# SAF-NFM-020
# 618-10 Near Field Monitoring – Air Filter Analysis
# FINAL DATA PACKAGE

**COMPLETE COPY OF DATA PACKAGE TO:**

No Distribution Required KW 9/2/16
INITIAL/DATE

**COMMENTS:**

**SDG NFM0177** **SAF NFM-020**

☑ Rad only Chem only Rad & Chem

☑ Complete Partial

**Sample Location: 618-10 Near Field Monitoring**

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* 21 *Pages*

Report No.: 69227

**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. |
|---|---|---|---|---|---|---|
| NFM0177 | NFM-020 | S980502 | J6H140414-1 | M836F1AA | 9M836F10 | 6228029 |
| | | S980503 | J6H140414-2 | M836G1AA | 9M836G10 | 6228029 |
| | | S980510 | J6H140414-3 | M836H1AA | 9M836H10 | 6228029 |
| | | S980511 | J6H140414-4 | M836J1AA | 9M836J10 | 6228029 |

TestAmerica Inc
rptSTLRchTitle v3.73

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# Certificate of Analysis

Washington Hanford Closure
2620 Fermi Avenue
Richland, WA 99354

August 29, 2016

Attention: Joan Kessner

| | | |
|---|---|---|
| SAF Number | : | NFM-020 |
| Date SDG Closed | : | August 9, 2016 |
| Number of Samples | : | Four (4) |
| Sample Type | : | Filter |
| SDG Number | : | NFM0177 |
| Data Deliverable | : | 21-Day / Summary |

## CASE NARRATIVE

### I. Introduction

On August 9, 2016, four filter 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 |
|---|---|---|---|
| S980502 | M836F | FILTER | 8/09/16 |
| S980503 | M836G | FILTER | 8/09/16 |
| S980510 | M836H | FILTER | 8/09/16 |
| S980511 | M836J | FILTER | 8/09/16 |

### 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:

**Gas Proportional Counting**
Gross Alpha by method RL-GPC-008
Gross Beta by method RL-GPC-008

## 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

**Gas Proportional Counting**
Simultaneous Gross Alpha and Gross Beta by method RL-GPC-008:
The LCS, batch blank and sample 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. |
| **CSU (#s)** ***$u_c$ Combined Standard Uncert.*** | 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 standard 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\|MDL** | 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:** 29-Aug-16

## TestAmerica Inc TARL

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

**Report No. :** 69227 **SDG No:** NFM0177

| Batch | Client Id Work Order | Parameter | Result +- CSU ( 2 s) | Qual | Units | Tracer Yield | MDL | CRDL | RPD |
|---|---|---|---|---|---|---|---|---|---|
| 6228029 ALPHA_GPC | | | | | | | | | |
| **S980502** | | | | | | | | | |
| | M836F1AA | Alpha | 2.10E+00 +- 4.9E-01 | | pCi/sample | 100% | 9.15E-02 | 1.10E-01 | |
| | | Beta | 1.91E+01 +- 2.9E+00 | | pCi/sample | 100% | 2.39E-01 | 1.10E-01 | |
| **S980503** | | | | | | | | | |
| | M836G1AA | Alpha | 1.94E+00 +- 4.6E-01 | | pCi/sample | 100% | 9.62E-02 | 1.10E-01 | |
| | | Beta | 1.90E+01 +- 2.9E+00 | | pCi/sample | 100% | 2.46E-01 | 1.10E-01 | |
| **S980510** | | | | | | | | | |
| | M836H1AA | Alpha | 1.52E+00 +- 3.9E-01 | | pCi/sample | 100% | 6.80E-02 | 1.10E-01 | |
| | | Beta | 1.76E+01 +- 2.7E+00 | | pCi/sample | 100% | 2.29E-01 | 1.10E-01 | |
| **S980511** | | | | | | | | | |
| | M836J1AA | Alpha | 1.97E+00 +- 4.6E-01 | | pCi/sample | 100% | 9.15E-02 | 1.10E-01 | |
| | | Beta | 1.83E+01 +- 2.8E+00 | | pCi/sample | 100% | 2.39E-01 | 1.10E-01 | |

**No. of Results:** 8

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

rptTALRchSaSum
mary2 V5.6 A2002

# QC Results Summary

**Date:** 29-Aug-16

## TestAmerica Inc TARL

Ordered by Method, Batch No, QC Type,.

