# SAF-RC-207
# Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites – In-Process
# FINAL DATA PACKAGE

**COMPLETE COPY OF DATA PACKAGE TO:**

Kathy Wendt H4-21 KW 12/3/12
INITIAL/DATE

**COMMENTS:**

**SDG J01628 SAF-RC-207**

Rad only ☑ Chem only Rad & Chem

☑ Complete Partial

**Sample Location: 100-C-7:1 (ACL)**

Analytical Data Package Prepared For

# Washington Closure Hanford

Radiochemical Analysis By

## TestAmerica

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

Assigned Laboratory Code: TARL

*Data Package Contains* 23 *Pages*

Report No.: 53878

**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. |
|---|---|---|---|---|---|---|
| J01628 | RC-207 | J1R5T4 | J2K290425-1 | MXFXT1AC | 9MXFXT10 | 2334046 |
| | | J1R5T5 | J2K290425-2 | MXFXV1AC | 9MXFXV10 | 2334046 |
| | | J1R5T6 | J2K290425-3 | MXFXW1AC | 9MXFXW10 | 2334046 |
| | | J1R5T7 | J2K290425-4 | MXFXX1AC | 9MXFXX10 | 2334046 |

TestAmerica
rptSTLRchTitle v3.73

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

**Certificate of Analysis**

TestAmerica Laboratories, Inc.

Washington Closure Hanford
2620 Fermi Avenue
Richland, WA 99354

November 30, 2012

Attention: Joan Kessner

| | | |
|---|---|---|
| SAF Number | : | RC-207 |
| Date SDG Closed | : | November 30, 2012 |
| Number of Samples | : | Four (4) |
| Sample Type | : | Soil |
| SDG Number | : | J01628 |
| Data Deliverable | : | Quick Turn Metals / Summary |

## CASE NARRATIVE

### I. Introduction

On November 29, 2012, four soil samples were received at TestAmerica for analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Washington Closure Hanford (WCH) specific ID;

| WCH ID# | TARL ID# | MATRIX | DATE OF RECEIPT |
|---|---|---|---|
| J1R5T4 | MXFXT | SOIL | 11/29/12 |
| J1R5T5 | MXFXV | SOIL | 11/29/12 |
| J1R5T6 | MXFXW | SOIL | 11/29/12 |
| J1R5T7 | MXFXX | SOIL | 11/29/12 |

### 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:

**ICP Metals**
ICP Metals by method SW-846 6010A
**Chemical Analysis**
Hexavalent Chromium by EPA method 7196A

### IV. Quality Control

SDG J01628 includes a minimum of one Laboratory Control Samples (LCS), one method (reagent)

blank, a duplicate sample, matrix spike sample and a matrix spike duplicate sample. Any exceptions have been noted in the "Comments" section.

Blanks and LCS are reported in mg/L units, other QC and sample results are reported in the same units.

## V. Comments

**ICP Metals**

ICP Metals by method SW-846 6010A

One batch was analyzed for the samples with the standard metal request list.

Batch 2334039:

The LCS, batch blank, samples, sample duplicate, MS, MSD, ICB, ICV, CCB and CCV results are within contractual limits.

**Chemical Analysis**

Hexavalent Chromium by EPA method 7196A

One batch was analyzed.

Batch 2334046:

The LCS, batch blank, samples, sample duplicate (J1R5T4) and sample matrix spike (J1R5T4) results are within contractual requirements.

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

**Date:** 30-Nov-12

## TestAmerica TARL

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

**Report No. :** 53878

**SDG No:** J01628

| Batch | Client Id Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | MDL | CRDL | RPD |
|---|---|---|---|---|---|---|---|---|---|
| 2334046 | 7196_CR6 | | | | | | | | |
| **J1R5T4** | | | | | | | | | |
| | MXFXT1AC | HEXCHROME | 6.53E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |
| | MXFXT1CF | HEXCHROME | 5.00E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 3.50E-01 | 26.5 |
| **J1R5T5** | | | | | | | | | |
| | MXFXV1AC | HEXCHROME | 8.95E-01 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |
| **J1R5T6** | | | | | | | | | |
| | MXFXW1AC | HEXCHROME | 1.62E+00 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |
| **J1R5T7** | | | | | | | | | |
| | MXFXX1AC | HEXCHROME | 2.19E+00 +- 0.0E+00 | | mg/kg | N/A | 1.55E-01 | 1.55E-01 | |

**No. of Results:** 5

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

**rptSTLRchSaSum mary2 V5.2.22 A2002**

# QC Results Summary

**Date:** 30-Nov-12

## TestAmerica TARL

Ordered by Method, Batch No, QC Type,.

