Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Data Validation Reports LDC #21991

Volatiles



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

August 3 through August 4, 2009

LDC Report Date:

December 8, 2009

Matrix:

Water

Parameters:

Volatiles

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904290

Sample Identification

M-31AB

M-31ABDL

TB080309-GW1

M-50B

M-50BDL

M-21B

FB080409-GW

TB080409-GW1

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------|---|--------|
| 6/18/09 | 2-Methyl-2-propanol | 0.026 (≤0.05) | All samples in SDG R0904290 | J (all detects) UJ (all non-detects) | А |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---------------------|------|---|--|--------|
| 8/12/09 | Styrene | 25.4 | M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1 165454-MB | J+ (all detects) | А |
| 8/14/09 | Hexachlorobutadiene | 25.6 | M-31ABDL M-50BDL M-21B 165930-MB | J- (all detects) UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 8/21/09 | 2-Methyl-2-propanol | 0.024 (≥0.05) | M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1 165454-MB | J (all detects) UJ (all non-detects) | Α |
| 8/14/09 | 2-Methyl-2-propanol | 0.021 (≥0.05) | M-31ABDL M-50BDL M-21B 165930-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples TB080309-GW1 and TB080409-GW1 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample FB080409-GW was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|--|--|--------------------|
| FB080409-GW | 8/4/09 | Acetone Chloromethane Dichloromethane Toluene | 12 ug/L 0.31 ug/L 0.28 ug/L 0.78 ug/L | M-21B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------|----------|---------------------------|---------------------------------|
| M-21B | Acetone | 6.6 ug/L | 6.6U ug/L |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|-----------------|------------|---|---|-----------------|--------|
| M-31AB M-50B | Chloroform | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects) | A |

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0904290 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|---------------------|--|------|--------|
| M-31AB M-50B | Chloroform | × | A |
| M-31ABDL M-50BDL | All TCL compounds except Chloroform | х | А |

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0904290

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|--|--|--------|-------------------------------------|
| R0904290 | M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) |
| R0904290 | M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1 | Styrene | J+ (all detects) | A | Continuing calibration (%D) (c) |
| R0904290 | M-31ABDL M-50BDL M-21B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | A | Continuing calibration (%D) (c) |
| R0904290 | M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0904290 | M-31AB M-50B | Chloroform | J (all detects) | A | Project Quantitation Limit |
| R0904290 | M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |
| R0904290 | M-31AB M-50B | Chloroform | х | Α | Overall assessment of data (o) |
| R0904290 | M-31ABDL M-50BDL | All TCL compounds except Chloroform | × | А | Overall assessment of data (o) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0904290

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------|----------|---------------------------------|--------|------|
| R0904290 | M-21B | Acetone | 6.6U ug/L | Α | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:___21991A1 SDG #:___R0904290 Stage 2B

Reviewer:

Laboratory: Columbia Analytical Services

2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|-----|----------------------------|
| 1. | Technical holding times | A | Sampling dates: 8/03-04/09 |
| 11. | GC/MS Instrument performance check | Ą | · |
| 111. | Initial calibration | SW | 2 KSD (10 rz) |
| IV. | Continuing calibration/ICV | SW | ca = 25 h |
| V. | Blanks | Å | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | chi ent spec |
| VIII. | Laboratory control samples | Α | Chi ent spec 1CS |
| IX. | Regional Quality Assurance and Quality Control | . 2 | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | SK | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | SN | |
| XVI. | Field duplicates | 7 | |
| XVII. | Field blanks | s W | 行B=3,8 FB=7 |

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

 γ_{ND} = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

WATER

| | | VAICE | | | | |
|---------------|--------------|-------|-----------|--------------|----|--|
| 1 \ | M-31AB | 11 1 | 165454-MB | (7412) 21 | 31 | |
| 2 - | M-31ABDL | 12 7 | 16 5930 } | (7243) 22 | 32 | |
| 3 1 | TB080309-GW1 | 13 | | 23 | 33 | |
| 4 1 | M-50B | 14 | | 24 | 34 | |
| 5 > | M-50BDL | 15 | | 25 | 35 | |
| 6 Y | M-21B | 16 | | 26 | 36 | |
| 7 1 | FB080409-GW | 17 | | 27 | 37 | |
| 8 1 | TB080409-GW1 | 18 | | 28 | 38 | |
| 9 | | 19 | | 29 | 39 | |
| 10 | | 20 | | 30 | 40 | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------|
| B, Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| E. Methyene chorde | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disuffide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dkchloroethene** | BB. 1,1,2,2-Tetrachioroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrytonitrile |
| 1. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. ds-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloraform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dkchloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanol |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachioride | II. 2-Chloroethytvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | 9999. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RARR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE, sec-Butylbenzene | YYY, tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TITE. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-tsopropytoluene | AAAA. Ethyl tert-butyl ether | טטטט. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |
| | | | | |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

| S WORNSHEE! |
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rage: Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

3DG #: Six (m~ DC#: -1.41 m/

| ria for all CCC's and SPCC's? | |
|--|--|
| fications below for all questions answered "N". Not applicable questions are identified as "N/A". Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? Did the initial calibration meet the acceptance criteria? Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? | |
| Pease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within mass a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? If yes, what was the acceptance criteria used for evaluation? Y N/A N/A N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? | |
| Please see qualifications below N/A Did the labora N/A Were percent Was a curve Y N/N/A Did the initial WRS | |

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|----------|--------|-------------|-------------------|------------------------------|-------------------------------|--------------------|----------------|-----|
| * | # Date | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications | |
| н | 18/64 | 187 | ANNA | | 0.026 | A11 + B/ks | J/11/4 | (S) |
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7 100 12 SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 1of 2nd Reviewer: Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ? Were all %D and RRFs within the validation criteria of <25 %D and ≥0.05 RRF? Y N NIA

| | Finding %D | Finding RRF | | | |
|----------|-----------------|----------------|--------------------|------------|------------|
| Compound | (Limit: <25.0%) | (Limit: >0.05) | Associated Samples | | ttlons |
| NNNN | | 0.024 | 1201 87 48 1 | 16 syly-MB | 1/43/A (C) |
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VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of) Reviewer:__ 2nd Reviewer:__

(tq)

U

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?

N N/A Were target compounds detected in the field blanks?

Blank units: 1/2 / Associated sample Units:

Sample Identification Associated Samples: 2 Blank ID 8/04/69 Blank ID 7 0,28 0,3 N o. Sampling Date V $\boldsymbol{\mu}$ Compound

Associated sample units: Blank units:

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|---|-----------------------|---------------|----------|----------|--------------|--|--|------|
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| Associated Samples: | Sample Identification | | | | | | | |
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| ank / Other: | | | | | | | | |
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| / Rinsate / 7 | Blank ID | | | | | | | |
| Field Blank | Blank ID | | | | | | | |
| le one) | | n Date | | | | | | |
| Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / | Compound | Samuling Date | | | | | | |
| ΙĒ | | | <u> </u> | <u> </u> | <u> </u> | ــــــــــــــــــــــــــــــــــــــ | | |

LDC #: 21 991 A1 SDG # 77 CM

VALIDATION FINDINGS WORKSHEET Compound Quantitation and CRQLs

Page: of Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

X N N X

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N M/A)

Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

| Qualifications | INER A (e) | | | | | | | | | | |
|--------------------|---------------|-------|--|--|--|--|--|--|--|--|--|
| Associated Samples | | | | | | | | | | | |
| Finding | k > ral range | | | | | | | | | | |
| Sample ID | 78 1 | 1 1 / | | | | | | | | | |
| Date | | | | | | | | | | | |
| * | | | | | | | | | | | |

Comments: See sample calculation verification worksheet for recalculations

SDG #: 24 Cm

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

| 101 | 2/5 | |
|-----------|----------|---------------|
| _ Page: _ | Reviewer | 2nd Reviewer: |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y)N N/A Was the overall quality and usability of the data acceptable?

| # | Date | Sample ID | Finding | Associated Samples | Qualifications | |
|-----------|--------|-----------|-------------------|--------------------|----------------|--|
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 8, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905115

Sample Identification

EB090809-SO1 SA54-31BMSD

SA54-10B

SA54-20B

SA54-31B

SA50-12B

SA50009-12B

SA50-25B

SA50-36B

SA170-20B

SA170-31B

SA170-0.5B

SA170-10B

SA135-0.5B

SA135-10B

SA135009-10B

SA135-25B

SA135-37B

TB090809-SO1

TB090809-SO2

TB090809-SO3

Introduction

This data review covers 17 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 8/28/09 | 2-Methyl-2-propanol | 0.027 (≤0.05) | EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB | J (all detects) UJ (all non-detects) | A |
| 7/17/09 | 2-Methyl-2-propanol | 0.017 (≤0.05) | TB090809-SO2 170232-MB | J (all detects) UJ (all non-detects) | А |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---|-----------------------|---|--|--------|
| 9/11/09 | Dibromochloromethane | 30.1 | EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB | J+ (all detects) | A |
| 9/14/09 | Trichlorofluoromethane 2-Hexanone Hexachlorobutadiene | 29.2 30.62 27.9 | TB090809-SO2 170232-MB | J+ (all detects) J+ (all detects) J+ (all detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 9/11/09 | 2-Methyl-2-propanol | 0.025 (≥0.05) | EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB | J (all detects) UJ (all non-detects) | А |
| 9/14/09 | 2-Methyl-2-propanol | 0.013 (≥0.05) | TB090809-SO2 170232-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|--|------------------------|--|
| 170003-MB | 9/11/09 | Hexachlorobutadiene | 0.30 ug/L | EB090809-SO1 TB090809-SO1 TB090809-SO3 |
| 170232-MB | 9/14/09 | 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene | 0.29 ug/L 0.35 ug/L | TB090809-SO2 |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.

