLAG | #Containers: 4 | Scr: | Alpha: | Beta: | | | | | | | | |
| **4 M1GA1-1-AA-B** J3G250000-34-BLK 07/25/2013 11:01 pd | AmtRec: | #Containers: 1 | Scr: | Alpha: | Beta: | | | | | | | | |
| **5 M1GA1-1-AC-C** J3G250000-34-LCS 07/25/2013 11:01 pd | AmtRec: | #Containers: 1 | Scr: | Alpha: | Beta: | | | | | | | | |
| **6 M1GA1-1-AD-B** N J3G250000-34-BLK 07/25/2013 11:01 pd | AmtRec: | #Containers: 1 | Scr: | Alpha: | Beta: | | | | | | | | |

TestAmerica Richland Wa. Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added



ISV - Insufficient Volume for Analysis

WO Cnt: 6
ICOC v4.8.49

7/25/2013 11:01:58 AM

# Sample Preparation/Analysis

**AT H-3 Prp/Sep LSC002**
**S6 Tritium by Liquid Scint**
**5I CLIENT: HANFORD**

**Balance Id:**

**Pipet #:** _____

**Sep1 DT/Tm Tech:**

**Sep2 DT/Tm Tech:**

**Prep Tech:**

**AnalyDueDate: 08/08/2013**

**Batch: 3206034** **pCi/g**
SEQ Batch, Test: None

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:**

All Clients for Batch:
127642, Washington Closure Hanford LLC Bechtel Hanford, Inc. , RW2, 27038

M1F7C1AF-SAMP Constituent List:
H-3 RDL:400 pCi/g LCL:70 UCL:130 RPD:35
M1GA11AA-BLK:

M1GA11AC-LCS:

M1GA11AD-BLK:

M1F7C1AF-SAMP Calc Info:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M1GA11AA-BLK:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M1GA11AC-LCS:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B
M1GA11AD-BLK:
Uncert Level (#s).: 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

8/8/2013 9:37:32 AM

# ICOC Fraction Transfer/Status Report

ByDate: 8/8/2012, 8/13/2013, Batch: '3206034', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| 3206034 | | | | | | |
| *AC* | | **Rev1C** | **NortonP** | 8/6/2013 10:59:37 | | |
| *SC* | | | NortonP | InCnt2 | 8/6/2013 10:59:37 AM | RL-RA-001 REVISION 4 |
| *SC* | | | nortonp | IsBatched | 8/6/2013 11:11:19 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | NortonP | Sep1C | 8/7/2013 10:37:32 AM | RL-LSC-002 REVISION 4 |
| *SC* | | | NortonJ | InCnt1 | 8/7/2013 11:38:34 AM | RL-CI-005 REVISION 3 |
| *SC* | | | NortonJ | CalcC | 8/8/2013 9:08:38 AM | RL-CI-005 REVISION 3 |
| *SC* | | | antonsonl | Rev1C | 8/8/2013 9:37:24 AM | RL-DR-001 Rev 2 |
| *AC* | | | **NortonP** | 8/7/2013 10:37:32 | | |
| *AC* | | | **NortonJ** | 8/7/2013 11:38:34 | | |
| *AC* | | | **NortonJ** | 8/8/2013 9:08:38 AM | | |
| *AC* | | | **antonsonl** | 8/8/2013 9:37:24 AM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

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Grp Rec Cnt: 5

ICOCFractions v4.8.44

7/31/2013 12:22:45 PM

# Sample Preparation/Analysis

127642, Washington Closure Hanford LLC ,
Bechtel Hanford, Inc.

**5S C-14 Prp/Sep LSC008**
**TC C-14 by LSC, Carbosorb**
**01 STANDARD TEST SET**

**AnalyDueDate: 08/08/2013**

**Balance Id:**

**Pipet #:** _____

**Sep1 DT/Tm Tech:**

**Sep2 DT/Tm Tech:**

**Prep Tech: SannohS,WindischT**

**Batch: 3206033** **SOIL** **pCi/g** **PM, Quote: RW2, 27038**
SEQ Batch, Test: None All Tests: DWEA, 3206031 AXTA, 3206032 CHTH, 3206033 5STC, 3206034 ATS6, 3206035 AFS4, 3206036 6ASO,

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 M1F7C-1-AH** | | | 5.092g,in | 5.092g | | | | | | | | | |
| J3G240439-1-SAMP | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **2 M1F7C-1-AJ-X** | | | 4.963g,in | 4.963g | | | | | | | | | |
| J3G240439-1-DUP | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **3 M1F7D-1-AH** | | | 4.933g,in | 4.933g | | | | | | | | | |
| J3G240439-2-SAMP | | | | | | | | | | | | | |
| 07/23/2013 12:35 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **4 M1GA0-1-AA-B** | | | 4.996g,in | 4.996g | | | | | | | | | |
| J3G250000-33-BLK | | | | | | | | | | | | | |
| 07/25/2013 11:01 pd | | | AmtRec: | | #Containers: 1 | | | | Scr: | | Alpha: | | Beta: |
| **5 M1GA0-1-AC-C** | | | 4.915g,in | 4.915g | CSB1294 | | | | | | | | |
| J3G250000-33-LCS | | | | | 07/30/13,pd 11/08/12,r | | | | | | | | |
| 07/25/2013 11:01 pd | | | AmtRec: | | #Containers: 1 | | | | Scr: | | Alpha: | | Beta: |
| **6 M1GA0-1-AD-BN** | | | | | | | | | | | | | |
| J3G250000-33-IBLK | | | | | | | | | | | | | |
| 07/25/2013 11:01 pd | | | AmtRec: | | #Containers: 1 | | | | Scr: | | Alpha: | | Beta: |