**Report No. :** 53878

**SDG No.:** J01628

| Batch Work Order | Parameter | Result +- Uncertainty ( 2s) | Qual | Units | Tracer Yield | LCS Recovery | Bias | MDL |
|---|---|---|---|---|---|---|---|---|
| 7196_CR6 | | | | | | | | |
| 2334046 MATRIX SPIKE, J1R5T4 | | | | | | | | |
| MXFXT1CE | HEXCHROME | 2.73E+01 +- 0.0E+00 | | mg/kg | N/A | 91% | -0.1 | 1.55E-01 |
| 2334046 LCS, | | | | | | | | |
| MXF2R1AC | HEXCHROME | 1.82E+01 +- 0.0E+00 | | mg/kg | N/A | 96% | 0.0 | 1.55E-01 |
| 2334046 BLANK QC, | | | | | | | | |
| MXF2R1AA | HEXCHROME | 1.55E-01 +- 0.0E+00 | U | mg/kg | N/A | | | 1.55E-01 |

**No. of Results:** 3

TestAmerica
rptSTLRchQcSummary V5.2.22
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:** 30-Nov-12

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica | **SDG:** | J01628 | **Collection Date:** | 11/29/2012 9:15:00 AM |
| **Lot-Sample No.:** | J2K290425-1 | **Report No. :** | 53878 | **Received Date:** | 11/29/2012 11:30:00 AM |
| **Client Sample ID:** | J1R5T4 | **COC No. :** | RC-207-110 | **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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXFXT1AC | | **Report DB ID:** | 9MXFXT10 | | | | |
| HEXCHROME | **6.53E-01** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(4.2)* | 11/29/12 03:00 p | | 2.4936 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

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

TestAmerica
rptSTLRchSample
V5.2.22 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:** 30-Nov-12

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica | **SDG:** | J01628 | **Collection Date:** | 11/29/2012 9:20:00 AM |
| **Lot-Sample No.:** | J2K290425-2 | **Report No. :** | 53878 | **Received Date:** | 11/29/2012 11:30:00 AM |
| **Client Sample ID:** | J1R5T5 | **COC No. :** | RC-207-110 | **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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXFXV1AC | | **Report DB ID:** | 9MXFXV10 | | | | |
| HEXCHROME | **8.95E-01** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(5.8)* | 11/29/12 03:00 p | | 2.5109 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

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





**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: 30-Nov-12

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | **TestAmerica** | **SDG:** | J01628 | **Collection Date:** | 11/29/2012 9:25:00 AM |
| **Lot-Sample No.:** | **J2K290425-3** | **Report No. :** | 53878 | **Received Date:** | 11/29/2012 11:30:00 AM |
| **Client Sample ID:** | **J1R5T6** | **COC No. :** | RC-207-110 | **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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXFXW1AC | | **Report DB ID:** | 9MXFXW10 | | | | |
| HEXCHROME | **1.62E+00** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(10.4)* | 11/29/12 03:00 p | | 2.4907 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

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

**TestAmerica**
**rptSTLRchSample**
**V5.2.22 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:** 30-Nov-12

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica | **SDG:** | J01628 | **Collection Date:** | 11/29/2012 9:30:00 AM |
| **Lot-Sample No.:** | J2K290425-4 | **Report No. :** | 53878 | **Received Date:** | 11/29/2012 11:30:00 AM |
| **Client Sample ID:** | J1R5T7 | **COC No. :** | RC-207-110 | **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:** 2334046 | 7196_CR6 | | | **Work Order:** MXFXX1AC | | | **Report DB ID:** 9MXFXX10 | | | | | |
| HEXCHROME | **2.19E+00** | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | *(14.1)* | 11/29/12 03:00 p | | 2.4996 | |
| | | | | | | | 1.55E-01 | *N/A* | | | g | |

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

TestAmerica
rptSTLRchSample
V5.2.22 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: 30-Nov-12

## DUPLICATE RESULTS

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | **TestAmerica** | **SDG:** | J01628 | **Collection Date:** | 11/29/2012 9:15:00 AM |
| **Lot-Sample No.:** | **J2K290425-1** | **Report No. :** | 53878 | **Received Date:** | 11/29/2012 11:30:00 AM |
| **Client Sample ID:** | **J1R5T4** | **COC No. :** | RC-207-110 | **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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXFXT1CF | | **Report DB ID:** | MXFXT1ER | **Orig Sa DB ID:** | 9MXFXT10 | | |
| HEXCHROME | 5.00E-01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | (3.2) | 11/29/12 03:00 p | | 2.5577 | |
| | 6.53E-01 | | **RPD** | **26.5** | | 3.50E-01 | | N/A | | | g | |