Samples TB090809-SO1, TB090809-SO2, and TB090809-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|--|------------------------------------|--|
| TB090809-SO2 | 9/8/09 | Bromoform Chloromethane Dibromochloromethane | 1.4 ug/L 0.25 ug/L 0.76 ug/L | SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135-10B SA135-25B SA135-25B SA135-37B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified.

Sample EB090809-SO1 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|-------------------------------|------------------------|--|
| EB090809-SO1 | 9/8/09 | Chloroform Dichloromethane | 0.55 ug/L 0.49 ug/L | SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-------------|-----------------|---------------------------|---------------------------------|
| SA50009-12B | Chloroform | 0.81 ug/Kg | 0.81U ug/Kg |
| SA170-0.5B | Dichloromethane | 0.57 ug/Kg | 0.57U ug/Kg |

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|--|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B |
| FB080309-SO | 8/3/09 | Acetone Toluene | 2.1 ug/L 0.30 ug/L | SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-------------|---------------------------------------|---------------------------------------|--|
| SA54-20B | Acetone Toluene | 5.0 ug/Kg 0.47 ug/Kg | 5.0U ug/Kg 0.47U ug/Kg |
| SA50-12B | Toluene | 0.60 ug/Kg | 0.60U ug/Kg |
| SA50009-12B | Toluene | 0.36 ug/Kg | 0.36U ug/Kg |
| SA50-36B | Toluene | 0.74 ug/Kg | 0.74U ug/Kg |
| SA170-20B | Acetone | 4.4 ug/Kg | 4.4U ug/Kg |
| SA170-31B | Acetone | 6.3 ug/Kg | 6.3U ug/Kg |
| SA170-0.5B | Acetone Dichloromethane Toluene | 2.4 ug/Kg 0.57 ug/Kg 0.51 ug/Kg | 2.4U ug/Kg 0.57U ug/Kg 0.51U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|---------------|---------------------|----------------------|-----------------|--|--------|
| SA54-31BMS/MSD (SA54-31B) | Chloromethane | 57 (70-130) | 54 (70-130) | - | J- (all detects) UJ (all non-detects) | А |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|--------------------------------------|------------------------------|---|--|--------|
| 170003-LCS | Bromomethane Dibromochloromethane | 134 (75-125) 136 (75-125) | EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB | J+ (all detects) J+ (all detects) | Р |
| 170142-LCS | Chloromethane | 65 (75-125) | SA54-31B 170142-MB | J- (all detects) UJ (all non-detects) | Р |
| 170337-LCS | Carbon tetrachloride | 74 (75-125) | SA54-10B SA54-20B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B 170337-MB | J- (all detects) UJ (all non-detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905115 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SA50-12B and SA50009-12B and samples SA135-10B and SA135009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | nnn. | D.144 | Flags | |
|------------|-----------------------|------|-----------------|------------------------|-------|--------|
| Compound | SA50-12B SA50009-12 | | RPD (Limits) | Difference (Limits) | | A or P |
| Acetone | 8.1 | 18U | - | 9.9 (≤18) | - | - |
| Chloroform | 2.1 | 0.81 | - | 1.29 (≤5.2) | - | - |
| Toluene | 0.60 | 0.36 | - | 0.24 (≤5.2) | + | - |

| | Concentration (ug/Kg) | | 200 | D.// | | |
|------------|-----------------------|-------------|-----------------|------------------------|-------|--------|
| Compound | SA50-12B | SA50009-12B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 10U | 1.2 | - | 8.8 (≤10) | - | - |

| | Concentra | tion (ug/Kg) | | | · | |
|------------|-----------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA135-10B | SA135009-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 2.8 | 13U | - | 10.2 (≤13) | - | - |
| Acetone | 6.1 | 27U | - | 20.9 (≤27) | - | - |
| Toluene | 4.0 | 2.4 | - | 1.6 (≤7.1) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905115

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---|--|--------|--|
| R0905115 | EB090809-SO1 TB090809-SO1 TB090809-SO3 TB090809-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905115 | EB090809-SO1 TB090809-SO1 TB090809-SO3 | Dibromochloromethane | J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905115 | TB090809-SO2 | Trichlorofluoromethane 2-Hexanone Hexachlorobutadiene | J+ (all detects) J+ (all detects) J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905115 | EB090809-SO1 TB090809-SO1 TB090809-SO3 TB090809-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905115 | SA54-31B | Chloromethane | J- (all detects) UJ (all non-detects) | Α | Matrix spike/Matrix spike duplicates (%R) (m) |
| R0905115 | EB090809-SO1 TB090809-SO1 TB090809-SO3 | Bromomethane Dibromochloromethane | J+ (all detects) J+ (all detects) | Р | Laboratory control samples (%R) (I) |
| R0905115 | SA54-31B | Chloromethane | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905115 | SA54-10B SA54-20B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B | Carbon tetrachloride | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---------------------------------------|-----------------|--------|---------------------------------|
| R0905115 | EB090809-SO1 SA54-10B SA54-20B SA54-20B SA54-31B SA50-12B SA5009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135-10B SA135-25B SA135-37B TB090809-SO1 TB090809-SO2 TB090809-SO3 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905115

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-------------|-----------------|---------------------------------|--------|------|
| R0905115 | SA50009-12B | Chloroform | 0.81U ug/Kg | А | be |
| R0905115 | SA170-0.5B | Dichloromethane | 0.57U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905115

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|----------|--------------------|---------------------------------|--------|------|
| R0905115 | SA54-20B | Acetone Toluene | 5.0U ug/Kg 0.47U ug/Kg | A | bf |

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-------------|---------------------------------------|--|--------|------|
| R0905115 | SA50-12B | Toluene | 0.60U ug/Kg | А | bf |
| R0905115 | SA50009-12B | Toluene | 0.36U ug/Kg | А | bf |
| R0905115 | SA50-36B | Toluene | 0.74U ug/Kg | А | bf |
| R0905115 | SA170-20B | Acetone | 4.4U ug/Kg | Α | bf |
| R0905115 | SA170-31B | Acetone | 6.3U ug/Kg | А | bf |
| R0905115 | SA170-0.5B | Acetone Dichloromethane Toluene | 2.4U ug/Kg 0.57U ug/Kg 0.51U ug/Kg | А | bf |

Tronox Northgate Henderson

| LDC #:: | 21991B1 | VALIDATION COMPLETENESS WORKSHEET |
|---------|----------|-----------------------------------|
| SDG #: | R0905115 | Stage 2B |

Laboratory: Columbia Analytical Services

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

Page: __of__ 2nd Reviewer:

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 |
|------------------|--|----|---|
| 1. | Technical holding times | A | Sampling dates: 9 /6 8 /09 |
| 11. | GC/MS instrument performance check | A | |
| I II. | Initial calibration | SM | 2 KSD +7 |
| IV. | Continuing calibration/ /CV | SW | cw = 25 } |
| V | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | Wک | |
| VIII. | Laboratory control samples | SM | us |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | SW | $D_1 = 5.6$ $D_2 = 14.15$ |
| XVII. | Field blanks | SW | EB=1 TB=18,19,20 FB=FB072909-SO (frm Ro |

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

⊀ND = No compounds detected D = Duplicate

R = Rinsate

TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

Water + Soil

| | •V~1€1 | | <i></i> | | | · · · · · · · · · · · · · · · · · · · | | |
|--------|----------------------|------|--------------------------|---|-----------------|---------------------------------------|------|-----------------|
| 1 1 | EB090809-SO1 | 11 | SA170-0.5B | | ₂₁ | SA54-31BMSD | 31 | 170003 - MB (85 |
| 2 > | SA54-10B | 12 | SA170-10B | | ₂₂ 3 | SA 54-31BMS | 32 | 170337 - |
| 3 | SA54-20B | 13 | SA135-0.5B | | 23 | | 33 | 7 170142 - (85 |
| 4 | SA54-31B | 14 | SA135-10B D ₂ | | 24 | | 34 | 170485 - 186081 |
| 5 5 | SA50-12B D / | 15 | SA135009-10B DY | | 25 | | 35 5 | 170232 - 185 |
| 6 | SA50009-12B b | 16 | SA135-25B | П | 26 | | 36 | |
| 7 | SA50-25B | 17 | SA135-37B | | 27 | | 37 | |
| 8 | SA50-36B | 18 1 | TB090809-SO1 | V | 28 | | 38 | |
| 9 | SA170-20B | 19 | TB090809-SO2 | | 29 | | 39 | |
| 10 | SA170-31B | 20 | TB090809-SO3 | | 30 | | 40 | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|------------------------------|--|----------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropy/ alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFF. Acrolein |
| E. Methylene chonde | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acryonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachlomethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachioroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene™ | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl. 2-propanel |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyt acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethytvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | 0000. |
| P. Bromodichioromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cls-1,3-Dkchloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Buty/ alcohoi | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyttoluene | AAAA. Ethyl tert-butyl ether | .חחחת |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

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VALIDATION FINDINGS WORKSHEE! **Initial Calibration**

rage:___ Reviewer:_ 2nd Reviewer:

AETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? r = 30.99

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

| N | N/A | N/A | N/A | Were percent relative standard deviations (%RSD) and relative response factors (RRF) within not the initial calibration meet the acceptance criteria?