24189

TestAmerica Richland Wa. Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added Page 1 ISV - Insufficient Volume for Analysis WO Cnt: **6** Prep_SamplePrep v4.8.61

7/31/2013 12:22:47 PM

# Sample Preparation/Analysis

5S C-14 Prp/Sep LSC008
TC C-14 by LSC, Carbosorb
01 STANDARD TEST SET

Balance Id:

Pipet #:

AnalyDueDate: 08/08/2013

Sep1 DT/Tm Tech:

Batch: 3206033 pCi/g

SEQ Batch, Test: None

Sep2 DT/Tm Tech:

Prep Tech:

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"

```
All Clients for Batch:
   127642, Washington Closure Hanford LLC          Bechtel Hanford, Inc.        ,  RW2, 27038

M1F7C1AH-SAMP Constituent List:
  C-14        RDL:5.00E+01    pCi/g     LCL:        UCL:        RPD:
M1GA01AA-BLK:
  C-14        RDL:5.00E+01    pCi/g     LCL:        UCL:        RPD:
M1GA01AC-LCS:

M1GA01AD-IBLK:
  C-14        RDL:5.00E+01    pCi/g     LCL:        UCL:        RPD:

M1F7C1AH-SAMP Calc Info:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA01AA-BLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA01AC-LCS:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA01AD-IBLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
```

8/5/2013 12:23:13 PM

# ICOC Fraction Transfer/Status Report

ByDate: 8/5/2012, 8/10/2013, Batch: '3206033', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| **3206033** | | | | | | |
| *AC* | | **Rev1C** | **WindischT** | 7/31/2013 12:44:46 | | |
| *SC* | | | rogersa | IsBatched | 7/29/2013 11:04:03 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | WindischT | Sep1C | 7/31/2013 12:44:46 PM | RL-LSC-008 REVISION 3 |
| *SC* | | | CarnesH | CalcC | 7/31/2013 12:57:11 PM | RL-CI-005 REVISION 3 |
| *SC* | | | DawkinsO | CalcC | 8/3/2013 10:00:05 PM | RL-CI-005 REVISION 3 |
| *SC* | | | mcginnist | Rev1C | 8/5/2013 12:23:06 PM | RL-DR-001 Rev 2 |
| *AC* | | | **CarnesH** | 7/31/2013 12:57:11 | | |
| *AC* | | | **DawkinsO** | 8/3/2013 10:00:05 PM | | |
| *AC* | | | **mcginnist** | 8/5/2013 12:23:06 PM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

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Grp Rec Cnt: 4

ICOCFractions v4.8.44

7/26/2013 10:53:26 AM

# Sample Preparation/Analysis

127642, Washington Closure Hanford LLC ,
Bechtel Hanford, Inc.

**AF Ni-63 Prp PRP003/PRP005, Sep LSC017**
**S4 Nickel by ICP and Nickel-63 by Liquid Scint**
**5I CLIENT: HANFORD**

**Balance Id:1120373922**

**Pipet #:** _____

**AnalyDueDate: 08/08/2013**

**Sep1 DT/Tm Tech:**

**Batch: 3206035 SOIL pCi/g PM, Quote: RW2, 27038**
SEQ Batch, Test: None

**Sep2 DT/Tm Tech:**

**Prep Tech: SannohS**

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 M1F7C-1-AD<br>J3G240439-1-SAMP<br>07/23/2013 12:25 | | | 0.25g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 0.25g<br>#Containers: 4 | NITA10038<br>07/22/13 | | | | 20 min<br>Scr: | | Alpha: | | Beta: |
| 2 M1F7D-1-AD<br>J3G240439-2-SAMP<br>07/23/2013 12:35 | | | 0.25g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 0.25g<br>#Containers: 4 | NITA10039<br>07/22/13 | | | | Scr: | | Alpha: | | Beta: |
| 3 M1F7D-1-AM-X<br>J3G240439-2-DUP<br>07/23/2013 12:35 | | | 0.25g,in<br>AmtRec: 1X500MLAG;3X250MLAG | 0.25g<br>#Containers: 4 | NITA10040<br>07/22/13 | | | | Scr: | | Alpha: | | Beta: |
| 4 M1GA2-1-AA-B<br>J3G250000-35-BLK<br>07/25/2013 11:01 pd | | | 0.25g,in<br>AmtRec: | 0.25g<br>#Containers: 1 | NITA10041<br>07/22/13 | | | | Scr: | | Alpha: | | Beta: |
| 5 M1GA2-1-AC-C<br>J3G250000-35-LCS<br>07/25/2013 11:01 pd | | | 0.25g,in<br>AmtRec: | 0.25g<br>#Containers: 1 | NISA1926<br>07/02/13 | | | | Scr: | | Alpha: | | Beta: |
| 6 M1GA2-1-AD-BN<br>J3G250000-35-IBLK<br>07/25/2013 11:01 pd | | | AmtRec: | #Containers: 1 | | | | | Scr: | | Alpha: | | Beta: |