**Report No. :** 69227

**SDG No.:** NFM0177

| Batch Work Order | Parameter | Result +- CSU ( 2 s) | Qual | Units | Tracer Yield | LCS Recovery | Bias | MDL |
|---|---|---|---|---|---|---|---|---|
| ALPHA_GPC | | | | | | | | |
| 6228029 BLANK QC, | | | | | | | | |
| M839H1AA | Alpha | 2.55E-03 +- 6.2E-02 | U | ıCi/sample | 100% | | | 9.62E-02 |
| | Beta | 4.08E-02 +- 1.5E-01 | U | ıCi/sample | 100% | | | 2.46E-01 |
| 6228029 LCS, | | | | | | | | |
| M839H1AC | Alpha | 1.60E+01 +- 3.2E+00 | | ıCi/sample | 100% | 89% | -0.1 | 6.80E-02 |
| | Beta | 6.34E+00 +- 1.0E+00 | | ıCi/sample | 100% | 85% | -0.2 | 2.29E-01 |

**No. of Results:** 4

TestAmerica Inc
rptSTLRchQcSummary V5.6 A2002

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.

# FORM I

## SAMPLE RESULTS

**Date:** 29-Aug-16

**Lab Name:** TestAmerica Inc
**Lot-Sample No.:** J6H140414-1
**Client Sample ID:** S980502

**SDG:** NFM0177
**Report No. :** 69227
**COC No. :** 20160803WCH

**Collection Date:** 8/2/2016 10:09:00 AM
**Received Date:** 8/9/2016 2:20:00 PM
**Matrix:** OTHER OTHERSOLID

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | CSU (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:** 6228029 | ALPHA_GPC | | | **Work Order:** M836F1AA | | **Report DB ID:** 9M836F10 | | | | | | |
| Alpha | **2.10E+00** | | 2.6E-01 | 4.9E-01 | 9.15E-02 | pCi/sample | 100% | *(23.)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29A |
| | | | | | | 4.17E-02 | 1.10E-01 | *(8.6)* | | Sample | Sample | |
| Beta | **1.91E+01** | | 4.6E-01 | 2.9E+00 | 2.39E-01 | pCi/sample | 100% | *(79.9)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29A |
| | | | | | | 1.16E-01 | 1.10E-01 | *(13.)* | | Sample | Sample | |

**No. of Results:** 2 **Comments:**

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V5.6 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, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 29-Aug-16

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | NFM0177 | **Collection Date:** | 8/2/2016 10:31:00 AM |
| **Lot-Sample No.:** | J6H140414-2 | **Report No. :** | 69227 | **Received Date:** | 8/9/2016 2:20:00 PM |
| **Client Sample ID:** | S980503 | **COC No. :** | 20160803WCH | **Matrix:** | OTHER OTHERSOLID |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | CSU (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:** 6228029 | ALPHA_GPC | | | **Work Order:** | M836G1AA | | **Report DB ID:** | 9M836G10 | | | | |
| Alpha | 1.94E+00 | | 2.7E-01 | 4.6E-01 | 9.62E-02 | pCi/sample | 100% | *(20.2)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29B |
| | | | | | | 4.40E-02 | 1.10E-01 | *(8.4)* | | Sample | Sample | |
| Beta | 1.90E+01 | | 4.6E-01 | 2.9E+00 | 2.46E-01 | pCi/sample | 100% | *(77.2)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29B |
| | | | | | | 1.20E-01 | 1.10E-01 | *(13.)* | | Sample | Sample | |

**No. of Results:** 2 **Comments:**

TestAmerica Inc
rptSTLRchSample
V5.6 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, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 29-Aug-16