| N | N/A | N/A

| # Date Standard ID 8 28/01 CAL 7/7 /00 CAL | | 0.037 0.017 | 1,18 20 170003-MB | JMIA | (2) |
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219918 SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: \ of / 2nd Reviewer: Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Y N N/A

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and ≥0.05 RRF?

| | 7 | | | | | | | 1 | | | | | | | | | | |
|-------------------------------|---------------------|--------|--|-----|---------------|-------|---------------|---------|---|--|--|--|---|--|---|--|--|--|
| Qualifications | 3+ 1 m /k (a | I/NJ A | | | らず activa | JA5 4 | T+ ACTS 4 | | | | | | | | | | | |
| Associated Samples | 1, 18, 20 170003-MB | | | | 19, 170232-MB | -3 | | | | | | | | | | | | |
| Finding RRF (Limit: >0.05) | | 0, 025 | | | | 0.013 | | | | | | | | | | | | |
| Finding %D (⊔mit: <25.0%) | 30.1 | | | - 1 | 29,2 | | そり.0 そ | 27.9 | | | | | | | : | | | |
| Compound | (4) | NNNN | | ١ | KK (+) | NNN | (+) Z | (+) 111 | | | | | | | | | | |
| Standard ID | 10201 | | | | +2540 | | | | | | | | | | | | | |
| Date | | | | | 9/4/69 | | | | , | | | | | | | | | |
| ** | | | | | | | | | | | | | L | | | | | |

to Carr LDC #: 2/ 99/ B/ SDG#:

VALIDATION FINDINGS WORKSHEET Blanks

Page: Reviewer:_ 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| lease see qu N N/A | ualifications below for all questions answered "N". Not applicable questions are identified as "N/A". | Was a method blank associated with every sample in this SDG? |
|-----------------------|---|--|
| $\alpha > 1$ | ease see | X/N N/A |

Was a method blank associated with every sample in this SDG? Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

Sample Identification YN N/A Was there contamination in the method blanks? If yes, please see the qualifications below. Brank analysis date: 4/11/04 Associated Samples: 1, 18, 20 170005-MB Blank ID 0,30 Conc. units: หฐ Compound Y N N/A

| 64 44 6 | | | |
|-------------------|------------|-----------------------|---|
| Sonc. units: Mg/L | | Associated Samples: | |
| Compound | Blank ID | Sample Identification | |
| | 170232-11B | | |
| スト大 | 0.29 | | |
| NNN | NNN 0.35 | | |
| | | | T |
| | | | |
| | | | |
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| | | | |
| | | | |

VALIDATION FINDINGS WORKSHEET

21991 BJ

LDC #: SDG #:

Page: 1of >

Reviewer: W6

2nd Reviewer:_

6 e

2-12

Field Blanks

FB Sample Identification Associated Samples: ٤ dither 4 0.57/ others METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Bfank units: MS /L Associated sample units: MS /L ST (41 0.81 Blank ID 60/80/8 Blank ID 0.49 0. SZ Sampling Date m Compound

82

(MD) 6-17 Associated Samples: Field blank type: (circle one) Field Blank / Rinsate / (frip Blank) Other.

Blank units: 4 / L Associated sample units: 4 / kg

| _ | _ | | | | | | | - | |
|-----------------------|-------------------------|-----|------|----------|-------------|-------------|-------------|---------------|------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| ntification | | | | | | | | | |
| Sample Identification | | | | | | | | | : |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Blank ID | | | | | | | | | |
| Blank ID 19 | | 1.4 | 0.25 | 0.76 | | | | | |
| Compound | Sampling Date 9 /68 /09 | × | Ą | - | | | | | |
| Сот | | | | | | | | | |

Ed Cores LDC #: 21 191 8/ SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 2 of Reviewer: T 2nd Reviewer._

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y/N N/A Were target compounds detected in the field blanks?
Blank units: NO/A Associated sample units: NO/A F
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other.

8

Associated Samples:

| Associated | | 7/27/69 3 5 6 8 9 10 11 | 5.0/4 | | 0.47/4 0.60/4 036/4 0.74/4 | (AU others either ND or > FB) | | | Blank units: \(\sigma \lambda \lambda \lambda \lambda \lambda \lambda \lambda \lambda \lambda \rangle \text{sigld blank} \text{Rinsate} \text{ Irip Blank} \text{ Other:} \text{Associated Samples:} \(\lambda \lambda - 17 \) | | 65/69 | 3.1 (Ail risults either ND M > FB) | | | | | |
|------------|----------|-------------------------|-------|------|----------------------------|-------------------------------|--|--|---|---------------------------------------|---------------|------------------------------------|-------|--|--|--|--|
| ון נ | | | | 0,30 | | | | | Associated sample units: 45 /kg e one Field Blank Rinsate / Trip Blank / | F9 + 80 309 - 50 Blank ID Blank ID | 8/02/69 | 2.1 (A1) | 0, 30 | | | | |
| | Compound | Sampling Date | | صا | 3 | | | | Blank units: ^{IN} /L Associ | Compound | Sampling Date | 11 | 3 | | | | |

3 λ

Ed Cores LDC #: 21 191 8/ SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 2 of Reviewer: T 2nd Reviewer._

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y/N N/A Were target compounds detected in the field blanks?
Blank units: NO/A Associated sample units: NO/A F
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other.

8

Associated Samples:

| Associated | | 7/27/69 3 5 6 8 9 10 11 | 5.0/4 | | 0.47/4 0.60/4 036/4 0.74/4 | (AU others either ND or > FB) | | | Blank units: \(\sigma \lambda \lambda \lambda \lambda \lambda \lambda \lambda \lambda \lambda \rangle \text{sigld blank} \text{Rinsate} \text{ Irip Blank} \text{ Other:} \text{Associated Samples:} \(\lambda \lambda - 17 \) | | 65/69 | 3.1 (Ail risults either ND M > FB) | | | | | |
|------------|----------|-------------------------|-------|------|----------------------------|-------------------------------|--|--|---|---------------------------------------|---------------|------------------------------------|-------|--|--|--|--|
| ון נ | | | | 0,30 | | | | | Associated sample units: 45 /kg e one Field Blank Rinsate / Trip Blank / | F9 + 80 309 - 50 Blank ID Blank ID | 8/02/69 | 2.1 (A1) | 0, 30 | | | | |
| | Compound | Sampling Date | | صا | 3 | | | | Blank units: ^{IN} /L Associ | Compound | Sampling Date | 11 | 3 | | | | |

3 λ

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

JC#: 2/491B/

DG #:

Reviewer:

IETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required?

Were the LCS percen

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| | | \ \ | | · · · · · | <u>ک</u> | \ | 3. | | | \overline{a} | | 1 | _ | | | | | <u> </u> | | | | | ī | _ |
|---------------------|--------------------|----------------|-----|-----------|-------------------|-------------|------------------|-----|-----|----------------|----------|-----|-----|-----|-----|-----|-------------|----------|-----|-----|-----|-----|-----|-----|
| Qualifications | J+ d(tz/p (1) | | | | No gual (MS/MSSin | J-/45/6 (m) | Noqual (MS/MSDin | , | | J-/MJ/P (1) | | | | | | | | | | | | | | |
| Associated Samples | 1, 18, 20 170005MB | \ | | | 4, 170142-MB | | \ \ | | | 21-3 6-12 | 17337 MS | | | | | | | | | | | | | |
| RPD (Limits) | () | () | () | () | () | () | () | , | () | (| () | () | () | () | () | () | () | () | () | () | () | () | () | () |
| LCSD %R (Limits) | | () | () | () | () | () | () | () | () | | () | () | () | () | () | () | () | () | () | () | () | () | () | () |
| LCS %R (Limits) | 136 (75-125) | (1) tel | () | () | (3c (75-125) | ()) 59 | (1) 921 | , , | () | 74 (75-125) | () | () | () | () | () | () | () | () | () | () | () | () | () | () |
| Compound | <u> </u> | જ | | | 11 | A | MMM | | | C | | | | | *** | | | | | | | | | |
| LCS/LCSD ID | 527 800021 | | | | 170142 LCS | | | | | 527 266921 | | | | | | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | | | | | | | | | |

| LDC #:_ | 2100 | 11 B/ |
|---------|------|-------|
| | | Come |

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page: | 1 of_ | 1 |
|---------------|-------|---|
| Reviewer: | 2/1 | |
| 2nd reviewer: | A | |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Y N N/A

Were field duplicate pairs identified in this SDG?