7/26/2013 10:53:27 AM

# Sample Preparation/Analysis

**AF Ni-63 Prp PRP003/PRP005, Sep LSC017**
**S4 Nickel by ICP and Nickel-63 by Liquid Scint**
**5I CLIENT: HANFORD**

**Balance Id:**

**Pipet #:** _____

**AnalyDueDate: 08/08/2013**

**Sep1 DT/Tm Tech:**

**Batch: 3206035** **pCi/g**
SEQ Batch, Test: None

**Sep2 DT/Tm Tech:**

**Prep Tech:**

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"
M1GA2-BLK CommentsP-13-00313,P-13-00345,S-13-00041

```
All Clients for Batch:
   127642, Washington Closure Hanford LLC          Bechtel Hanford, Inc.        ,  RW2, 27038

M1F7C1AD-SAMP Constituent List:
  Ni-63       RDL:30          pCi/g     LCL:70      UCL:130     RPD:35
M1GA21AA-BLK:
  Ni-63       RDL:30          pCi/g     LCL:        UCL:        RPD:
M1GA21AC-LCS:
  Ni-63       RDL:30          pCi/g     LCL:70      UCL:130     RPD:35
M1GA21AD-IBLK:
  Ni-63       RDL:30          pCi/g     LCL:        UCL:        RPD:

M1F7C1AD-SAMP Calc Info:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA21AA-BLK:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA21AC-LCS:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1GA21AD-IBLK:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
```

8/8/2013 7:47:19 AM

# ICOC Fraction Transfer/Status Report

ByDate: 8/8/2012, 8/13/2013, Batch: '3206035', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | Comments |
|---|---|---|---|---|---|---|
| **3206035** | | | | | | |
| *AC* | | **Rev1C** | **SannohS** | 7/26/2013 10:44:10 | | |
| *SC* | | | mcginnist | IsBatched | 7/25/2013 11:06:22 AM | ICOC_RADCALC v4.8.49 |
| *SC* | | | SannohS | InPrep | 7/26/2013 10:44:10 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | SannohS | Prep1C | 7/29/2013 9:42:49 AM | RL-PRP-003 REVISION 4 |
| *SC* | | | JorgensonD | Sep2C | 8/6/2013 6:34:41 PM | RL-LSC-017 REVISION 3 |
| *SC* | | | DawkinsO | InCnt1 | 8/6/2013 7:28:35 PM | RL-CI-005 REVISION 3 |
| *SC* | | | DawkinsO | InRev1 | 8/8/2013 3:12:28 AM | RL-CI-005 REVISION 3 |
| *SC* | | | mcginnist | Rev1C | 8/8/2013 7:46:39 AM | RL-DR-001 Rev 2 |
| *AC* | | | **SannohS** | 7/29/2013 9:42:49 | | |
| *AC* | | | **JorgensonD** | 8/6/2013 6:34:41 PM | | |
| *AC* | | | **DawkinsO** | 8/6/2013 7:28:35 PM | | |
| *AC* | | | **DawkinsO** | 8/8/2013 3:12:28 AM | | |
| *AC* | | | **mcginnist** | 8/8/2013 7:46:39 AM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

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Grp Rec Cnt: 6

ICOCFractions v4.8.44

8/1/2013 9:38:26 AM

# Sample Preparation/Analysis

127642, Washington Closure Hanford LLC ,
Bechtel Hanford, Inc.

**DW Alkaline Digestion by method 3060A**
**EA Chromium, Hexavalent (7196A)**
**5I CLIENT: HANFORD**

**Balance Id:**

**Pipet #:** _____

**AnalyDueDate: 08/08/2013**

**Sep1 DT/Tm Tech:**

**Batch: 3213025 SOIL mg/kg PM, Quote: RW2, 27038**

SEQ Batch, Test: None

**Sep2 DT/Tm Tech:**

**Prep Tech:**

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 M1F7C-1-AA** | | | | | | | | | | | | | |
| J3G240439-1-SAMP | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **2 M1F7C-1-AL-S** | | | | | | | | | | | | | |
| J3G240439-1-MS | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **3 M1F7C-1-AM-X** | | | | | | | | | | | | | |
| J3G240439-1-DUP | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **4 M1F7C-1-AN-S** | | | | | | | | | | | | | |
| J3G240439-1-MS | | | | | | | | | | | | | |
| 07/23/2013 12:25 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **5 M1F7D-1-AA** | | | | | | | | | | | | | |
| J3G240439-2-SAMP | | | | | | | | | | | | | |
| 07/23/2013 12:35 | | | AmtRec: 1X500MLAG;3X250MLAG | | #Containers: 4 | | | | Scr: | | Alpha: | | Beta: |
| **6 M1H10-1-AA-B** | | | | | | | | | | | | | |
| J3H010000-25-BLK | | | | | | | | | | | | | |
| 08/01/2013 09:38 pd | | | AmtRec: | | #Containers: 1 | | | | Scr: | | Alpha: | | Beta: |
| **7 M1H10-1-AC-C** | | | | | | | | | | | | | |
| J3H010000-25-LCS | | | | | | | | | | | | | |
| 08/01/2013 09:38 pd | | | AmtRec: | | #Containers: 1 | | | | Scr: | | Alpha: | | Beta: |

TestAmerica Richland Wa.

