



LABORATORY DATA CONSULTANTS, INC.

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ERM
2525 Natomas Park Drive, Suite 350
Sacramento, CA 95833
ATTN: Ms. Maria Barajas-Albalawi

April 28, 2008

SUBJECT: BRC Tronox Parcel H, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on March 21, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 18484:

| <u>SDG #</u> | <u>Fraction</u> |
|---------------------|--|
| 204220 | Gross Alpha and Beta, Gamma Spectroscopy |

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel H
Collection Date: March 6, 2008
LDC Report Date: April 3, 2008
Matrix: Soil
Parameters: Gross Alpha and Beta
Validation Level: EPA Level III & IV
Laboratory: General Engineering Laboratories, LLC.

Sample Delivery Group (SDG): 204220

Sample Identification

TSB-HJ-10-Surf
TSB-HJ-01-Surf**
TSB-HR-05-Surf
TSB-HJ-10-SurfMS
TSB-HJ-10-SurfMSD
TSB-HJ-10-SurfDUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 6 soil samples listed on the cover sheet. The analyses were per EPA Method 900.0 for Gross Alpha and Beta Radioactivity.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified a P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- U Data are qualified as non-detected, because the analyte was observed in as associated laboratory or field blank.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined and a self-absorption curve was generated for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within laboratory control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA) with the following exceptions:

| Method Blank ID | Analyte | Activity | Associated Samples |
|-----------------|------------|------------|---------------------------|
| PB (prep blank) | Gross beta | 4.34 pCi/g | All samples in SDG 204220 |

No sample data were qualified based on the gross alpha or beta contaminants found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel H
Gross Alpha and Beta - Data Qualification Summary - SDG 204220**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Gross Alpha and Beta - Laboratory Blank Data Qualification Summary - SDG
204220**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Gross Alpha and Beta - Field Blank Data Qualification Summary - SDG 204220**

No Sample Data Qualified in this SDG

LDC #: 18484A22

VALIDATION COMPLETENESS WORKSHEET

Date: 4-1-08

SDG #: 204220

Level III/IV

Page: 1 of 1

Laboratory: GEL Laboratories LLC

Reviewer: MG

2nd Reviewer: **METHOD:** Gross Alpha & Beta (EPA SW 846 Method 900.0)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|-------|--|----|--|
| I. | Technical holding times | A | Sampling dates: 3-6-08 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification | A | |
| III. | Blanks | SW | |
| IVa. | Matrix Spike/(Matrix Spike) Duplicates | A | MS/MSD/DUP |
| IVb. | Laboratory control samples | A | LCS |
| V. | Minimum detectable activity (MDA) | A | |
| VI. | Sample result verification | A | Not reviewed for Level III validation. |
| VII. | Overall assessment of data | A | |
| VIII. | Field duplicates | N | |
| IX. | Field blanks | N | |

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

all soil

| | | | | | | | |
|----|-------------------|----|--|----|--|----|--|
| 1 | TSB-HJ-10-Surf | 11 | | 21 | | 31 | |
| 2 | TSB-HJ-01-Surf** | 12 | | 22 | | 32 | |
| 3 | TSB-HR-05-Surf | 13 | | 23 | | 33 | |
| 4 | TSB-HJ-10-SurfMS | 14 | | 24 | | 34 | |
| 5 | TSB-HJ-10-SurfMSD | 15 | | 25 | | 35 | |
| 6 | TSB-HJ-10-SurfDUP | 16 | | 26 | | 36 | |
| 7 | PBS | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes: _____

LDC #: 18484A22
 SDG #: 204220

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: MG
 2nd Reviewer: W

Method: Radiochemistry(EPA Method 900.0)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|-----|----|----|-------------------|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| II. Calibration | | | | |
| Were all instruments and detectors calibration as required? | ✓ | | | |
| Were NIST traceable standards used for all calibrations? | ✓ | | | |
| Was the check source identified by activity and radionuclide? | ✓ | | | |
| Were check sources including background counts analyzed at the required frequency and within laboratory control limits? | ✓ | | | |
| III. Blanks | | | | |
| Were blank analyses performed as required? | ✓ | | | |
| Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet. | ✓ | | | |
| IV. Matrix spikes and Duplicates | | | | |
| Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | ✓ | | | |
| Was a duplicate sample analyzed at the required frequency of 5% in this SDG? | ✓ | | | |
| Were all duplicate sample duplicate error ratios (DER) ≤ 1.42 ? | ✓ | | | |
| V. Laboratory control samples | | | | |
| Was an LCS analyzed per analytical batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125% | ✓ | | | |
| VI. Sample Chemical/Carrier Recovery | | | | |
| Was a tracer/carrier added to each sample? | | ✓ | | |
| Were tracer/carrier recoveries within the QC limits? | | | ✓ | |
| VII. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| VIII. Sample Result Verification | | | | |
| Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| Were the Minimum Detectable Activities (MDA) < RL? | ✓ | | | |