Were target compounds detected in the field duplicate pairs?

| | | Concentration | in (49 /kgg | Parent |
|----------|----|---------------|-------------|-----------------|
| Compound | | 5 | 6 | RPD My |
| | F | 8.1 | 18 U | 9,9 (4180) - |
| | K | 2,1 | 0, 81 | 1,29 (\$5.20) - |
| | cc | 0.60 | 0.36 | 0.24 |
| | M | lou | 1. 2 | 8.8 (=100) - |
| | | | | |

| | Concentra | | Parent | |
|----------|-----------|-------|---------------|----|
| Compound | 14 | 15 | RPD | my |
| M | 2.8 | 13 VI | 10,2 (£ 13 D) | |
| F | 6.1 | 27 U | 20,9 (£27 D) | ` |
| CC | 4.0 | 2,4 | 1.6 (47.11) | - |
| | | | | |
| | | | | |

| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | |
| | | |

| | Concentration () | | | | |
|----------|-------------------|-----|--|--|--|
| Compound | | RPD | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 3, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905072

Sample Identification

SA58-0.5BSA204-45BSA58-10BEB090309-SO2SA58009-28BTB090309-SO1SA58-28BTB090309-SO2SA53-10BTB090309-SO3SA53-25BTB090309-SO4

SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B

RSAU7-25B RSAU7-40B RSAU7-54B

SA204-0.5B SA204-10B

SA204009-10B SA204-30B

Introduction

This data review covers 21 soil samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 8/28/09 | 2-Methyl-2-propanol | 0.027 (≤0.05) | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 170003-MB | J (all detects) UJ (all non-detects) | A |
| 7/17/09 | 2-Methyl-2-propanol | 0.017 (≤0.05) | TB090309-SO2 170232-MB | J (all detects) UJ (all non-detects) | Α |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|--------------------|---|-----------------------|---|--|--------|
| 9/11/09 (H0701) | 2-Chlorotoluene | 25.5 | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7-0.5B RSAU7-10B 169909-MB | J+ (all detects) | A |
| 9/11/09 (C0701) | Dibromochloromethane | 30.1 | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 17003-MB | J+ (all detects) | A |
| 9/14/09 | Trichlorofluoromethane Hexachlorobutadiene 2-Hexanone | 29.2 27.9 30.62 | TB090309-SO2 170232-MB | J+ (all detects) J+ (all detects) J+ (all detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|--------------------|---------------------|---------------|--|---|--------|
| 9/11/09 (C0701) | 2-Methyl-2-propanol | 0.025 (≥0.05) | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 17003-MB | J (all detects) UJ (all non-detects) | A |
| 9/14/09 | 2-Methyl-2-propanol | 0.013 (≥0.05) | TB090309-SO2 170232-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|--|------------------------|--|
| 170003-MB | 9/11/09 | Hexachlorobutadiene | 0.30 ug/L | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 |
| 170232-MB | 9/14/09 | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | 0.35 ug/L 0.29 ug/L | TB090309-SO2 |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.

Samples TB090309-SO1, TB090309-SO2, TB090309-SO3, and TB090309-SO4 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample EB090309-SO2 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|----------------------------|----------------------|---|
| EB090309-SO2 | 9/3/09 | Acetone Dichloromethane | 12 ug/L 0.27 ug/L | RSAU7-0.5B RSAU7-009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---------------|----------|---------------------------|---------------------------------|
| RSAU7-0.5B | Acetone | 12 ug/Kg | 12U ug/Kg |
| RSAU7009-0.5B | Acetone | 11 ug/Kg | 11U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------|---------------------------|---------------------------------|
| RSAU7-10B | Acetone | 23 ug/Kg | 23U ug/Kg |
| RSAU7-54B | Acetone | 3.1 ug/Kg | 3.1U ug/Kg |
| SA204-30B | Acetone | 14 ug/Kg | 14U ug/Kg |

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|---|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B |
| FB080309-SO | 8/3/09 | Acetone Toluene | 2.1 ug/L 0.30 ug/L | RSAU7-0.5B RSAU7-09-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA20409-10B SA204-30B SA204-35B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-------------|----------|---------------------------|---------------------------------|
| SA58-0.5B | Toluene | 0.54 ug/Kg | 0.54U ug/Kg |
| SA58009-28B | Acetone | 3.4 ug/Kg | 3.4U ug/Kg |
| SA58-28B | Acetone | 6.6 ug/Kg | 6.6U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------|---------------------------|---------------------------------|
| SA53-10B | Acetone | 6.5 ug/Kg | 6.5U ug/Kg |
| SA106-12B | Toluene | 0.65 ug/Kg | 0.65U ug/Kg |
| RSAU7-54B | Acetone | 3.1 ug/Kg | 3.1U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 not within QC limits. Since there were no associated samples, no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|--------------------------------------|------------------------------|---|--------------------------------------|--------|
| 169909-LCS | Acetone Vinyl chloride | 129 (75-125) 127 (75-125) | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7-0.5B RSAU7-10B 169909-MB | J+ (all detects) J+ (all detects) | Р |
| 170003-LCS | Bromomethane Dibromochloromethane | 134 (75-125) 136 (75-125) | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 170003-MB | J+ (all detects) J+ (all detects) | Р |

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|---------------|-------------|---|--|--------|
| 170142-LCS | Chloromethane | 65 (75-125) | RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B 170142-MB | J- (all detects) UJ (all non-detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905072 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SA58009-28B and SA58-28B, samples RSAU7-0.5B and RSAU7009-0.5B, and samples SA204-10B and SA204009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentrati | on (ug/Kg) | | | | |
|-----------------|-------------|------------|-----------------|------------------------|-------|--------|
| Compound | SA58009-28B | SA58-28B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| Acetone | 3.4 | 6.6 | - | 3.2 (≤30) | - | - |
| Chloroform | 3.4 | 3.8 | - | 0.4 (≤7.6) | - | - |
| Dichloromethane | 7.6U | 1.2 | - | 6.4 (≤7.6) | - | - |
| Toluene | 1.8 | 6.7U | - | 4.9 (≤6.7) | - | - |

| | Concentration (ug/Kg) | | | | 222 | D:# | (E) | |
|------------|-----------------------|---------------|-----------------|------------------------|-------|--------|-----|--|
| Compound | RSAU7-0.5B | RSAU7009-0.5B | RPD (Limits) | Difference (Limits) | Flags | A or P | | |
| 2-Butanone | 1.8 | 0.92 | - | 0.88 (≤14) | - | - | | |
| Acetone | 1.2 | 11 | - | 1.0 (≤27) | - | - | | |
| Toluene | 2.8 | 1.6 | - | 1.2 (≤6.8) | - | - | | |

| | Concentrat | ion (ug/Kg) | 222 | Diff. | | |
|------------|------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA204-10B | SA204009-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 3.4 | 13U | - | 9.6 (≤13) | - | - |
| Toluene | 1.0 | 6.4U | - | 5.4 (≤6.4) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905072

| SDC. | 01- | | E1 | A a = P | Reason (Code) | | | | |
|------------------------|--|---|--|---------|-------------------------------------|--|--|--|--|
| SDG R0905072 | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 TB090309-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | A or P | Initial calibration (RRF) | | | | |
| R0905072 | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7-10B | 2-Chlorotoluene | J+ (all detects) | A | Continuing calibration (%D) (c) | | | | |
| R0905072 | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 | Dibromochloromethane | J+ (all detects) | A | Continuing calibration (%D) (c) | | | | |
| R0905072 | TB090309-SO2 | Trichlorofluoromethane Hexachlorobutadiene 2-Hexanone | J+ (all detects) J+ (all detects) J+ (all detects) | A | Continuing calibration (%D) (c) | | | | |
| R0905072 | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 TB090309-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) | | | | |
| R0905072 | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7-0.5B RSAU7-10B | Acetone Vinyl chloride | J+ (all detects) J+ (all detects) | Р | Laboratory control samples (%R) (I) | | | | |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---------------------------------------|--|--------|--|
| R0905072 | EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 | Bromomethane Dibromochloromethane | J+ (all detects) J+ (all detects) | Р | Laboratory control samples (%R) (I) |
| R0905072 | RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B | Chloromethane | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905072 | SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-20B SA106-35B RSAU7-0.5B RSAU7-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204-10B SA204-10B SA204-30B SA204-30B SA204-45B EB090309-SO2 TB090309-SO2 TB090309-SO3 TB090309-SO4 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905072

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|---------------|----------|---------------------------------|--------|------|
| R0905072 | RSAU7-0.5B | Acetone | 12U ug/Kg | Α | be |
| R0905072 | RSAU7009-0.5B | Acetone | 11U ug/Kg | А | be |
| R0905072 | RSAU7-10B | Acetone | 23U ug/Kg | А | be |
| R0905072 | RSAU7-54B | Acetone | 3.1U ug/Kg | А | be |
| R0905072 | SA204-30B | Acetone | 14U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905072

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-------------|----------|---------------------------------|--------|------|
| R0905072 | SA58-0.5B | Toluene | 0.54U ug/Kg | A | bf |
| R0905072 | SA58009-28B | Acetone | 3.4U ug/Kg | А | bf |
| R0905072 | SA58-28B | Acetone | 6.6U ug/Kg | Α | bf |
| R0905072 | SA53-10B | Acetone | 6.5U ug/Kg | Α | bf |
| R0905072 | SA106-12B | Toluene | 0.65U ug/Kg | А | bf |
| R0905072 | RSAU7-54B | Acetone | 3.1U ug/Kg | Α | bf |

Tronox Northgate Henderson

| | | 3 | , , |
|----------|-----------------|-----------------------------------|---------------|
| LDC #:_ | 21991C1 | VALIDATION COMPLETENESS WORKSHEET | Date: 1/30/00 |
| SDG #:_ | R0905072 | Stage 2B | Page: 1_of_1 |
| Laborato | ry: Columbia An | alytical Services | Reviewer: 374 |
| | | | 2nd Reviewer: |

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|------|--|
| l. | Technical holding times | A | Sampling dates: 9/6ラ/69 |
| II. | GC/MS Instrument performance check | A | |
| Ш. | Initial calibration | SW | 7. RSD FY |
| IV. | Continuing calibration/ICV | WZ | CON £25 2 |
| V. | Blanks | _SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SN) | No associated sample, No gral |
| VIII. | Laboratory control samples | -CM) | us |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | ZW | D, = 3,4 D2 = 11,12 D3 = 18,4 |
| XVII. | Field blanks | SW | $D_1 = 3.4$ $D_2 = 11.12$ $D_3 = 18.9$ EB = 22 $TB = 23, 24, 25, 26$ $FB = FB072904-50$ |