Key: In - Initial Amt, fi - Final Amt, di - Diluted Amt, s1 - Sep1, s2 - Sep2 pd - Prep Dt, dc - Date Chg, r - Reference Dt, ec-Enrichment Cell, ct-Cocktailed Added

Page 1

ISV - Insufficient Volume for Analysis

WO Cnt: 7

ICOC v4.8.49

8/1/2013 9:38:26 AM

# Sample Preparation/Analysis

DW Alkaline Digestion by method 3060A
EA Chromium, Hexavalent (7196A)
5I CLIENT: HANFORD

Balance Id:

Pipet #:

Sep1 DT/Tm Tech:

Sep2 DT/Tm Tech:

Prep Tech:

AnalyDueDate: 08/08/2013

Batch: 3213025 mg/kg
SEQ Batch, Test: None

| Work Ord, Lot, Sample Date | Total Amt/Unit | Total Acidified/Unit | Initial Aliquot Amt/Unit | Adj Aliq Amt (Un-Acidified) | QC Tracer Prep Date | Tracer Yield | Dish Size | Ppt or Geometry | Count Time Min | Detector Id | Count On \| Off (24hr) Circle | CR Analyst, Init/Date | Comments: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Comments:** M1F7C-SAMP "CommentsISV-Recount DUP On a Different Detector"

```
All Clients for Batch:
    127642, Washington Closure Hanford LLC            Bechtel Hanford, Inc.        ,  RW2, 27038

M1F7C1AA-SAMP Constituent List:
  HEXCHROME   RDL:.1548       mg/kg      LCL:80      UCL:120      RPD:20
M1F7C1AL-MS Constituent List:

M1F7C1AN-MS:

M1H101AA-BLK:

M1H101AC-LCS:

M1F7C1AA-SAMP Calc Info:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1F7C1AL-MS Calc Info:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1F7C1AN-MS:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1H101AA-BLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
M1H101AC-LCS:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
```

# ANALYTICAL REPORT

Job Number: 280-44787-1

SDG Number: J01880

Job Description: SAF# RC-238

For:
Washington Closure Hanford
2620 Fermi Avenue
Richland, WA 99354

Attention: Joan H Kessner

Approved for release.
Kae E Yoder
Project Manager II
8/9/2013 8:48 AM

Kae E Yoder, Project Manager II
4955 Yarrow Street, Arvada, CO, 80002
(303)736-0190
kae.yoder@testamericainc.com
08/09/2013

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is E87667.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

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# CASE NARRATIVE

## Client: Washington Closure Hanford

## Project: WASHINGTON CLOSURE HANFORD

## Report Number: 280-44787-1

**SDG #: J01880**
**SAF#: RC-238**

**Date SDG Closed: July 25, 2013**
**Data Deliverable: 15 Day / Summary**

| CLIENT ID | LAB ID | ANALYSES REQUESTED | ANALYSES PERFORMED |
|---|---|---|---|
| J1RPY8 | 280-44787-1 | 6010/7471 | 6010B/7471A |
| J1RPY9 | 280-44787-2 | 6010/7471 | 6010B/7471A |

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed in this Case Narrative. 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 signature on the Report Cover.

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

The results, RLs and MDLs included in this report have been adjusted for dry weight, as appropriate.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

**RECEIPT**
The samples were received on 7/25/2013 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.5º C.

**TOTAL METALS - SW846 6010B/7471A**
Low levels of Barium are present in the method blank associated with batch 280-184703. Because the concentration in the method blank is not present at a level greater than half the reporting limit, corrective action is deemed unnecessary.

It can be noted that the sample amount was greater than four times the spike amount for Aluminum and Iron in the Matrix Spike performed on sample J1RPY8; therefore, control limits are not applicable.

No other anomalies were encountered.

**PERCENT MOISTURE**
The duplicate analysis of sample J1RPY8 exhibited RPD data outside the control limits, and the associated sample result has been flagged "M".

No other anomalies were encountered.

# DATA REPORTING QUALIFIERS

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

| Lab Section | Qualifier | Description |
|---|---|---|
| Metals | | |
| | U | Analyzed for but not detected. |
| | B | Estimated result. Result is less than the RL, but greater than MDL |
| | 4 | MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable. |
| General Chemistry | | |
| | M | Sample duplicate precision not met. |

# SAMPLE SUMMARY

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 280-44787-1 | J1RPY8 | Solid | 07/23/2013 1225 | 07/25/2013 0915 |
| 280-44787-2 | J1RPY9 | Solid | 07/23/2013 1235 | 07/25/2013 0915 |

# METHOD SUMMARY

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Solid** | | | |
| Metals (ICP) | TAL DEN | SW846 6010B | |
| Preparation, Metals | TAL DEN | | SW846 3050B |
| Mercury (CVAA) | TAL DEN | SW846 7471A | |
| Preparation, Mercury | TAL DEN | | SW846 7471A |
| ASTM D-2216 | TAL DEN | ASTM D-2216 | |