LDC #: 18484A22
SDG #: 204220

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: [Signature]

| Validation Area | Yes | No | NA | Findings/Comments |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------|
| IX. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| X. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Target analytes were detected in the field duplicates. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| XI. Field blanks | | | | |
| Field blanks were identified in this SDG. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Target analytes were detected in the field blanks. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

LDC #: 12484A22
 SDG #: 204220

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
 Reviewer: MG
 2nd Reviewer: [Signature]

METHOD: Radiochemistry (Method: 900.0)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = activity of each analyte measured in the analysis of the sample.
 True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample activity
 D = Duplicate sample activity

| Sample ID | Type of Analysis | Analyte | Found/S (units) | True/D (units) | Recalculated | | Reported %R or RPD | Acceptable (Y/N) |
|-----------|---------------------------|----------------|-----------------|----------------|--------------|-----|-----------------------|---------------------|
| | | | | | %R or RPD | | | |
| LCS | Laboratory control sample | Gross Beta | 314 (pci/g) | 301 (pci/g) | 104 | 104 | 104 | Y |
| 4 | Matrix spike sample | Gross Alpha | 111.4 (pci/g) | 116 (pci/g) | 96 | 96 | 96 | — |
| 6 | Duplicate RPD | Gross Beta | 33.0 (pci/g) | 34.3 (pci/g) | 4 | 4 | 4 | — |
| — | Chemical recovery | — | — | — | — | — | — | — |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel H
Collection Date: March 6, 2008
LDC Report Date: April 3, 2008
Matrix: Soil
Parameters: Gamma Spectroscopy
Validation Level: EPA Level III & IV
Laboratory: General Engineering Laboratories, LLC.

Sample Delivery Group (SDG): 204220

Sample Identification

TSB-HJ-10-Surf
TSB-HJ-01-Surf**
TSB-HR-05-Surf
TSB-HJ-10-SurfDUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 4 soil samples listed on the cover sheet. The analyses were per EML HASL Method 300.4.5.2.3 for Gamma Spectroscopy.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified a P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- U Data are qualified as non-detected, because the analyte was observed in as associated laboratory or field blank.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination was performed at the required frequencies.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicates

A matrix spike (MS) analysis was not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Minimum Detectable Activity

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel H
Gamma Spectroscopy - Data Qualification Summary - SDG 204220**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Gamma Spectroscopy - Laboratory Blank Data Qualification Summary - SDG
204220**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Gamma Spectroscopy - Field Blank Data Qualification Summary - SDG 204220**

No Sample Data Qualified in this SDG

METHOD: Gamma Spectroscopy (EML HASL 300,4.5.2.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|-------|--|---|--|
| I. | Technical holding times | A | Sampling dates: 3-6-08 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification | A | |
| III. | Blanks | A | |
| IVa. | Matrix Spike/(Matrix Spike) Duplicates | A | DUP |
| IVb. | Laboratory control samples | A | LCS |
| V. | Minimum detectable activity (MDA) | A | |
| VI. | Sample result verification | A | Not reviewed for Level III validation. |
| VII. | Overall assessment of data | A | |
| VIII. | Field duplicates | N | |
| IX. | Field blanks | N | |

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

all soil

| | | | | | | | |
|----|-------------------|----|--|----|--|----|--|
| 1 | TSB-HJ-10-Surf | 11 | | 21 | | 31 | |
| 2 | TSB-HJ-01-Surf** | 12 | | 22 | | 32 | |
| 3 | TSB-HR-05-Surf | 13 | | 23 | | 33 | |
| 4 | TSB-HJ-10-SurfDUP | 14 | | 24 | | 34 | |
| 5 | <i>PBS</i> | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes: _____

LDC #: 18484A35
 SDG #: 204220

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: MG
 2nd Reviewer: [Signature]