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected D = Duplicate

R = Rinsate FB = Field blank TB = Trip blank

EB = Equipment blank

Validated Samples:

cail + Water

| | | 2011 | *** | | | | | | | |
|----------------|-------------|-----------------|-------------|---------------|-------------------------------------|--------------------------|--------------|---|------------------|-----------|
| 1 | SA58-0.5B | ٤ | 11 1 | RSAU7-0.5B | D7 S | 21 | SA204-45B | ک | 31 1 | 169909-MB |
| 2 1 | SA58-10B | k 7 | 12 | RSAU7009-0.5B | $\mathcal{O}_{\boldsymbol{\gamma}}$ | 1 × 22 > | EB090309-SO2 | W | ↓ 32 γ | 170003- |
| 3 1 | SA58009-28B | b' ₁ | 13 \ | RSAU7-10B | | - 23 2 | TB090309-SO1 | i | 33 y | 170142_ |
| 4 | SA58-28B | D_{l} | 14 3 | RSAU7-25B | | <u>54</u> # | TB090309-SO2 | | # 34 £ | 17023>- + |
| ₅ 1 | SA53-10B | | 153 | RSAU7-40B | | 25 > | TB090309-SO3 | | 35 | |
| 6 | SA53-25B | | 16 3 | RSAU7-54B | | ₂₆ > | TB090309-SO4 | | 36 | |
| 7 l | SA53-32B | | 17 | SA204-0.5B | | 27 | | | 37 | |
| 8 1 | SA106-12B | | 18 | SA204-10B | 0 > | 28 | | | 38 | |
| 9 | SA106-20B | | 19 3 | SA204009-10B | b, | 29 | | | 39 | |
| 10 | SA106-35B | 4 | 20 3 | SA204-30B | ٧ | 30 | | | 40 | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| V. Berzzene PP. Bromochloromentane JJJ. 1.2-Olchloropozane A. C. V. Encardiom** RR. Dibromorethane LLL. Hexachlorobusdiene A. C. Y. 4-Methyl-2-pantanone RR. Dibromorethane LLL. Hexachlorobusdiene Z. 2-Hexanone TT. 1.2-Dibromocethane MMM. Naphthalene D. C. Toluene** VV. Hoppropybenzene PPP. trans-1.2-Dichlorobenzene BB. 1,12.2-Tetrachloroethane VV. Isopropybenzene PPP. trans-1.2-Dichloroethane C. Toluene** WV. Bromobenzene WW. Bromobenzene II. D. Chloroethane WW. Bromobenzene SS. 5. Aylenes EE. Ethyldenzene** VV. L. 2.3-Trichloroponene RRR m.p. Xylenes D. Chloroethane VY. A. 1.2.3-Trimeltylbenzene SS. 6. Xylenes HH. Vinyl acotate BBB. 4-Chlorotoluene VVV. 4-Ethyllouene HH. Vinyl acotate BBB. 4-Chlorotoluene VVV. 4-Ethyllouene JJ. Dichlorofuluromethane CCC. tert-Burylbenzene VVV. 4-Ethyllouene KK. Trichlorofuluromethane EEE. sec-Burylbenzene VVV. 4-Ethyllouene LL. Methyl-tert-buryl ether GCG. tert-Burylbenzene VVV. 4-Ethyllouene <t< th=""><th>A. Chloromethane*</th><th>U. 1,1,2-Trichloroethane</th><th>OO. 2,2-Dichloropropane</th><th>III. n-Butylbenzene</th><th>CCCC.1-Chlorohexane</th></t<> | A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|---|------------------------------|---------------------------------|------------------------------|--|---------------------------|
| W. trans-1,3-Dichloropropene WKK. 1,2-4-Trichloroberzene A. E. Y. 4-Methyl-2-pentanone RR. Dibonomethane LLL. Herachlorobusdiene 2. 2-Hexanone TT. 1,2-Dichloropropene MMM. Naphthalene A.A. Tetrachlorobthane TT. 1,2-Dichloropropene MMM. 1,2,3-Trichloroberzane BB. 1,1,2,2-Tetrachloroethane UU. 1,1,1,2-Tetrachloroethane NV. Isopropythanzane C.C. Tolune** WW. Bromoberzane PPP. trans-1,2-Dichloroethane DD. Chloroberzane** WV. Isopropythanzane RRR. m.p-Xylenes FF. Styrene XX. 1,2,3-Trichloropropane RRR. m.p-Xylenes FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,2-Trichloroethane GG. Xylenes, total AAA. 1,3,5-Trimethythenzane VVV. 4-Eityfroluene HH. Vinyl acetate CC. Istr-Burylbenzane VVV. 4-Eityfroluene MK. Trichlorofulkuoromethane EE. so-Burylbenzane VVV. 4-Eityfroluene MK. Trichlorofulkuoromethane EE. so-Burylbenzane VVV. 4-Eityfroluene MMI. 1,2-Dichromo-3-chloropane GGG. p-leopropyfiolene ZZZ Istr-Buryl ether | B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyt alcohol |
| A. A. Tetrachloroethene R.R. Dibomomethane LLL. Hexachlorobuladiene 2. 2-Hexanone S.S. 1,3-Dichloropropene MMM. Naphthalene A. Tetrachloroethene TT. 1,2-Dibromoethane NNN. 1,2,3-Trichlorobarzane BB. 1,1,2,2-Tetrachloroethane VV. Isopropy/benzane PPP. Irane-1,2-Dichloroethene CC. Toluene** WW. Bromobertzene PPP. Irane-1,2-Dichloroethene DD. Chlorobertzene** XX. 1,2,3-Trichloropthane RRR. m,p-Xylenes FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2-2-trifluoroethane GG. Xylenes, total AAA. 1,3-Trimethythenzane VVV. 4-Ethytholnene HH. Vinyl scelate BBB. 4-Chlorotoluene VVV. 4-Ethytholnene M. Dichlorodifluoromethane CCC. Inf-Buylbenzane VVV. 4-Ethytholnene KK. Trichlorofluoromethane EEE. sec-Buylbenzane VVV. 4-Ethytholnene KK. Trichlorophythinene TZZ. tart-Butyl stohol KK | C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| Ane Y. 4-Methyl-2-pertanone SS. 1,3-Dichloropropene MMMI. Naphthalene Z. 2-Hexanone TT. 1,2-Dibromoethane NINI. 1,2-Trichlorobenzane AA. Tetrachloroethane UU. 1,1,1,2-Tetrachloroethane OOO. 1,3,5-Trichlorobenzane BB. 1,1,2-2-Tetrachloroethane WW. Bromobenzane PPP. trans. 1,2-Dichloroethane I CC. Toluene** WW. Bromobenzane RRR. mp.Xylenes I DD. Chlorobenzane** XX. 1,2,3-Trichloropropane RRR. mp.Xylenes EE. Ethylbenzane** YY. n-Propylbenzane SSS. o-Xylene FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2-Lrifluoroethane GG. Xylenes, total AAA. 1,3,5-Trimethylbenzane UU. 1,2-Dichlorotetrafluoroethane HH. Vinyl sociate BBB. 4-Chlorotoluene VWV. 4-Ethyltoluene JJ. Dichlorodifluoromethane EEE. sec-Butylbenzane VYY. Lett-Butanol II. 2-ChloroethyMinyl ether EEE. sec-Butylbenzane XXX. Di-sopropyl ether IV. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzane ZZZ. Lett-Butyl ether IV. Methyl-tert-butyl ether GGG. p-Isopropylioluene XXX. Di-sopropyl ether MMI. 1,2-Dibrono-3-chloroepene | D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFF. Acrolein |
| 2. 2-Hexanone TT. 1.2-Dibromoethane NNN. 1.2.3-Trichlorobenzene AA. Tetrachloroethane* UU. 1.1.1.2-Tetrachloroethane 0.00. 1.3.5-Trichlorobenzene BB. 1.1.2-2-ferrachloroethane* VV. Isopropy/benzene PPP. trans-1,2-Dichloroethene CC. Toluene* WW. Bromobenzene QQO. ds-1,2-Dichloroethene PD. Chlorobenzane** XX. 1,2,3-Trichloropthene RRR. m,p-Xylenes FE. Ethylbenzane** YY. n-Propy/benzene SSS. 0-Xylenes FF. Sylvene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2-Urifluoroethane FF. Sylvene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2-Urifluoroethane HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyritoluene JJ. Dichloroethyvinyl ether CCC tert-Buty/benzene XXX. Di-tsopropyl ether KK. Trichlorofluoromethane EEE. sec-Buty/benzene XXX. Di-tsopropyl ether KK. Trichlorofluoromethane FFF. 1,3-Dichlorobenzene XXX. Di-tsopropyl ether MM. 1,2-Dibromo-3-chloropopane GGG. P-Isopropyritoluene AAAA. Ethyl tert-butyl ether | E. Methyene chonder + hane | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| AA. Tetrachloroethane UU. 1,1,1.2-Tetrachloroethane OOO. 1,3,5-Trichlorobenzane BB. 1,1,2,2-Tetrachloroethane* VV. Isopropy/benzane PPP. trans-1,2-Dichloroethane C.C. Toluene** WW. Bromobenzane QQO. cis-1,2-Dichloroethane D. Chlorobenzane** XX. 1,2,3-Trichloropropane RRR. m,p-Xylenes EE. Ethylbenzane** YY. n-Propylbenzane SSS. c-Xylenes FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,2-Trichloro-1,2,2-trifluoroethane GG. Xylenes, total AAA. 1,3,5-Trimethylbenzane UUU. 1,2-Dichlorotetrafluoroethane HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyltoluene M. Dichlorodifluoromethane CCC. tert-Butylbenzane VYY. tert-Butyl alcohol KK. Trichlorothanethane EEE. sec-Butylbenzane XXX. Di-isopropyl ether KK. Trichlorothanethane FFF. 1,3-Dichlorobenzane ZZZ. tert-Butyl alcohol LL. Methy-tert-butyl ether FFF. 1,3-Dichlorobenzane ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. Pisopropyftoluene AAAA. Ethyl tert-butyl ether | F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| BB. 1,1,2,2-Tetrachloroethane* VV. Isopropy/benzene PPP. trans-1,2-Dichloroethene CC. Toluene** WW. Bromobenzene QQQ. cis-1,2-Dichloroethene DD. Chlorobenzene** XX. 1,2,3-Trichloropropane RRR. m,p-Xylenes EE. Ethylbenzene** YY. n-Propylbenzene RRR. m,p-Xylenes FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2,2-trifluoroethene HH. Vinyl acetate AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethene HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyltoluene JJ. Dichlorodifluoromethane CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorofiluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol NK. Trichlorofluoromethane EEE. sec-Butylbenzene ZZZ. tert-Butyl ether MM. 1,2-Dibromo-3-chloroponene GGG. p-Isopropyltoluene AAAA. Ethyl tert-butyl ether | G. Carbon disuffide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachlomethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| CC. Toluene** WW. Bromobenzene QQQ. cis-1,2-Dichloroethene IDD. Chlorobenzene** XX. 1,2,3-Trichloropropane RRR. m,p-Xylenes EE. Ethylbenzene** YY. n-Propylbenzene SSS. o-Xylene FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane GG. Xylenes, total AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethane HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyttoluene HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyttoluene III. 2-Chloroethyvinyl ether CCC. tert-Butylbenzene VVV. 4-Ethyttoluene VKX. Trichlorofluoromethane EEE. sec-Butylbenzene XXX. Di-isopropyl ether VKX. Trichlorophane EEE. sec-Butylbenzene YYY. tert-Butanol ULL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl ether MMI. 1,2-Dibromo-3-chloropopane GGG. p-Isopropytioluene AAAA. Ethyl tert-butyl ether | H. 1,1-Dkchloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| ID. Chlorobenzane** XX. 1,2,3-Trichloropropane RRR. m,p-Xylenes EE. Ethylbenzane** YY. n-Propylbenzene SSS. o-Xylene FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane IH. Vinyl acotate AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethane II. 2-Chlorodifluoromethane CCC. tert-Butylbenzene WWW. Ethyritoluene III. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-laopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. P-Isopropyltoluene AAAA. Ethyl tert-butyl ether | I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| EE. Ethylbenzene** YY. n-Propylbenzene SSS. o-Xylene FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane GG. Xylenes, total AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethane II. 2-Chloroethylvinyl ather CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-Isopropyl ether KK. Trichlorothuromethane EEE. sec-Butylbenzene YYY: tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropopane GGG. p-Isopropyltoluene AAAA. Ethyl tert-butyl ether | J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| FF. Styrene ZZ. 2-Chlorotoluene TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane GG. Xylenes, total AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethane HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyltoluene II. 2-Chloroethylvinyl ether CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-laopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropyltoluene AAAA. Ethyl tert-butyl ether | K. Chloraform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| GG, Xylenes, total AAA. 1,3,5-Trimethylbenzene UUU. 1,2-Dichlorotetrafluoroethane HH. Vinyl acetate BBB. 4-Chlorotoluene VVV. 4-Ethyltoluene II. 2-Chloroethylvinyl ather CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-Isopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropytioluene AAAA. Ethyl tert-butyl ether | L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichioro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanol |
| HH. Vinyl acetate BBB. 4-Chlorotoluene VvV. 4-Ethyttoluene II. 2-Chloroethylvinyl ether CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-isopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropyltoluene AAAA. Ethyl tert-butyl ether | M. 2-Butanone | GG, Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| II. 2-Chloroethylvinyl ether CCC. tert-Butylbenzene WWW. Ethanol JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-isopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropyltoluene AAAA. Ethyl tert-butyl ether | N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chiorotoluene | VVV. 4-Ethyttoluene | рррр. |
| JJ. Dichlorodifluoromethane DDD. 1,2,4-Trimethylbenzene XXX. Di-isopropyl ether KK. Trichlorofluoromethane EEE. sec-Butylbenzene YYY. tert-Butanol LL. Methyt-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-isopropytioluene AAAA. Ethyl tert-butyl ether | O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | ଉବଦଦ. |
| KK. Trichlorofluoromethane EEE. sec-Butytbenzene YYY. tert-Butanol LL. Methyt-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl alcohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropytfoluene AAAA. Ethyl tert-butyl ether | P. Bromodichloromethane | JJ, Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRR. |
| LL. Methyl-tert-butyl ether FFF. 1,3-Dichlorobenzene ZZZ. tert-Butyl akohol MM. 1,2-Dibromo-3-chloropropane GGG. p-Isopropytfoluene AAAA. Ethyl tert-butyl ether | Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Buty/benzene | YYY, tert-Butanol | SSSS. |
| MM. 1,2-Dibromo-3-chloropropane GGG, p-Isopropytioluene AAAA. Ethyl tert-butyl ether | R. cls-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Buty/ alcohol | TTTT. |
| | S. Trichloroethen® | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyttoluene | AAAA. Ethyl tert-butyl ether | טטטט. |
| i NN. Methyl ethyl ketone i HHH. 1,4-Dichlorobenzene BBBB. tอส-Amyl methyl ether | T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amy methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