**Lab References:**

TAL DEN = TestAmerica Denver

**Method References:**

ASTM = ASTM International

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

## METHOD / ANALYST SUMMARY

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

| Method | Analyst | Analyst ID |
|---|---|---|
| SW846 6010B | Bowen, Heidi E | HEB |
| SW846 7471A | Mooney, Joseph C | JM |
| ASTM D-2216 | Benson, Alex F | AFB |

# SAMPLE RESULTS

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Client Sample ID:** **J1RPY8**

Lab Sample ID: 280-44787-1
Client Matrix: Solid
% Moisture: 1.2

Date Sampled: 07/23/2013 1225
Date Received: 07/25/2013 0915

**6010B Metals (ICP)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6010B | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Prep Method: | 3050B | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 1.13 g |
| Analysis Date: | 07/30/2013 1614 | | | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |

| Analyte | DryWt Corrected: Y | Result (mg/Kg) | Qualifier | MDL | RL |
|---|---|---|---|---|---|
| Aluminum | | 6560 | | 1.4 | 4.5 |
| Antimony | | 0.34 | U | 0.34 | 0.54 |
| Arsenic | | 2.8 | | 0.59 | 0.90 |
| Barium | | 46.5 | | 0.068 | 0.45 |
| Beryllium | | 0.030 | U | 0.030 | 0.18 |
| Boron | | 1.2 | B | 0.88 | 1.8 |
| Cadmium | | 0.17 | B | 0.037 | 0.18 |
| Calcium | | 3020 | | 12.6 | 44.8 |
| Chromium | | 13.5 | | 0.052 | 0.18 |
| Cobalt | | 4.2 | | 0.090 | 0.90 |
| Copper | | 6.9 | | 0.19 | 0.90 |
| Iron | | 12500 | | 3.4 | 4.5 |
| Lead | | 3.6 | | 0.24 | 0.45 |
| Magnesium | | 3940 | | 3.3 | 17.9 |
| Manganese | | 164 | | 0.090 | 0.90 |
| Molybdenum | | 0.23 | U | 0.23 | 1.8 |
| Nickel | | 12.7 | | 0.11 | 3.6 |
| Potassium | | 1130 | | 36.7 | 269 |
| Selenium | | 0.77 | U | 0.77 | 0.90 |
| Silicon | | 230 | | 5.1 | 9.0 |
| Silver | | 0.14 | U | 0.14 | 0.18 |
| Sodium | | 106 | B | 52.8 | 107 |
| Vanadium | | 24.3 | | 0.084 | 1.8 |
| Zinc | | 31.5 | | 0.36 | 0.90 |

**7471A Mercury (CVAA)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 7471A | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Prep Method: | 7471A | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | | | Initial Weight/Volume: | .57 g |
| Analysis Date: | 07/30/2013 1856 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |

| Analyte | DryWt Corrected: Y | Result (mg/Kg) | Qualifier | MDL | RL |
|---|---|---|---|---|---|
| Mercury | | 0.0059 | U | 0.0059 | 0.018 |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Client Sample ID:** **J1RPY9**

Lab Sample ID: 280-44787-2
Client Matrix: Solid
% Moisture: 2.9

Date Sampled: 07/23/2013 1235
Date Received: 07/25/2013 0915

**6010B Metals (ICP)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6010B | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Prep Method: | 3050B | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 1.10 g |
| Analysis Date: | 07/30/2013 1623 | | | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |

| Analyte | DryWt Corrected: Y | Result (mg/Kg) | Qualifier | MDL | RL |
|---|---|---|---|---|---|
| Aluminum | | 6660 | | 1.5 | 4.7 |
| Antimony | | 0.36 | U | 0.36 | 0.56 |
| Arsenic | | 3.7 | | 0.62 | 0.94 |
| Barium | | 51.3 | | 0.071 | 0.47 |
| Beryllium | | 0.031 | U | 0.031 | 0.19 |
| Boron | | 1.7 | B | 0.92 | 1.9 |
| Cadmium | | 0.32 | | 0.038 | 0.19 |
| Calcium | | 3720 | | 13.2 | 46.8 |
| Chromium | | 14.1 | | 0.054 | 0.19 |
| Cobalt | | 4.6 | | 0.094 | 0.94 |
| Copper | | 12.0 | | 0.20 | 0.94 |
| Iron | | 13500 | | 3.6 | 4.7 |
| Lead | | 15.2 | | 0.25 | 0.47 |
| Magnesium | | 4120 | | 3.5 | 18.7 |
| Manganese | | 193 | | 0.094 | 0.94 |
| Molybdenum | | 0.28 | B | 0.24 | 1.9 |
| Nickel | | 13.4 | | 0.12 | 3.7 |
| Potassium | | 1330 | | 38.4 | 281 |
| Selenium | | 0.80 | U | 0.80 | 0.94 |
| Silicon | | 309 | | 5.3 | 9.4 |
| Silver | | 0.15 | U | 0.15 | 0.19 |
| Sodium | | 135 | | 55.2 | 112 |
| Vanadium | | 26.8 | | 0.088 | 1.9 |
| Zinc | | 85.1 | | 0.37 | 0.94 |