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | TestAmerica Inc | **SDG:** | NFM0177 | **Collection Date:** | 8/2/2016 10:23:00 AM |
| **Lot-Sample No.:** | J6H140414-3 | **Report No. :** | 69227 | **Received Date:** | 8/9/2016 2:20:00 PM |
| **Client Sample ID:** | S980510 | **COC No. :** | 20160803WCH | **Matrix:** | OTHER OTHERSOLID |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | CSU (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:** 6228029 | ALPHA_GPC | | | **Work Order:** | M836H1AA | | **Report DB ID:** | 9M836H10 | | | | |
| Alpha | **1.52E+00** | | 2.5E-01 | 3.9E-01 | 6.80E-02 | pCi/sample | 100% | *(22.3)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29C |
| | | | | | | 2.99E-02 | 1.10E-01 | *(7.9)* | | Sample | Sample | |
| Beta | **1.76E+01** | | 4.4E-01 | 2.7E+00 | 2.29E-01 | pCi/sample | 100% | *(76.9)* | 8/18/16 10:34 a | 1.0 | 1.0 | GPC29C |
| | | | | | | 1.11E-01 | 1.10E-01 | *(13.)* | | Sample | Sample | |

**No. of Results:** 2 **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, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.**

# FORM I

## SAMPLE RESULTS

**Date:** 29-Aug-16

**Lab Name:** TestAmerica Inc
**Lot-Sample No.:** J6H140414-4
**Client Sample ID:** S980511

**SDG:** NFM0177
**Report No. :** 69227
**COC No. :** 20160803WCH

**Collection Date:** 8/2/2016 10:15:00 AM
**Received Date:** 8/9/2016 2:20:00 PM
**Matrix:** OTHER OTHERSOLID

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | CSU (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:** 6228029 | ALPHA_GPC | | | **Work Order:** | M836J1AA | | **Report DB ID:** | 9M836J10 | | | | |
| Alpha | **1.97E+00** | | 2.5E-01 | 4.6E-01 | 9.15E-02 | pCi/sample | 100% | *(21.5)* | 8/18/16 07:34 p | 1.0 | 1.0 | GPC29A |
| | | | | | | 4.17E-02 | 1.10E-01 | *(8.5)* | | Sample | Sample | |
| Beta | **1.83E+01** | | 4.5E-01 | 2.8E+00 | 2.39E-01 | pCi/sample | 100% | *(76.3)* | 8/18/16 07:34 p | 1.0 | 1.0 | GPC29A |
| | | | | | | 1.16E-01 | 1.10E-01 | *(13.)* | | Sample | Sample | |

**No. of Results:** 2 **Comments:**

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rptSTLRchSample
V5.6 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, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.**

# FORM II

# BLANK RESULTS

**Date:** 29-Aug-16

**Lab Name:** TestAmerica Inc

**Matrix:** OTHER

**SDG:** NFM0177

**Report No. :** 69227

| Parameter | Result | Qual | Count Error ( 2 s) | CSU (2 s) | MDL, Lc | Rpt Unit, CRDL | Yield | Rst/MDL, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 6228029 | ALPHA_GPC | | | **Work Order:** | M839H1AA | **Report DB ID:** | M839H1AB | | | | | |
| Alpha | 2.55E-03 | U | 6.2E-02 | 6.2E-02 | 9.62E-02 | pCi/sample | 100% | 0.03 | 8/18/16 07:34 p | 1.0 | 1.0 | GPC29B |
| | | | | | 4.40E-02 | 1.10E-01 | | 0.08 | | Sample | Sample | |
| Beta | 4.08E-02 | U | 1.5E-01 | 1.5E-01 | 2.46E-01 | pCi/sample | 100% | 0.17 | 8/18/16 07:34 p | 1.0 | 1.0 | GPC29B |
| | | | | | 1.20E-01 | 1.10E-01 | | 0.55 | | Sample | Sample | |