VALIDATION FINDINGS WORKSHEE! Initial Calibration

Taye. Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

DC#:

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

| sPcc's? | | Qualifications | 3/NJA (C) | | | | | | | | | | | | |
|--|--|-------------------------------|---------------------------|-----|-----|--------------|--|--|--|--|--|--|--|--|--|
| Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? | | Associated Samples | 22, 23, 25, 26, 1700 3-MB | | - 1 | 74 110-22-MP | | | | | | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within methods a control of the secondary for evaluation? | Was a curve in used to evaluation in 100, mild most the initial calibration meet the acceptance criteria? Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? | Finding RRF (Limit: >0.05) | 0, 027 | | İ | 0,017 | | | | | | | | | |
| n prior to sample analysis? RSD) and relative response | criteria? on criteria of ≤30 %F | Finding %RSD | | | | | | | | | | | | | |
| m a 5 point calibration andard deviations (%I | meet the acceptance Fs within the validation | Compound | 7272 | | | マススフ | | | | | | | | | |
| Did the laboratory perform a 5 point calibration prior Were percent relative standard deviations (%RSD) and the standard deviations (%RSD) and the standard laboratory of the standard standard the standard standard the standard standard the standard standard standard the standard st | Was a curve in used for evaluation in 3cs, which was a Did the initial calibration meet the acceptance criteria? Were all %RSDs and RRFs within the validation criteria | Gi brahada | ICA1 | 447 | | 187) | | | | | | | | | |
| N/A N/A | N N N N N N N N N N N N N N N N N N N | | 8 | | | 7/7/09 | | | | | | | | | |

21991C SDG #: 22 C2 LDC#:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 2nd Reviewer: Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

N N N N

| | (c) | 7 | | | | | | | \ \ | } | | | | | | | |
|-------------------------------|-----------------|---|--|--------------|-----------|---|--------------|--------|--------|-------|--|--|--|--|--|--|--|
| Qualifications | J-dets /A | | | J/NJ /A | J+ dets 4 | | J+ 11th 14 | JANS A | 1+000M | 7 | | | | | | | |
| Associated Samples | 1-13, 169909-MB | | | 22 23 25 26, | 170003-MB | | 24 170232-MB | | | Î | | | | | | | |
| Finding RRF (Limit: >0.05) | | | | 50.0 | | | | 8.0.0 | | | | | | | | | |
| Finding %D (Limit: <25.0%) | 5.5% | | | | 30.1 | | 29.2 | | 27.9 | 30,67 | | | | | | | |
| Compound | (+) ZZ | | | 7 2 2 2 2 | (±) - | | kk (+) | 777 | (サール) | | | | | | | | |
| Standard ID | 107011 | | | 10202 | | | F2540 | | | | | | | | | | |
| Date | 9/1/ba | + | | 60/ W/6 | | | 9/4/69 | , | , | | | | | | | | |
| - | T | T | | Ť | | T | | | | | | | | | | | |

LDC #: 21 941C1 SDG #:

VALIDATION FINDINGS WORKSHEET

Page: Reviewer:_ 2nd Reviewer:

Blanks

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was a method blank associated with every sample in this SDG? METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

Note: Was there contamination in the method blanks? If yes, please see the qualifications below. Y Y N N/A N N/A N N/A N N/A

Conc. units:

22,23 Associated Samples:

ろと 25

| Compound | Blank ID | Sample Identification |
|---|-----------|-------------------------------|
| | 170003-MB | |
| 777 | 0, 30 | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Blank analysis date: 9 /4 /69 Conc. units: 49 / | | Associated Samples: 24 (MD) |
| | | |

Sample Identification 170232-MB Blank ID 0,35 0,29 アトト ZZ Compound

| 15 | 2 |
|-------|--------|
| 1012 | J |
| DC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of Reviewer:_ 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: 49 Associated sample units: 40 Associated samp

Blank units: いの/L Associated sample units: いの/たみ Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other.