**7471A Mercury (CVAA)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 7471A | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Prep Method: | 7471A | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | | | Initial Weight/Volume: | .59 g |
| Analysis Date: | 07/30/2013 1903 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |

| Analyte | DryWt Corrected: Y | Result (mg/Kg) | Qualifier | MDL | RL |
|---|---|---|---|---|---|
| Mercury | | 0.0058 | U | 0.0058 | 0.018 |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**General Chemistry**

**Client Sample ID:** **J1RPY8**

Lab Sample ID: 280-44787-1
Client Matrix: Solid

Date Sampled: 07/23/2013 1225
Date Received: 07/25/2013 0915

| Analyte | Result | Qual | Units | RL | RL | Dil | Method |
|---|---|---|---|---|---|---|---|
| Percent Moisture | 1.2 | M | % | 0.10 | 0.10 | 1.0 | D-2216 |

Analysis Batch: 280-184821 Analysis Date: 07/29/2013 1151 DryWt Corrected: N

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**General Chemistry**

**Client Sample ID:** **J1RPY9**

Lab Sample ID: 280-44787-2
Client Matrix: Solid

Date Sampled: 07/23/2013 1235
Date Received: 07/25/2013 0915

| Analyte | Result | Qual | Units | RL | RL | Dil | Method |
|---|---|---|---|---|---|---|---|
| Percent Moisture | 2.9 | | % | 0.10 | 0.10 | 1.0 | D-2216 |

Analysis Batch: 280-184821 Analysis Date: 07/29/2013 1151 DryWt Corrected: N

# QUALITY CONTROL RESULTS

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Method Blank - Batch: 280-184703**

**Method: 6010B**
**Preparation: 3050B**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-184703/1-A | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Client Matrix: | Solid | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 1 g |
| Analysis Date: | 07/30/2013 1610 | Units: | mg/Kg | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Aluminum | 1.6 | U | 1.6 | 5.0 |
| Antimony | 0.38 | U | 0.38 | 0.60 |
| Arsenic | 0.66 | U | 0.66 | 1.0 |
| Barium | 0.0880 | B | 0.076 | 0.50 |
| Beryllium | 0.033 | U | 0.033 | 0.20 |
| Boron | 0.98 | U | 0.98 | 2.0 |
| Cadmium | 0.041 | U | 0.041 | 0.20 |
| Calcium | 14.1 | U | 14.1 | 50.0 |
| Chromium | 0.058 | U | 0.058 | 0.20 |
| Cobalt | 0.10 | U | 0.10 | 1.0 |
| Copper | 0.22 | U | 0.22 | 1.0 |
| Iron | 3.8 | U | 3.8 | 5.0 |
| Lead | 0.27 | U | 0.27 | 0.50 |
| Magnesium | 3.7 | U | 3.7 | 20.0 |
| Manganese | 0.10 | U | 0.10 | 1.0 |
| Molybdenum | 0.26 | U | 0.26 | 2.0 |
| Nickel | 0.12 | U | 0.12 | 4.0 |
| Potassium | 41.0 | U | 41.0 | 300 |
| Selenium | 0.86 | U | 0.86 | 1.0 |
| Silicon | 5.7 | U | 5.7 | 10.0 |
| Silver | 0.16 | U | 0.16 | 0.20 |
| Sodium | 59.0 | U | 59.0 | 120 |
| Vanadium | 0.094 | U | 0.094 | 2.0 |
| Zinc | 0.40 | U | 0.40 | 1.0 |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Lab Control Sample - Batch: 280-184703**

**Method: 6010B**
**Preparation: 3050B**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-184703/2-A | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Client Matrix: | Solid | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 1 g |
| Analysis Date: | 07/30/2013 1612 | Units: | mg/Kg | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Aluminum | 200 | 193.2 | 97 | 82 - 116 | |
| Antimony | 50.0 | 47.80 | 96 | 82 - 110 | |
| Arsenic | 100 | 101.7 | 102 | 85 - 110 | |
| Barium | 200 | 202.7 | 101 | 87 - 112 | |
| Beryllium | 5.00 | 4.91 | 98 | 84 - 114 | |
| Boron | 100 | 99.09 | 99 | 80 - 120 | |
| Cadmium | 10.0 | 10.53 | 105 | 87 - 110 | |
| Calcium | 5000 | 5023 | 100 | 82 - 114 | |
| Chromium | 20.0 | 20.11 | 101 | 84 - 114 | |
| Cobalt | 50.0 | 49.74 | 99 | 87 - 110 | |
| Copper | 25.0 | 25.39 | 102 | 88 - 110 | |
| Iron | 100 | 102.8 | 103 | 87 - 120 | |
| Lead | 50.0 | 50.83 | 102 | 86 - 110 | |
| Magnesium | 5000 | 4957 | 99 | 90 - 110 | |
| Manganese | 50.0 | 49.77 | 100 | 88 - 110 | |
| Molybdenum | 100 | 99.58 | 100 | 86 - 110 | |
| Nickel | 50.0 | 49.85 | 100 | 87 - 110 | |
| Potassium | 5000 | 5073 | 101 | 89 - 110 | |
| Selenium | 200 | 198.0 | 99 | 83 - 110 | |
| Silicon | 1000 | 139.2 | 14 | 10 - 70 | |
| Silver | 5.00 | 4.98 | 100 | 87 - 114 | |
| Sodium | 5000 | 5068 | 101 | 90 - 112 | |
| Vanadium | 50.0 | 50.73 | 101 | 88 - 110 | |
| Zinc | 50.0 | 49.92 | 100 | 76 - 114 | |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Matrix Spike - Batch: 280-184703**