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

**TestAmerica**
**rptSTLRchDupV5.2.22 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.

# FORM II

## BLANK RESULTS

**Date:** 30-Nov-12

**Lab Name:** TestAmerica

**Matrix:** SOIL

**SDG:** J01628

**Report No. :** 53878

| 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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXF2R1AA | **Report DB ID:** | MXF2R1AB | | | | | |
| HEXCHROME | 1.55E-01 | U | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 1. | 11/29/12 03:00 p | | 2.5 | |
| | | | | | | 1.55E-01 | | N/A | | | g | |

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

TestAmerica
rptSTLRchBlank
V5.2.22 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:** 30-Nov-12

**Lab Name:** TestAmerica

**Matrix:** SOIL

**SDG:** J01628

**Report No. :** 53878

| 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:** 2334046 | 7196_CR6 | | | **Work Order:** | MXF2R1AC | | **Report DB ID:** | MXF2R1AS | | | | | |
| HEXCHROME | 1.82E+01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 1.90E+01 | | 96% | 11/29/12 03:00 p | 2.5 | |
| | | | | | | | **Rec Limits:** | 80 | 120 | 0.0 | | g | |

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

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

rptSTLRchLcs
V5.2.22 A2002

# FORM II

## MATRIX SPIKE RESULTS

Date: 30-Nov-12

**Lab Name:** TestAmerica **SDG:** J01628

**Lot-Sample No.:** J2K290425-1, J1R5T4 **Report No. :** 53878 **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: 2334046 | Work Order: | MXFXT1CE | | Report DB ID: | MXFXT1CW | | Orig Sa DB ID: | 9MXFXT10 | | | | |
| HEXCHROME | 2.73E+01 | | | 0.0E+00 | 1.55E-01 | mg/kg | N/A | 90.54% | 3.02E+01 | 11/29/12 03:00 p | 2.5506 | 7196_CR6 |
| | 6.53E-01 | | | | | | | | | | g | |

**Number of Results:** 1

**Comments:**

TestAmerica
rptSTLRchMs
V5.2.22 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.