17-11 Associated Samples: 弘

| | Compound | Blank ID 22 | Blank 10 | | | | Sample Identification | ification | | | |
|--------|--|----------------------------------|----------------|-----------------------------|--------|--------|-----------------------|-----------|----------|------|--|
| | Sampling Date | 9/02/01 | | 7 | 13 | 9 | 20 | | | | |
| | ட | 2 | 12/4 | n/ 11 | 1782 | 3,1/4 | 14 /4 | | | | |
| | ш | 0, 27 | | | | | | | | | |
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| | | | | | | | | | ; | | |
| | | | | | | | | | : | | |
| | | | | | | | | | | | |
| | Blank units: 46 /L Associated sample units: Field blank type: (circle one) (Field Blank Arinsate / | ociated samp | ale units: 2 | いらんと Trip Blank / Other: | Jer: | Associ | Associated Samples: | 21-1 | ٥ | (+9) | |
| | Compound | FB072901-SD Blank ID Blank ID | So Blank-to | | | | Sample Identification | ification | | | |
| | Sampling Date | 7/20/69 | | N | 4 | 2 | 8 | | | | |
| | 1 | 3'5 | | 3.4 /4 | 6,6/4 | h/5.9 | | | | | |
| | · B | 0€′0 | | | | | | | | | |
|) K | 3 | 0.44 | n/25.0 | | | | 0.65/4 | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | CAII OTHERS | rs ein | her MD | W. | > FB | | | | |
| | | | | | | | | | | | |
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| 151 | |
|--------|--------|
| 21 901 | j |
| LDC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET

Page: 2 of 2 Reviewer: JVC 2nd Reviewer:_

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12 -11

Field Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Y/N/N/A Were field blanks identified in this SDG?

Note: Were target compounds detected in the field blanks?

Blank units: 49/L Associated sample units: 45/E8

Field blank type: (circle one) Field Blank | Rinsate / Trip Blank / Other. Y N /N/A

Sample Identification Associated Samples: 7 3 F. B. 08 63 09 - S. Blank ID 8/03/69 30 3 O Sampling Date y Compound

S

Associated sample units: Blank units:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other.

Sample Identification Associated Samples: Blank ID Blank ID Sampling Date Compound

LDC#: 21 441C/

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| | | | | | | | | | <u> </u> | _ | ٤. | \ | | | | | | | | | | | | |
|--------------------|----------------|---------|--------|-----|---------------|-----------|-----|---|-----------------|------------|-------------|-------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | (7 | | | | | | | | (MX) | (l) | 3 | | | | | | | | | | | | | |
| Qualifications | J+dets/p (| | | | | | | | CM |) 4/m3/p (| ZW) | , | | | | | | | | | | | | |
| Associated Samples | 1-13 169969-MB |) | | | 22 23 25, 26 | 170003-MP | | | 14-21 17142-418 | | | | | | | | | | | | | | | |
| RPD (Limits) | () | () | () | () | () | () | () |) | () | () | () | () | () | () | [() | () | () | () | () | () | () | () | () | (|
| LCSD %R (Lmits) | | () | () | () | () | () | () | | () | () | () |] (| () | () | () | () | () | () | () | () | () | () | () | |
| LCS %R (Umits) | (251-52) 601 | 127 () | [(]) | () | 134 () | 130 () | () | | () 87 | 1) >1 | 1 (/) 901 | (,) | () | () | () | () | () | () | () | () | () | () | () | () |
| Compound | μ. | U | - | | В | 1 | | | + | ∢ | MMM | | | | | | | | | | | | | |
| CS/LCSD ID | 527-606691. | | | | 17 0003 - 465 | | | | 170142-145 | | | | | | | | | | | | | | | |
| Oute | - | | | | , | | | | | | | | | | | | | | | | | | | |
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| LDC #:_ | 21991 | CI |
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VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page: | lof1_ |
|---------------|-------|
| Reviewer: | JV6 |
| 2nd reviewer: | 4 |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field duplicate pairs identified in this SDG? Were target compounds detected in the field duplicate pairs?

| | | Concentrati | on (Mg/key) | | Parent |
|----------|----|-------------|-------------|--------------|--------|
| Compound | | 3 | 4 | RPD | only |
| | F | 3.4 | 6.4 | 3,2 (٤ 30 0) | _ |
| | K | 3.4 | 3, 8 | 6,4 (= 7.6) | _ |
| | E | 7.6 U | 1,2 | 6.4 | |
| | cc | 1-8 | 6.7U | 4,9 (=6.70) | |
| | | | | | |

| | | Concentrat | ion (us/fg) | |
|----------|----|------------|--------------|----------------|
| Compound | | 11 | 12 | RPD |
| | M | 1.8 | 0.92 | 0.88 (£14D) - |
| | F | 1.2 | 11 | 1.0 (=270) - |
| | cc | 2.8 | 1.6 | 1.7 (= 6.80) - |
| | | | | |
| | | | | |

| | | Concentration | ug/kg) | |
|----------|----|---------------|--------|---------------|
| Compound | | 18 | 19 | RPD |
| - | M | 3. 4 | 134 | 9.6 (4130) - |
| | cc | 1,0 | 6, 4 U | 5.4 (46.4D) - |
| | | | 5 | |
| | | | | |
| | | | | |

| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | |
| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 10, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905177

Sample Identification

EB091009-SO1 SA126-40B
EB091009-SO2 TB091009-SO2
SA102-10B TB091009-SO3
SA102-30B TB091009-SO4
SA109-10B TB091009-SO5
SA109-25B SA126-40BMS
SA109-25BDL SA126-40BMSD

SA109-25BDL SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B

SA125009-39B SA125-0.5B

SA125-10B

SA126-0.5B

SA126-10B

SA126-18B SA126-25B

Introduction

This data review covers 21 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------------|---|--------|
| 7/17/09 | 2-Methyl-2-propanol | 0.017 (≤0.05) | All water samples in SDG R0905177 | J (all detects) UJ (all non-detects) | А |
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | SA109-25BDL 171659-MB | J (all detects) UJ (all non-detects) | Α |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|--------------------|--|--------------|---|---|--------|
| 9/18/09 (H0910) | Hexachlorobutadiene | 26.1 | SA102-10B SA102-30B SA109-10B SA109-25B 170888-MB | J- (all detects) UJ (all non-detects) | A |
| 9/19/09 | Hexachlorobutadiene 1,2,3-Trichlorobenzene | 35.2 27.1 | SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-0.5B SA125-0.5B SA126-40B SA126-40BMS SA126-40BMSD 171072-MB | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | Α |
| 9/18/09 (F2667) | 2-Methyl-2-propanol | 29.4 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170939-MB | J+ (all detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|--------------------|---------------------|---------------|---|---|--------|
| 9/18/09 (F2667) | 2-Methyl-2-propanol | 0.022 (≥0.05) | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170939-MB | J (all detects) UJ (all non-detects) | А |
| 9/18/09 (F2693) | 2-Methyl-2-propanol | 0.020 (≥0.05) | TB091009-SO4 TB091009-SO5 170939-MB | J (all detects) UJ (all non-detects) | A |
| 9/23/09 | 2-Methyl-2-propanol | 0.027 (≥0.05) | SA109-25BDL 171659-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|--|--|--|
| 170936-MB | 9/18/09 | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Acetone Bromomethane Naphthalene | 0.29 ug/L 0.21 ug/L 2.8 ug/L 0.42 ug/L 0.31 ug/L | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 |
| 170939-MB | 9/19/09 | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Naphthalene | 0.33 ug/L 0.28 ug/L 0.32 ug/L | TB091009-SO4 TB091009-SO5 |
| 171110-MB | 9/21/09 | Dichloromethane | 0.77 ug/Kg | SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B |
| 171659-MB | 9/23/09 | 2-Butanone | 80 ug/Kg | SA109-25BDL |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound TIC (RT in minutes) | Reported Concentration | Modified Final Concentration |
|--------------|---------------------------------|---------------------------|---------------------------------|
| EB091009-SO1 | Acetone | 4.7 ug/L | 4.7U ug/L |
| EB091009-SO2 | Acetone | 4.0 ug/L | 4.0U ug/L |
| SA109-25BDL | 2-Butanone | 170 ug/Kg | 170U ug/Kg |

Samples TB091009-SO2, TB091009-SO3, TB091009-SO4, and TB091009-SO5 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|----------|---------------|---|
| TB091009-SO3 | 9/10/09 | Acetone | 6.9 ug/L | EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124-009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-39B SA125-0.5B SA125-10B SA126-10B SA126-10B SA126-10B SA126-10B SA126-10B SA126-25B SA126-25B SA126-40B |
| TB091009-SO4 | 9/10/09 | Acetone | 2.4 ug/L | EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-39B SA125-0.5B SA125-10B SA126-10B SA126-10B SA126-0.5B SA126-0.5B SA126-0.5B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------|---------------------------|---------------------------------|
| EB091009-SO1 | Acetone | 4.7 ug/L | 4.7U ug/L |
| EB091009-SO2 | Acetone | 4.0 ug/L | 4.0U ug/L |
| SA109-10B | Acetone | 5.5 ug/Kg | 5.5U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|----------|---------------------------|---------------------------------|
| SA109-25B | Acetone | 13 ug/Kg | 13U ug/Kg |
| SA109-34B | Acetone | 13 ug/Kg | 13U ug/Kg |
| SA125-10B | Acetone | 8.9 ug/Kg | 8.9U ug/Kg |
| SA126-0.5B | Acetone | 4.8 ug/Kg | 4.8U ug/Kg |
| SA126-25B | Acetone | 12 ug/Kg | 12U ug/Kg |