**Method: 6010B**
**Preparation: 3050B**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-44787-1 | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Client Matrix: | Solid | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 1.02 g |
| Analysis Date: | 07/30/2013 1621 | Units: | mg/Kg | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|---|---|
| Aluminum | 6560 | | 198 | 8571 | 1015 | 50 - 200 | 4 |
| Antimony | 0.34 | U | 49.6 | 28.62 | 58 | 20 - 200 | |
| Arsenic | 2.8 | | 99.2 | 97.22 | 95 | 76 - 111 | |
| Barium | 46.5 | | 198 | 245.0 | 100 | 52 - 159 | |
| Beryllium | 0.030 | U | 4.96 | 4.54 | 92 | 72 - 105 | |
| Boron | 1.2 | B | 99.2 | 91.30 | 91 | 80 - 120 | |
| Cadmium | 0.17 | B | 9.92 | 9.97 | 99 | 40 - 130 | |
| Calcium | 3020 | | 4960 | 8732 | 115 | 43 - 165 | |
| Chromium | 13.5 | | 19.8 | 34.61 | 106 | 70 - 200 | |
| Cobalt | 4.2 | | 49.6 | 49.99 | 92 | 72 - 106 | |
| Copper | 6.9 | | 24.8 | 31.05 | 97 | 37 - 187 | |
| Iron | 12500 | | 99.2 | 13130 | 614 | 70 - 200 | 4 |
| Lead | 3.6 | | 49.6 | 50.07 | 94 | 70 - 200 | |
| Magnesium | 3940 | | 4960 | 9031 | 103 | 64 - 145 | |
| Manganese | 164 | | 49.6 | 227.1 | 126 | 40 - 200 | |
| Molybdenum | 0.23 | U | 99.2 | 90.72 | 91 | 75 - 103 | |
| Nickel | 12.7 | | 49.6 | 59.00 | 93 | 61 - 126 | |
| Potassium | 1130 | | 4960 | 6234 | 103 | 56 - 172 | |
| Selenium | 0.77 | U | 198 | 181.4 | 91 | 76 - 104 | |
| Silicon | 230 | | 992 | 547.6 | 32 | 20 - 200 | |
| Silver | 0.14 | U | 4.96 | 4.70 | 95 | 75 - 141 | |
| Sodium | 106 | B | 4960 | 4976 | 98 | 78 - 111 | |
| Vanadium | 24.3 | | 49.6 | 76.83 | 106 | 50 - 169 | |
| Zinc | 31.5 | | 49.6 | 78.65 | 95 | 70 - 200 | |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Duplicate - Batch: 280-184703**

**Method: 6010B**
**Preparation: 3050B**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-44787-1 | Analysis Batch: | 280-185154 | Instrument ID: | MT_025 |
| Client Matrix: | Solid | Prep Batch: | 280-184703 | Lab File ID: | 25a073013.asc |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 1.05 g |
| Analysis Date: | 07/30/2013 1619 | Units: | mg/Kg | Final Weight/Volume: | 100 mL |
| Prep Date: | 07/30/2013 0730 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|---|
| Aluminum | 6560 | | 6597 | 0.6 | 40 | |
| Antimony | 0.34 | U | 0.37 | NC | 40 | U |
| Arsenic | 2.8 | | 2.69 | 5 | 30 | |
| Barium | 46.5 | | 47.20 | 2 | 30 | |
| Beryllium | 0.030 | U | 0.032 | NC | 30 | U |
| Boron | 1.2 | B | 1.08 | 10 | 30 | B |
| Cadmium | 0.17 | B | 0.166 | 3 | 30 | B |
| Calcium | 3020 | | 3207 | 6 | 30 | |
| Chromium | 13.5 | | 13.72 | 2 | 40 | |
| Cobalt | 4.2 | | 4.26 | 0.7 | 30 | |
| Copper | 6.9 | | 7.05 | 3 | 30 | |
| Iron | 12500 | | 12710 | 1 | 40 | |
| Lead | 3.6 | | 3.73 | 3 | 40 | |
| Magnesium | 3940 | | 3957 | 0.5 | 30 | |
| Manganese | 164 | | 166.3 | 1 | 40 | |
| Molybdenum | 0.23 | U | 0.25 | NC | 30 | U |
| Nickel | 12.7 | | 12.90 | 2 | 30 | |
| Potassium | 1130 | | 1143 | 0.7 | 40 | |
| Selenium | 0.77 | U | 0.83 | NC | 30 | U |
| Silicon | 230 | | 228.7 | 0.7 | 40 | |
| Silver | 0.14 | U | 0.15 | NC | 30 | U |
| Sodium | 106 | B | 99.95 | 6 | 30 | B |
| Vanadium | 24.3 | | 24.69 | 2 | 30 | |
| Zinc | 31.5 | | 31.74 | 0.9 | 40 | |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Method Blank - Batch: 280-184975**