SDG: J01628
SAF: RC-207
BATCH: 2334039
MATRIX: SOIL
ANALYSIS DATE: 11/29/12

| Client_id | Matrix | Result_t | Cas_nbr | Parameter | Result | Qualifier | Units | Reporting_Limits_: | Reporting_Limits | Uncertainty_1s | Analyzed_ | Analyz | Decision_level_lc | LCSRecc | Adde | Analysis_date_time | Batch_nbr | Test_Me | Lab_sample_id |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1R5T4 | SOIL | CS | 7440-22-4 | Ag | 2.78E-01 | U | UG/G | 1.00E+01 | 1.00E+01 | 9.80E-02 | 0.2501 | G | 8.07E-02 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7440-38-2 | As | 1.91E+00 | U | UG/G | 1.00E+01 | 1.00E+01 | 7.70E-02 | 0.2501 | G | 6.35E-02 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7440-39-3 | Ba | 5.66E+01 | | UG/G | 2.00E+00 | 2.00E+00 | 1.70E-01 | 0.2501 | G | 1.40E-01 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7440-41-7 | Beryllium | 2.07E-01 | | UG/G | 1.00E-01 | 1.00E-01 | 1.20E-02 | 0.2501 | G | 1.03E-02 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7440-43-9 | Cadmium | 1.31E-01 | U | UG/G | 2.00E+00 | 2.00E+00 | 3.90E-02 | 0.2501 | G | 3.17E-02 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7440-47-3 | Chromium | 3.58E+00 | U | UG/G | 1.00E+01 | 1.00E+01 | 2.80E-01 | 0.2501 | G | 2.32E-01 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7439-92-1 | Lead | 2.74E+00 | U | UG/G | 1.00E+01 | 1.00E+01 | 4.40E-01 | 0.2501 | G | 3.64E-01 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | CS | 7782-49-2 | Se | 4.27E-01 | U | UG/G | 1.00E+01 | 1.00E+01 | 9.60E-01 | 0.2501 | G | 7.94E-01 | | | 11/29/2012 18:16 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T5 | SOIL | CS | 7440-22-4 | Ag | 3.83E-01 | U | UG/G | 9.93E+00 | 9.93E+00 | 8.10E-02 | 0.2518 | G | 6.67E-02 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7440-38-2 | As | 5.49E-01 | U | UG/G | 9.93E+00 | 9.93E+00 | 3.50E-01 | 0.2518 | G | 2.85E-01 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7440-39-3 | Ba | 2.99E+01 | | UG/G | 1.99E+00 | 1.99E+00 | 4.00E-01 | 0.2518 | G | 3.25E-01 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7440-41-7 | Beryllium | 2.50E-01 | | UG/G | 9.93E-02 | 9.93E-02 | 2.10E-02 | 0.2518 | G | 1.73E-02 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7440-43-9 | Cadmium | 9.18E-02 | U | UG/G | 1.99E+00 | 1.99E+00 | 4.70E-02 | 0.2518 | G | 3.90E-02 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7440-47-3 | Chromium | 1.21E+01 | | UG/G | 9.93E+00 | 9.93E+00 | 7.60E-02 | 0.2518 | G | 6.24E-02 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7439-92-1 | Lead | 2.24E+00 | U | UG/G | 9.93E+00 | 9.93E+00 | 3.20E-01 | 0.2518 | G | 2.64E-01 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T5 | SOIL | CS | 7782-49-2 | Se | 4.11E-01 | U | UG/G | 9.93E+00 | 9.93E+00 | 3.60E-01 | 0.2518 | G | 2.98E-01 | | | 11/29/2012 18:38 | 2334039 | 46DQ | MXFXV1AA |
| J1R5T6 | SOIL | CS | 7440-22-4 | Ag | 3.12E-01 | U | UG/G | 1.01E+01 | 1.01E+01 | 1.40E-01 | 0.2478 | G | 1.17E-01 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7440-38-2 | As | 3.84E-01 | U | UG/G | 1.01E+01 | 1.01E+01 | 8.30E-01 | 0.2478 | G | 6.86E-01 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7440-39-3 | Ba | 4.36E+01 | | UG/G | 2.02E+00 | 2.02E+00 | 3.80E-01 | 0.2478 | G | 3.16E-01 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7440-41-7 | Beryllium | 2.27E-01 | | UG/G | 1.01E-01 | 1.01E-01 | 6.20E-03 | 0.2478 | G | 5.09E-03 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7440-43-9 | Cadmium | 1.05E-01 | U | UG/G | 2.02E+00 | 2.02E+00 | 1.90E-02 | 0.2478 | G | 1.52E-02 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7440-47-3 | Chromium | 4.10E+00 | U | UG/G | 1.01E+01 | 1.01E+01 | 3.30E-02 | 0.2478 | G | 2.67E-02 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7439-92-1 | Lead | 2.35E+00 | U | UG/G | 1.01E+01 | 1.01E+01 | 2.40E-02 | 0.2478 | G | 2.00E-02 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T6 | SOIL | CS | 7782-49-2 | Se | 1.49E-01 | U | UG/G | 1.01E+01 | 1.01E+01 | 5.50E-01 | 0.2478 | G | 4.49E-01 | | | 11/29/2012 18:43 | 2334039 | 46DQ | MXFXW1AA |
| J1R5T7 | SOIL | CS | 7440-22-4 | Ag | 3.79E-01 | U | UG/G | 9.96E+00 | 9.96E+00 | 1.50E-01 | 0.251 | G | 1.27E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7440-38-2 | As | 1.33E+00 | U | UG/G | 9.96E+00 | 9.96E+00 | 2.30E-01 | 0.251 | G | 1.92E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7440-39-3 | Ba | 5.28E+01 | | UG/G | 1.99E+00 | 1.99E+00 | 5.60E-01 | 0.251 | G | 4.60E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7440-41-7 | Beryllium | 2.92E-01 | | UG/G | 9.96E-02 | 9.96E-02 | 2.60E-03 | 0.251 | G | 2.15E-03 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7440-43-9 | Cadmium | 9.39E-02 | U | UG/G | 1.99E+00 | 1.99E+00 | 5.50E-02 | 0.251 | G | 4.48E-02 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7440-47-3 | Chromium | 1.08E+01 | | UG/G | 9.96E+00 | 9.96E+00 | 2.40E-01 | 0.251 | G | 1.96E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7439-92-1 | Lead | 3.99E+00 | U | UG/G | 9.96E+00 | 9.96E+00 | 4.50E-01 | 0.251 | G | 3.71E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| J1R5T7 | SOIL | CS | 7782-49-2 | Se | 9.65E-02 | U | UG/G | 9.96E+00 | 9.96E+00 | 1.40E-01 | 0.251 | G | 1.13E-01 | | | 11/29/2012 18:49 | 2334039 | 46DQ | MXFXX1AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-22-4 | Ag | 1.51E-03 | U | MG/L | 5.00E-02 | 5.00E-02 | 9.30E-04 | 0.2512 | L | 7.61E-04 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-38-2 | As | -6.66E-04 | U | MG/L | 5.00E-02 | 5.00E-02 | 1.50E-03 | 0.2512 | L | 1.24E-03 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-39-3 | Ba | 4.22E-05 | U | MG/L | 1.00E-02 | 1.00E-02 | 4.90E-05 | 0.2512 | L | 4.01E-05 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-41-7 | Beryllium | 4.63E-05 | U | MG/L | 5.00E-04 | 5.00E-04 | 6.00E-05 | 0.2512 | L | 4.94E-05 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-43-9 | Cadmium | 3.78E-04 | U | MG/L | 1.00E-02 | 1.00E-02 | 3.00E-05 | 0.2512 | L | 2.44E-05 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7440-47-3 | Chromium | 9.95E-05 | U | MG/L | 5.00E-02 | 5.00E-02 | 3.40E-04 | 0.2512 | L | 2.76E-04 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7439-92-1 | Lead | 5.32E-04 | U | MG/L | 5.00E-02 | 5.00E-02 | 1.10E-03 | 0.2512 | L | 8.69E-04 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB BLANK | SOIL | BLK | 7782-49-2 | Se | 3.67E-03 | U | MG/L | 5.00E-02 | 5.00E-02 | 1.40E-03 | 0.2512 | L | 1.16E-03 | | | 11/29/2012 18:02 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-22-4 | Ag | 9.40E-01 | | MG/L | 5.00E-02 | 5.00E-02 | 1.10E-02 | 0.2475 | L | 9.25E-03 | 0.94 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-38-2 | As | 9.34E-01 | | MG/L | 5.00E-02 | 5.00E-02 | 7.00E-03 | 0.2475 | L | 5.76E-03 | 0.93 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-39-3 | Ba | 9.84E-01 | | MG/L | 1.00E-02 | 1.00E-02 | 9.30E-03 | 0.2475 | L | 7.67E-03 | 0.98 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-41-7 | Beryllium | 9.16E-01 | | MG/L | 5.00E-04 | 5.00E-04 | 2.30E-02 | 0.2475 | L | 1.86E-02 | 0.92 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-43-9 | Cadmium | 9.68E-01 | | MG/L | 1.00E-02 | 1.00E-02 | 5.60E-03 | 0.2475 | L | 4.60E-03 | 0.97 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7440-47-3 | Chromium | 9.74E-01 | | MG/L | 5.00E-02 | 5.00E-02 | 3.30E-02 | 0.2475 | L | 2.69E-02 | 0.97 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7439-92-1 | Lead | 9.62E-01 | | MG/L | 5.00E-02 | 5.00E-02 | 8.90E-03 | 0.2475 | L | 7.31E-03 | 0.96 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| INTRA-LAB CHECK | SOIL | LCS | 7782-49-2 | Se | 8.60E-01 | | MG/L | 5.00E-02 | 5.00E-02 | 3.80E-03 | 0.2475 | L | 3.14E-03 | 0.86 | 1 | 11/29/2012 18:05 | 2334039 | 46DQ | MXF081AA |
| J1R5T4 DUP | SOIL | DUP | 7440-22-4 | Ag | 2.15E-01 | U | UG/G | 9.95E+00 | 9.95E+00 | 1.00E-01 | 0.2512 | G | 8.54E-02 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7440-38-2 | As | 8.49E-01 | U | UG/G | 9.95E+00 | 9.95E+00 | 6.10E-01 | 0.2512 | G | 5.00E-01 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7440-39-3 | Ba | 4.43E+01 | | UG/G | 1.99E+00 | 1.99E+00 | 3.70E-01 | 0.2512 | G | 3.05E-01 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7440-41-7 | Beryllium | 2.24E-01 | | UG/G | 9.95E-02 | 9.95E-02 | 1.10E-02 | 0.2512 | G | 8.77E-03 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7440-43-9 | Cadmium | 1.02E-01 | U | UG/G | 1.99E+00 | 1.99E+00 | 2.10E-02 | 0.2512 | G | 1.69E-02 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7440-47-3 | Chromium | 5.23E+00 | U | UG/G | 9.95E+00 | 9.95E+00 | 8.10E-02 | 0.2512 | G | 6.63E-02 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7439-92-1 | Lead | 2.92E+00 | U | UG/G | 9.95E+00 | 9.95E+00 | 5.00E-01 | 0.2512 | G | 4.10E-01 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 DUP | SOIL | DUP | 7782-49-2 | Se | 3.85E-01 | U | UG/G | 9.95E+00 | 9.95E+00 | 4.00E-01 | 0.2512 | G | 3.25E-01 | | | 11/29/2012 18:33 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-22-4 | Ag | 1.81E+02 | | % REC | 9.99E+00 | 9.99E+00 | 1.60E+00 | 0.2502 | L | 1.31E+00 | 0.91 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-38-2 | As | 1.83E+02 | | % REC | 9.99E+00 | 9.99E+00 | 9.90E-01 | 0.2502 | L | 8.14E-01 | 0.92 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-39-3 | Ba | 1.78E+02 | | % REC | 2.00E+00 | 2.00E+00 | 3.10E+00 | 0.2502 | L | 2.52E+00 | 0.89 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-41-7 | Beryllium | 1.81E+02 | | % REC | 9.99E-02 | 9.99E-02 | 8.80E-01 | 0.2502 | L | 7.28E-01 | 0.9 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-43-9 | Cadmium | 1.89E+02 | | % REC | 2.00E+00 | 2.00E+00 | 5.90E-01 | 0.2502 | L | 4.86E-01 | 0.95 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7440-47-3 | Chromium | 1.90E+02 | | % REC | 9.99E+00 | 9.99E+00 | 1.10E+00 | 0.2502 | L | 8.98E-01 | 0.95 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7439-92-1 | Lead | 1.79E+02 | | % REC | 9.99E+00 | 9.99E+00 | 1.80E+00 | 0.2502 | L | 1.50E+00 | 0.89 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MS | 7782-49-2 | Se | 1.70E+02 | | % REC | 9.99E+00 | 9.99E+00 | 1.40E+00 | 0.2502 | L | 1.14E+00 | 0.85 | 200 | 11/29/2012 18:21 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7440-22-4 | Ag | 1.78E+02 | | % REC | 1.00E+01 | 1.00E+01 | 1.30E+00 | 0.25 | L | 1.06E+00 | 0.89 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7440-38-2 | As | 1.79E+02 | | % REC | 1.00E+01 | 1.00E+01 | 1.60E+00 | 0.25 | L | 1.32E+00 | 0.9 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7440-39-3 | Ba | 1.76E+02 | | % REC | 2.00E+00 | 2.00E+00 | 7.00E+00 | 0.25 | L | 5.77E+00 | 0.88 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7440-41-7 | Beryllium | 1.78E+02 | | % REC | 1.00E-01 | 1.00E-01 | 2.10E+00 | 0.25 | L | 1.70E+00 | 0.89 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |

| Client_id | Matrix | Result_t | Cas_nbr | Parameter | Result | Qualifier | Units | Reporting_Limits_: | Reporting_Limits | Uncertainty_1s | Analyzed_ | Analyz | Decision_level_lc | LCSRec | Adde | Analysis_date_time | Batch_nbr | Test_Me | Lab_sample_id |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1R5T4 | SOIL | MSD | 7440-43-9 | Cadmium | 1.85E+02 | | % REC | 2.00E+00 | 2.00E+00 | 4.30E-01 | 0.25 | L | 3.50E-01 | 0.93 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7440-47-3 | Chromium | 1.84E+02 | | % REC | 1.00E+01 | 1.00E+01 | 2.50E+00 | 0.25 | L | 2.03E+00 | 0.92 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7439-92-1 | Lead | 1.76E+02 | | % REC | 1.00E+01 | 1.00E+01 | 8.90E-01 | 0.25 | L | 7.35E-01 | 0.88 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |
| J1R5T4 | SOIL | MSD | 7782-49-2 | Se | 1.65E+02 | | % REC | 1.00E+01 | 1.00E+01 | 1.10E+00 | 0.25 | L | 8.68E-01 | 0.82 | 200 | 11/29/2012 18:27 | 2334039 | 46DQ | MXFXT1A0 |