**No. of Results:** 2 **Comments:**

TestAmerica Inc
rptSTLRchBlank
V5.6 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, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.**

# FORM II

## LCS RESULTS

**Date:** 29-Aug-16

**Lab Name:** TestAmerica Inc

**Matrix:** OTHER

**SDG:** NFM0177

**Report No. :** 69227

| Parameter | Result | Qual | Count Error ( 2 s) | CSU ( 2 s) | MDL | Report Unit | Yield | Expected | Expected Uncert | Recovery, Bias | Analysis, Prep Date | Aliquot Size | Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 6228029 | ALPHA_GPC | | | **Work Order:** | M839H1AC | | **Report DB ID:** | M839H1CS | | | | | |
| Alpha | 1.60E+01 | | 4.5E-01 | 3.2E+00 | 6.80E-02 | pCi/sample | 100% | 1.80E+01 | 6.1E-01 | 89% | 8/18/16 07:34 p | 1.0 | GPC29C |
| | | | | | | | **Rec Limits:** | | | -0.1 | | Sample | |
| Beta | 6.34E+00 | | 3.2E-01 | 1.0E+00 | 2.29E-01 | pCi/sample | 100% | 7.48E+00 | 1.5E-01 | 85% | 8/18/16 07:34 p | 1.0 | GPC29C |
| | | | | | | | **Rec Limits:** | | | -0.2 | | Sample | |

**No. of Results:** 2 **Comments:**

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

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# Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/26/2016 2:54:51 PM

**Lot No., Due Date:** J6H140414; 08/30/2016
**Client, Site:** 127642; S00W235B00 HANFORD
**QC Batch No., Method Test:** 6228029; RAB-P/SR Alpha,Beta by GPC
**SDG, Matrix:** NFM0177; OTHER

| | | | |
|---|---|---|---|
| **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** [signature] **Date** 8/26/16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

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

**Batch Number:** 6228029

| 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 Nonconformances (NCM) included and noted? | | | ✓ |
| 2. Was the correct methodology used? | ✓ | | |
| 3. Were units checked? | ✓ | | |

Comments on any "No" response:

Second Level Review: [signature] Date: 5/29/16

DR-001, Rev. 01, 10/30/2013

SDG #: NFM0177 SAF#: NFM-020

| Mission Support Alliance | CHAIN OF CUSTODY FOR PSRP AIR SAMPLE ANALYSIS | SAF No. NFM - Air | COC No. 20160803 WCH ~~NFM~~ 2 8/3/16 |
|---|---|---|---|

| Sample Collector | Company Contact | Telephone No. | Project Designation | Please refer to laboratory contract scope of work for composite and data deliverable details |
|---|---|---|---|---|
| Felipe Garza | Craig J Perkins | 376-2049 | PSRP | |

| POSSIBLE SAMPLE HAZARDS | Field Logbook No. / Page No. | Shipment | Shipped To | Contract / Project no. |
|---|---|---|---|---|
| N/A | N/A | Govt Vehicle | Test America | WCH Samples |

| EDP Code | Analysis | Comments | EDP Code | Analysis | Comments |
|---|---|---|---|---|---|
| N482 | Beta, Alpha | N/A | N/A | N/A | N/A |
| N517 | Beta, Alpha | | N/A | N/A | N/A |
| N518 | Beta, Alpha | | N/A | N/A | N/A |
| N548 | Beta, Alpha | M836F | N/A | N/A | N/A |
| N549 | Beta, Alpha | M836G | N/A | N/A | N/A |
| N579 | Beta, Alpha | M83~~GH~~6H RW 8/15/16 | N/A | N/A | N/A |
| N580 | Beta, Alpha | M836J | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