Method: Radiochemistry (EPA Method EML HASL) 300, 4.5.2.3

| Validation Area | Yes | No | NA | Findings/Comments |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------|
| I. Technical holding times | | | | |
| All technical holding times were met. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| II. Calibration | | | | |
| Were all instruments and detectors calibration as required? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were NIST traceable standards used for all calibrations? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Was the check source identified by activity and radionuclide? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were check sources including background counts analyzed at the required frequency and within laboratory control limits? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| III. Blanks | | | | |
| Were blank analyses performed as required? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| IV. Matrix spikes and Duplicates | | | | |
| Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. (Soil) Water. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Was a duplicate sample analyzed at the required frequency of 5% in this SDG? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were all duplicate sample duplicate error ratios (DER) ≤ 1.42 ? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| V. Laboratory control samples | | | | |
| Was an LCS analyzed per analytical batch? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| VI. Sample Chemical/Carrier Recovery | | | | |
| Was a tracer/carrier added to each sample? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Were tracer/carrier recoveries within the QC limits? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| VII. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Were the performance evaluation (PE) samples within the acceptance limits? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| VIII. Sample Result Verification | | | | |
| Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Were the Minimum Detectable Activities (MDA) $< RL$? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

LDC #: 18484A35
 SDG #: 204820

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: MG
 2nd Reviewer: [Signature]

| Validation Area | Yes | No | NA | Findings/Comments |
|--|-----|----|----|-------------------|
| IX. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| X. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| XI. Field blanks | | | | |
| Field blanks were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field blanks. | | | ✓ | |

LDC #: 18434A35
SDG #: 204220

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer: [Signature]

METHOD: Radiochemistry (Method: EML HASL 300, 4.5.2.3)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = activity of each analyte measured in the analysis of the sample.
 True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample activity
 D = Duplicate sample activity

| Sample ID | Type of Analysis | Analyte | Found/S (units) | True/D (units) | Recalculated | | Reported | Acceptable (Y/N) |
|-----------|---------------------------|---------|-----------------|----------------|--------------|-----|----------|------------------|
| | | | | | %R | RPD | | |
| LCS | Laboratory control sample | Am-241 | 15.2 (pci/g) | 16.0 (pci/g) | 95 | 95 | | Y |
| - | Matrix spike sample | - | - | - | - | - | | - |
| 4 | Duplicate RPD | Ac-228 | 1.25 (pci/g) | 1.98 (pci/g) | 7 | 6 | | * N |
| - | Chemical recovery | - | - | - | - | - | | - |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.
 * both values in limits; No Qual.

LDC #: 18484 A35

SDG #: 204220

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1

Reviewer: MG

2nd reviewer: METHOD: Radiochemistry (Method: EML HASL 300, 4.5.2.3)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

 Y N N/A

Have results been reported and calculated correctly?

 Y N N/A

Are results within the calibrated range of the instruments?

Analyte results for # 2, Ac-228 reported with a positive detect were recalculated and verified using the following equation:

Activity =

Recalculation:

$$\frac{(\text{cpm} - \text{bckgrd cpm})}{(2.22)(E)(\text{Vol})(\text{CF})}$$
$$(211 / 120)$$
$$= 1.582 \text{ pCi/g}$$

E = Efficiency

Vol = Volume

CF = %R, Self-absorbance, abundance, ect.

$$(2.22)(0.01181)(0.2770)(153.050 \text{ g})$$

| # | Sample ID | Analyte | Reported Concentration (pCi/g) | Calculated Concentration (pCi/g) | Acceptable (Y/N) |
|---|-----------|---------|--------------------------------|----------------------------------|------------------|
| 1 | 2 | Ac-228 | 1.58 | 1.58 | Y |
| | | Bi-214 | 1.16 | 1.16 | |
| | | Pb-212 | 1.69 | 1.68 | |
| | | Pb-214 | 0.996 | 0.996 | |
| | | Po-212 | 1.69 | 1.68 | |
| | | Po-214 | 0.996 | 0.996 | |
| | | Po-216 | 1.69 | 1.68 | |
| | | Po-218 | 0.996 | 0.996 | |
| | | K-40 | 21.3 | 21.3 | |
| | | Ra-226 | 1.16 | 1.16 | |
| | | Ra-228 | 1.58 | 1.58 | |
| | | Tl-208 | 0.613 | 0.610 | |
| | | Th-234 | 1.23 | 1.23 | |
| | | U-238 | 1.23 | 1.23 | ↓ |
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Note: _____