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Richland Laboratory
# Data Review Check List
# Hexavalent Chromium

| Batch Number(s): | 2334046 | Lab Sample Numbers or SDG: | J01628 |
|---|---|---|---|

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? | ✓ | | | X |
| 2. Correlation coefficient greater than 0.97? | ✓ | | | X |
| 3. Initial calibration verification (ICV) analyzed immediately after calibration and results within 10% of expected? | ✓ | | | X |
| 4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit? | ✓ | | | X |
| **B. Continuing Calibration**<br>1. CCV analyzed at required frequency and all parameters within 10% of expected? | ✓ | | | X |
| 2. CCB analyzed at required frequency and all results ≤ reporting limit? | ✓ | | | X |
| **C. Sample Analysis**<br>1. Were any samples with concentrations above the linear range diluted and reanalyzed? | | | ✓ | X |
| 2. Were all sample holding times met? | ✓ | | | X |
| **D. QC Samples**<br>1. All results for the preparation blank below limits? | ✓ | | | X |
| 2. LCS percent recovery within 85-115% | ✓ | | | X |
| 3. $PbCrO_4$ percent recovery within 75-125%? | ✓ | | | X |
| 4. Sample and Duplicate within 20% (aqueous) or 35% (solid) RPD? | ✓ | | | X |
| 5. MS or MS/MSD recoveries within 85-115% (aqueous) or 75-125% (solid)? | ✓ | | | X |
| 6. On MS failure, PDMS within 85-115%? | | | ✓ | X |
| **E. Other**<br>1. Are all nonconformances included and noted? | | | ✓ | X |
| 2. Is the correct date and time of analysis shown? | ✓ | | | X |
| 3. Did the analyst sign and date the front page of the analytical run? | ✓ | | | X |
| 4. Correct methodology used? | ✓ | | | X |
| 5. Transcriptions checked? | ✓ | | | X |
| 6. Calculations checked at minimum frequency? | ✓ | | | X |
| 7. Units checked? | ✓ | | | X |

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

Analyst [signature] Date 11/29/12 2nd Review [signature] Date 11/30/12

CG-231 Rev 1, 5/12

| Washington Closure Hanford | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | RC-207-110 | Page 1 of ~~1~~ 2 11-29-12 CMB |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Collector** R. Brackett | **Company Contact** Joan Kessner | **Telephone No.** 509-375-4688 | **Project Coordinator** KESSNER, JH |
| **Project Designation** Remedial Action of the 100-C-7 & 100-C-7:1 Waste Sites - I | **Sampling Location** 100-C-7:1(ACL) | | **SAF No.** RC-207 |
| **Ice Chest No.** N/A | **Field Logbook No.** EL-1655-~~06~~ 07 11/29/12 | **COA** R00C712600 | **Method of Shipment** Hand deliver |
| **Shipped To** TestAmerica Incorporated, Richland | **Offsite Property No.** N/A | | **Bill of Lading/Air Bill No.** N/A |

RB ~~Price Code~~ ~~8L~~ 11-29-12 **Data Turnaround** ~~21 Days~~ QUICK TURN

**POSSIBLE SAMPLE HAZARDS/REMARKS**
*None*

**Special Handling and/or Storage**
*Cool 4 degrees centigrade*

~~S2K290423~~ 11-29-12

J01628
Due 11-30-12
J2K290425

SA J2K290425

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Preservation** | Cool 4C | None | Cool 4C | | | | | | | | | |
| **Type of Container** | G/P | G/P | G/P | | | | | | | | | |
| **No. of Container(s)** | 1 | 1 | 1 | | | | | | | | | |
| **Volume** | 125mL | 125mL | 125mL | | | | | | | | | |
| | See item (1) in Special Instructions. | See item (2) in Special Instructions. | Chromium Hex - 7196 - Quick Turn | | | | | | | | | |

| Sample No. | Matrix * | Sample Date | Sample Time | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J1R5T4 mXFXT | SOIL | 11-29-12 | 0915 | X | X | X | | | | | | | |
| J1R5T5 mXFXV | SOIL | 11-29-12 | 0920 | X | X | X | | | | | | | |
| J1R5T6 mXFXW | SOIL | 11-29-12 | 0925 | X | X | X | | | | | | | |
| J1R5T7 mXFXX | SOIL | 11-29-12 | 0930 | X | X | X | | | | | | | |
| J1R5T8 RB 11-29-12 | SOIL | | | | | | | | | | | | |

| CHAIN OF POSSESSION | Sign/Print Names | | |
|---|---|---|---|
| Relinquished By/Removed From | Date/Time 0940 11-29-12 | Received By/Stored In | Date/Time 0940 11-29-12 |
| Relinquished By/Removed From | Date/Time 1045 11-29-12 | Received By/Stored In | Date/Time 1045 |
| Relinquished By/Removed From | Date/Time 11-29-12 1130 | Received By/Stored In | Date/Time 1130 11-29-12 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time |

**SPECIAL INSTRUCTIONS**

(1) Metals by ICP - 6010 - Quick Turn {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}; Metals by ICP - 6010 - Quick Turn (Add On) {Beryllium}
~~(2) QTL TCLP ICP Metals - 1311/6010 {Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver}~~ 11-29-12 CMB

REVIEWED BY AJ
DATE 11-29-12

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

| | | | |
|---|---|---|---|
| **LABORATORY SECTION** | Received By | Title | Date/Time |
| **FINAL SAMPLE DISPOSITION** | Disposal Method | Disposed By | Date/Time |

WCH-EE-011

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Sample Check-in List

Date/Time Received: 11-29-12 / 1130 Container GM Screen Result: (Airlock) .04 Initials [ ]
Sample GM Screen Result (Sample Receiving) .06 Initials [ ]