**Method: 7471A**
**Preparation: 7471A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-184975/1-A | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Client Matrix: | Solid | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | .6 g |
| Analysis Date: | 07/30/2013 1851 | Units: | mg/Kg | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | MDL | RL |
|---|---|---|---|---|
| Mercury | 0.0055 | U | 0.0055 | 0.017 |

**Lab Control Sample - Batch: 280-184975**

**Method: 7471A**
**Preparation: 7471A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-184975/2-A | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Client Matrix: | Solid | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | .6 g |
| Analysis Date: | 07/30/2013 1853 | Units: | mg/Kg | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Mercury | 0.417 | 0.428 | 103 | 87 - 111 | |

**Matrix Spike - Batch: 280-184975**

**Method: 7471A**
**Preparation: 7471A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-44787-1 | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Client Matrix: | Solid | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | .67 g |
| Analysis Date: | 07/30/2013 1900 | Units: | mg/Kg | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|---|---|
| Mercury | 0.0059 | U | 0.378 | 0.387 | 102 | 87 - 111 | |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Duplicate - Batch: 280-184975**

**Method: 7471A**
**Preparation: 7471A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-44787-1 | Analysis Batch: | 280-185233 | Instrument ID: | MT_033 |
| Client Matrix: | Solid | Prep Batch: | 280-184975 | Lab File ID: | 130730aa.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | .66 g |
| Analysis Date: | 07/30/2013 1858 | Units: | mg/Kg | Final Weight/Volume: | 50 mL |
| Prep Date: | 07/30/2013 1310 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|---|
| Mercury | 0.0059 | U | 0.0051 | NC | 20 | U |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

**Duplicate - Batch: 280-184821**

**Method: D-2216**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-44787-1 | Analysis Batch: | 280-184821 | Instrument ID: | No Equipment |
| Client Matrix: | Solid | Prep Batch: | N/A | Lab File ID: | N/A |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 07/29/2013 1151 | Units: | % | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|
| Percent Moisture | 1.2 | 0.80 | 36 | 20 | M |

Client: Washington Closure Hanford

Job Number: 280-44787-1
Sdg Number: J01880

## QC Association Summary

| Lab Sample ID | Client Sample ID | Report Basis | Client Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| **Metals** | | | | | |
| **Prep Batch: 280-184703** | | | | | |
| LCS 280-184703/2-A | Lab Control Sample | T | Solid | 3050B | |
| MB 280-184703/1-A | Method Blank | T | Solid | 3050B | |
| 280-44787-1 | J1RPY8 | T | Solid | 3050B | |
| 280-44787-1DU | Duplicate | T | Solid | 3050B | |
| 280-44787-1MS | Matrix Spike | T | Solid | 3050B | |
| 280-44787-2 | J1RPY9 | T | Solid | 3050B | |
| **Prep Batch: 280-184975** | | | | | |
| LCS 280-184975/2-A | Lab Control Sample | T | Solid | 7471A | |
| MB 280-184975/1-A | Method Blank | T | Solid | 7471A | |
| 280-44787-1 | J1RPY8 | T | Solid | 7471A | |
| 280-44787-1DU | Duplicate | T | Solid | 7471A | |
| 280-44787-1MS | Matrix Spike | T | Solid | 7471A | |
| 280-44787-2 | J1RPY9 | T | Solid | 7471A | |
| **Analysis Batch:280-185154** | | | | | |
| LCS 280-184703/2-A | Lab Control Sample | T | Solid | 6010B | 280-184703 |
| MB 280-184703/1-A | Method Blank | T | Solid | 6010B | 280-184703 |
| 280-44787-1 | J1RPY8 | T | Solid | 6010B | 280-184703 |
| 280-44787-1DU | Duplicate | T | Solid | 6010B | 280-184703 |
| 280-44787-1MS | Matrix Spike | T | Solid | 6010B | 280-184703 |
| 280-44787-2 | J1RPY9 | T | Solid | 6010B | 280-184703 |
| **Analysis Batch:280-185233** | | | | | |
| LCS 280-184975/2-A | Lab Control Sample | T | Solid | 7471A | 280-184975 |
| MB 280-184975/1-A | Method Blank | T | Solid | 7471A | 280-184975 |
| 280-44787-1 | J1RPY8 | T | Solid | 7471A | 280-184975 |
| 280-44787-1DU | Duplicate | T | Solid | 7471A | 280-184975 |
| 280-44787-1MS | Matrix Spike | T | Solid | 7471A | 280-184975 |
| 280-44787-2 | J1RPY9 | T | Solid | 7471A | 280-184975 |

**Report Basis**
T = Total

**General Chemistry**

| | | | | | |
|---|---|---|---|---|---|
| **Analysis Batch:280-184821** | | | | | |
| 280-44787-1 | J1RPY8 | T | Solid | D-2216 | |
| 280-44787-1DU | Duplicate | T | Solid | D-2216 | |
| 280-44787-2 | J1RPY9 | T | Solid | D-2216 | |

**Report Basis**
T = Total