| CHAIN OF POSSESSION | | PRINT AND SIGN NAMES | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|
| Relinquished By/Removed From: Felipe Garza Felipe Garza | Date/Time: 8/3/2016 900 | Received By/Stored In: 2724 WB locked storage 2 | Date/Time: 8/3/2016 900 | **Bill of Lading Information** |
| Relinquished By/Removed From: 2724 WB locked storage 2 | Date/Time: 8/9/2016 1000 | Received By/Stored In: Felipe Garza Felipe Garza | Date/Time: 8/9/2016 1000 | ☐ FedEx ☐ UPS ☐ Other ☐ N/A |
| Relinquished By/Removed From: Felipe Garza Felipe Garza | Date/Time: 8/9/2016 1420 | Received By/Stored In: Jack J. Bock TALR 8-9-16 | Date/Time: 1420 | Tracking #: |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | HPT Sign/Date: Felipe Garza 8/9/2016 1000 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | Radiological Survey Report: N-16-0512 |
| Relinquished By/Removed From | Date/Time | Received By/Stored In | Date/Time | Reviewed By: [signature] |

| LABORATORY SECTION | Received By | Title | Date/Time |
|---|---|---|---|

Due: 8/30/16



J6H140414

A-6006-498 (REV 4)

ABCASH 2 (C02 - Ver 2.0)
Report Date: 8/3/16 13:10

C.O.C 20160803WCH PS 2 of 2

# SAMPLE CUSTODY CHANGE LIST

~~Page 1 of 1~~

CUSTODY CHANGE REASON: ES to GEL/TestAmerica

SAF #:

Custody Changed By: [redacted] Garza, Phil

| Sample Number | Location Code | Off Date/Time | Sample Collected by |
|---|---|---|---|
| S980502-M8366 | N548 | 08 / 02 / 2016 10:09 | Garza, Phil |
| S980503-M8366 | N549 | 08 / 02 / 2016 10:31 | Garza, Phil |
| S980510-M8366H | N579 | 08 / 02 / 2016 10:23 | Garza, Phil |
| S980511-M8366J | N580 | 08 / 02 / 2016 10:15 | Garza, Phil |
| S980515 | N482 | 08 / 03 / 2016 07:54 | Garza, Phil |
| S980518 | N517 | 08 / 03 / 2016 08:01 | Garza, Phil |
| S980519 | N518 | 08 / 03 / 2016 07:45 | Garza, Phil |

NFM-020

J6H140414
SDG-NFM0177
Due 8-30-16

J6H140414

Total Custody Changes: 7

Delivered to: ☐ 222 S ☐ PFP ☐ GEL ☑ TestAmerica ☐ MO-285 ☐ Other

Delivered by: N/A ~~Date/Time:~~

Received by: N/A ~~Date/Time:~~

ABCASH 2 Database Version 2.4.001

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# Sample Check-in List

Date/Time Received: 8-9-16 / 1420 Container GM Screen Result: (Airlock) 0 cpm Initials [ ]
Sample GM Screen Result (Sample Receiving) 0 cpm Initials [ ]

Client: WCH SDG #: NFM0177 SAF #: NFM-020 NA [ ]

Lot Number: 360H140414

Chain of Custody #: 20160803WCH

Shipping Container ID or Air Bill Number : _____ NA [ ]

Samples received inside shipping container/cooler/box Yes [ ] Continue with 1 through 4. Initial appropriate response.
Envelopes 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: _____°C 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: 4x Liter
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: _____ Date: 8-9-16

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

[ ] No action necessary; process as is

Project Manager: _____ Date 8/15/16

8/15/2016 12:40:57 PM

# Sample Preparation/Analysis

Balance Id:,,

127642, Washington Closure Hanford LLC ,
Washington Closure Hanford LLC

BE Gross Alpha/Beta Prp GPC008
S9 Gross Alpha and Beta by GPC using Pu-239,Sr/Y90
01 STANDARD TEST SET

Pipet #: _____

**AnalyDueDate: 08/30/2016**

Sep1 DT/Tm Tech:

**Batch: 6228029 OTHER pCi/sampl** PM, Quote: RW2, 91174

SEQ Batch, Test: None All Tests: 6228029 BES9,

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 M836F-1-AA<br>J6H140414-1-SAMP<br>08/02/2016 10:09 AmtRec: 1XFILTER #Containers: 1 | | | | | | | | | | 29A | 1353 | 8/15/16 LB | |
| 2 M836G-1-AA<br>J6H140414-2-SAMP<br>08/02/2016 10:31 AmtRec: 1XFILTER #Containers: 1 | | | | | | | | | | 29B | | | |
| 3 M836H-1-AA<br>J6H140414-3-SAMP<br>08/02/2016 10:23 AmtRec: 1XFILTER #Containers: 1 | | | | | | | | | | 29C | 2254 | 8/18/16 DD | |
| 4 M836J-1-AA<br>J6H140414-4-SAMP<br>08/02/2016 10:15 AmtRec: 1XFILTER #Containers: 1 | | | | | | | | | | 29A | | | |
| 5 M839H-1-AA-B<br>J6H150000-29-BLK<br>08/15/2016 12:40 pd AmtRec: #Containers: 1 | | | | | | | | | | 29B | | | |
| 6 M839H-1-AC-C<br>J6H150000-29-LCS<br>08/15/2016 12:40 pd AmtRec: #Containers: 1 | | | | | | | | | | 29C | | | |

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: 6 ICOC v4.9.0

8/15/2016 12:40:59 PM

# Sample Preparation/Analysis

BE Gross Alpha/Beta Prp GPC008
S9 Gross Alpha and Beta by GPC using Pu-239,Sr/Y90
01 STANDARD TEST SET

Balance Id:,,

Pipet #: _____

Sep1 DT/Tm Tech:

Sep2 DT/Tm Tech:

Prep Tech:

AnalyDueDate: 08/30/2016

**Batch: 6228029** pCi/sampl

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  Washington Closure Hanford LLC, RW2, 91174

M836F1AA-SAMP Constituent List:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALPHA | RDL:1.10E-01 | pCi/sam | LCL: | UCL: | RPD: | BETA | RDL:1.10E-01 | pCi/sam | LCL: | UCL: | RPD: |

M839H1AA-BLK:

M839H1AC-LCS:

M836F1AA-SAMP Calc Info:
Uncert Level (#s).: 2  Decay to SaDt: Y  Blk Subt.: N  Sci.Not.: Y  ODRs: B
M839H1AA-BLK:
Uncert Level (#s).: 2  Decay to SaDt: Y  Blk Subt.: N  Sci.Not.: Y  ODRs: B
M839H1AC-LCS:
Uncert Level (#s).: 2  Decay to SaDt: Y  Blk Subt.: N  Sci.Not.: Y  ODRs: B

8/26/2016 2:53:48 PM

# ICOC Fraction Transfer/Status Report

ByDate: 8/27/2015, 8/31/2016, Batch: '6228029', User: *ALL Order By DateTimeAccepting

| Q Batch | Work Ord | CurStatus | Accepting | | | SOPs,Reagents,Comments |
|---|---|---|---|---|---|---|
| **6228029** | | | | | | |
| *AC* | | **Rev1C** | **DawkinsO** | 8/16/2016 5:40:49 PM | | |
| *SC* | | | wagarr | IsBatched | 8/15/2016 12:41:48 PM | ICOC_RADCALC v4.9.0 |
| *SC* | | | DawkinsO | InCnt1 | 8/16/2016 5:40:49 PM | RL-CI-006 REVISION 6 |
| *SC* | | | DawkinsO | CalcC | 8/19/2016 12:14:02 AM | RL-CI-006 REVISION 6 |
| *SC* | | | carnesj | Rev1C | 8/26/2016 2:53:29 PM | RL-DR-001 Rev 7 |
| *AC* | | | **DawkinsO** | 8/19/2016 12:14:02 | | |
| *AC* | | | **carnesj** | 8/26/2016 2:53:29 PM | | |

*AC: Accepting Entry; SC: Status Change*

*TestAmerica Richland*

Richland Wa.

Page 1

Grp Rec Cnt: 3

ICOCFractions v4.9.4