Client: WCH SDG #: 501628 NA [ ] SAF #: RC-207 NA [ ]

Lot Number: J2K290425

Chain of Custody # RC-207-110

Shipping Container ID: hand delivered NA [ ] Air Bill Number: 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: 4.3 °C Ice Packs 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): 4
7. Containers received: 8x 125 mlp

8. Sample holding times exceeded? NA [ ] Yes [ ] No [ ]
9. Samples have:
   - ___ tape
   - ___ custody seals
   - ___ hazard labels
   - ___ appropriate sample labels
10. Matrix:
    - ___ A (FLT, Wipe, Solid, Soil)
    - ___ S (Air, Niosh 7400)
    - ___ I (Water)
    - ___ T (Biological, Ni-63)
11. Samples:
    - ___ are in good condition
    - ___ are broken
    - ___ are leaking
    - ___ 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, then document sample ID, initial pH, amount of $HNO_3$ added and pH after addition on table overleaf)

    RPL ID # of preservative used :
13. Were any anomalies identified in sample receipt? Yes [ ] No [ ]
14. Description of anomalies (include sample numbers): NA [ ]

LS-023, Rev. 15, 07/11 See over for additional information.

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15. Sample Location, Sample Collector Listed on COC? * Yes [X] No [ ]
*For documentation only. No corrective action needed.

16. Additional Information:

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

Sample Custodian: Jessica Bock Date: 11-29-12

Client Informed on ______ by ______ Person contacted ______

[X] No action necessary; process as is

Project Manager Rhonda Wefer Date 11/29/12

| SAMPLE ID | Initial pH | Acid Amt | Final pH | SAMPLE ID | Initial pH | Acid Amt | Final pH |
|---|---|---|---|---|---|---|---|
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(Columns struck through diagonally: "Bock 11-29-12")

J2K290425 RW 11/29/12

LS-023, Rev. 15, 07/11

See over for additional information.

11/29/2012 2:07:46 PM

# Sample Preparation/Analysis

127642, Washington Closure Hanford LLC
Washington Closure Hanford LLC

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

**AnalyDueDate: 11/30/2012**

**Batch: 2334046** **SOIL** **mg/kg** **PM, Quote: RW2, 88144**
SEQ Batch, Test: None

**Balance Id:**
**Pipet #:**
**Sep1 DT/Tm Tech:**
**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 MXFXT-1-AC** | | | | | | | | | | | | | |
| J2K290425-1-SAMP | | | | | | | | | | | | | |
| 11/29/2012 09:15 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **2 MXFXT-1-CE-S** | | | | | | | | | | | | | |
| J2K290425-1-MS | | | | | | | | | | | | | |
| 11/29/2012 09:15 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **3 MXFXT-1-CF-X** | | | | | | | | | | | | | |
| J2K290425-1-DUP | | | | | | | | | | | | | |
| 11/29/2012 09:15 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **4 MXFXV-1-AC** | | | | | | | | | | | | | |
| J2K290425-2-SAMP | | | | | | | | | | | | | |
| 11/29/2012 09:20 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **5 MXFXW-1-AC** | | | | | | | | | | | | | |
| J2K290425-3-SAMP | | | | | | | | | | | | | |
| 11/29/2012 09:25 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **6 MXFXX-1-AC** | | | | | | | | | | | | | |
| J2K290425-4-SAMP | | | | | | | | | | | | | |
| 11/29/2012 09:30 | | | AmtRec: 2X125MLP | | #Containers: 2 | | | | Scr: | | Alpha: | | Beta: |
| **7 MXF2R-1-AA-B** | | | | | | | | | | | | | |
| J2K290000-46-BLK | | | | | | | | | | | | | |
| 11/29/2012 14:07 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

11/29/2012 2:07:47 PM

# 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: 11/30/2012**

**Batch: 2334046** **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: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 MXF2R-1-AC-C | | | | | | | | | | | | | |
| J2K290000-46-LCS | | | | | | | | | | | | | |
| 11/29/2012 14:07 pd | | | AmtRec: | | #Containers: 1 | | | | | Scr: | Alpha: | | Beta: |

**Comments:**

```
All Clients for Batch:
    127642, Washington Closure Hanford LLC          Washington Closure Hanford LLC,  RW2, 88144

MXFXT1AC-SAMP Constituent List:

MXFXT1CE-MS Constituent List:

MXF2R1AA-BLK:

MXF2R1AC-LCS:

MXFXT1AC-SAMP Calc Info:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
MXFXT1CE-MS Calc Info:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
MXF2R1AA-BLK:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
MXF2R1AC-LCS:
    Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
```