Samples EB091009-SO1 and EB091009-SO2 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|---|--|-------------------------------------|
| EB091009-SO1 | 9/10/09 | 1,4-Dichlorobenzene Acetone Benzene Dichloromethane Toluene | 0.51 ug/L 4.7 ug/L 0.36 ug/L 8.3 ug/L 1.9 ug/L | All soil samples in SDG R0905177 |
| EB091009-SO2 | 9/10/09 | Acetone Toluene Trichlorofluoromethane | 4.0 ug/L 0.32 ug/L 4.4 ug/L | All soil samples in SDG R0905177 |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------------------------|---------------------------|---------------------------------|
| SA102-10B | Toluene | 0.48 ug/Kg | 0.48U ug/Kg |
| SA102-30B | Toluene | 0.50 ug/Kg | 0.50U ug/Kg |
| SA109-10B | Acetone Toluene | 5.5 ug/Kg 0.58 ug/Kg | 5.5U ug/Kg 0.58U ug/Kg |
| SA109-25B | Dichloromethane Toluene | 0.80 ug/Kg 0.82 ug/Kg | 0.80U ug/Kg 0.82U ug/Kg |
| SA109-34B | Toluene | 0.58 ug/Kg | 0.58U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|-----------------------------------|---------------------------|---------------------------------|
| SA124009-10B | Toluene | 0.49 ug/Kg | 0.49U ug/Kg |
| SA124-0.5B | Toluene | 1.3 ug/Kg | 1.3U ug/Kg |
| SA124-10B | Toluene | 3.7 ug/Kg | 3.7U ug/Kg |
| SA125-25B | Toluene | 0.36 ug/Kg | 0.36U ug/Kg |
| SA125-39B | Dichloromethane Toluene | 0.55 ug/Kg 0.48 ug/Kg | 0.55U ug/Kg 0.48U ug/Kg |
| SA125009-39B | Trichlorofluoromethane | 1.8 ug/Kg | 1.8U ug/Kg |
| SA125-0.5B | Toluene | 0.47 ug/Kg | 0.47U ug/Kg |
| SA125-10B | Acetone Trichlorofluoromethane | 8.9 ug/Kg 1.8 ug/Kg | 8.9U ug/Kg 1.8U ug/Kg |
| SA126-0.5B | Acetone Toluene | 4.8 ug/Kg 0.61 ug/Kg | 4.8U ug/Kg 0.61U ug/Kg |
| SA126-10B | Toluene | 1.0 ug/Kg | 1.0U ug/Kg |
| SA126-18B | Toluene | 0.45 ug/Kg | 0.45U ug/Kg |
| SA126-25B | Toluene | 0.49 ug/Kg | 0.49U ug/Kg |
| SA126-40B | Toluene | 0.53 ug/Kg | 0.53U ug/Kg |

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905177 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------------------------|---------------------------|---------------------------------|
| SA102-10B | Toluene | 0.48 ug/Kg | 0.48U ug/Kg |
| SA102-30B | Toluene | 0.50 ug/Kg | 0.50U ug/Kg |
| SA109-10B | Acetone Toluene | 5.5 ug/Kg 0.58 ug/Kg | 5.5U ug/Kg 0.58U ug/Kg |
| SA109-25B | Toluene | 0.82 ug/Kg | 0.82U ug/Kg |
| SA109-34B | Toluene | 0.58 ug/Kg | 0.58U ug/Kg |
| SA124009-10B | Toluene | 0.49 ug/Kg | 0.49U ug/Kg |
| SA125-25B | Toluene | 0.36 ug/Kg | 0.36U ug/Kg |
| SA125-39B | Dichloromethane Toluene | 0.55 ug/Kg 0.48 ug/Kg | 0.55U ug/Kg 0.48U ug/Kg |
| SA125-0.5B | Toluene | 0.47 ug/Kg | 0.47U ug/Kg |
| SA126-0.5B | Acetone Toluene | 4.8 ug/Kg 0.61 ug/Kg | 4.8U ug/Kg 0.61U ug/Kg |
| SA126-18B | Toluene | 0.45 ug/Kg | 0.45U ug/Kg |
| SA126-25B | Toluene | 0.49 ug/Kg | 0.49U ug/Kg |
| SA126-40B | Toluene | 0.53 ug/Kg | 0.53U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|-------------------------|---------------------|----------------------|-----------------|--|--------|
| SA126-40BMS/MSD (SA126-40B) | Dichlorodifluoromethane | 49 (70-130) | 49 (70-130) | • | J- (all detects) UJ (all non-detects) | A |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|--|----------------------------|---|--|--------|
| 170936-LCS | 2-Methyl-2-propanol | 130 (75-125) | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170936-MB | J+ (all detects) | Р |
| 170936-LCS | Dichlorodifluoromethane | 70 (75-125) | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170936-MB | J- (all detects) UJ (all non-detects) | Р |
| 170939-LCS | Dichlorodifluoromethane | 64 (75-125) | TB091009-SO4 TB091009-SO5 170939-MB | J- (all detects) UJ (all non-detects) | Р |
| 170888-LCS | Carbon tetrachloride Dichlorodifluoromethane | 66 (75-125) 71 (75-125) | SA102-10B SA102-30B SA109-10B SA109-25B 170888-MB | J- (all detects) UJ (all non-detects) | Р |
| 171072-LCS | Dichlorodifluoromethane | 73 (75-125) | SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-009-39B SA125-0.5B SA126-40B 171072-MB | J- (all detects) UJ (all non-detects) | Р |
| 171110-LCS | Dichlorodifluoromethane | 67 (75-125) | SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B 171110-MB | J- (all detects) UJ (all non-detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|-----------|------------|---|---|-----------------|--------|
| SA109-25B | Chloroform | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects) | А |

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905177 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|-------------|--|------|--------|
| SA109-25B | Chloroform | × | Α |
| SA109-25BDL | All TCL compounds except Chloroform | X | А |

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

XVI. Field Duplicates

Samples SA124009-10B and SA124-10B and samples SA125-39B and SA125009-39B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentrati | on (ug/Kg) | 555 | D:# | | |
|------------|--------------|------------|-----------------|------------------------|-----------------|--------|
| Compound | SA124009-10B | SA124-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 1.3 | 1.6 | - | 0.3 (≤13) | - | - |
| Acetone | 63 | 19 | - | 44 (≤26) | J (all detects) | А |
| Chloroform | 0.97 | 0.87 | - | 0.10 (≤6.5) | - | - |
| Toluene | 0.49 | 3.7 | - | 3.21 (≤6.5) | - | - |

| | Concentration (ug/Kg) | | | | | |
|------------------------|-----------------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA125-39B | SA125009-39B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| Chloroform | 44 | 41 | 7 (≤50) | - | - | - |
| Dichloromethane | 0.55 | 4.8U | - | 4.25 (≤4.8) | - | - |
| Toluene | 0.48 | 4.8U | - | 4.32 (≤4.8) | - | - |
| 2-Butanone | 11U | 0.96 | - | 10.04 (≤11) | | |
| Trichlorofluoromethane | 5.6U | 1.8 | - | 3.8 (≤5.6) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905177

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|--|---|--------|--|
| R0905177 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-25BDL | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | A | Initial calibration (RRF) (c) |
| R0905177 | SA102-10B SA102-30B SA109-10B SA109-25B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905177 | SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA126-40B | Hexachlorobutadiene 1,2,3-Trichlorobenzene | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | A | Continuing calibration (%D) (c) |
| R0905177 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 | 2-Methyl-2-propanol | J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905177 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-25BDL | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905177 | SA126-40B | Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) | A | Matrix spike/Matrix spike duplicates (%R) (m) |
| R0905177 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 | 2-Methyl-2-propanol | J+ (all detects) | Р | Laboratory control samples (%R) (I) |

| 0.00 | 0 | | | | D (2.1) |
|----------|---|--|--|--------|--|
| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
| R0905177 | EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-0.5B SA125-0.5B SA125-0.5B SA126-40B SA126-10B SA126-10B SA126-10B SA126-10B SA126-10B SA126-10B SA126-10B SA126-10B | Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) | P | Laboratory control samples (%R) (I) |
| R0905177 | SA102-10B SA102-30B SA109-10B SA109-25B | Carbon tetrachloride Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905177 | SA109-25B | Chloroform | J (all detects) | А | Project Quantitation Limit (e) |
| R0905177 | EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124-009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125-39B SA125-0.5B SA125-10B SA126-10B | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |
| R0905177 | SA109-25B | Chloroform | х | A | Overall assessment of data (o) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---------------------------|--|-----------------|--------|---------------------------------------|
| R0905177 | SA109-25BDL | All TCL compounds except Chloroform | x | А | Overall assessment of data (o) |
| R0905177 | SA124-10B SA124009-10B | Acetone | J (all detects) | Α | Field duplicates (Difference) (fd) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905177

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|--------------|---------------------------------|---------------------------------|--------|------|
| R0905177 | EB091009-SO1 | Acetone | 4.7U ug/L | Α | Ы |
| R0905177 | EB091009-SO2 | Acetone | 4.0U ug/L | А | Ы |
| R0905177 | SA109-25BDL | 2-Butanone | 170U ug/Kg | Α | Ы |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905177

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|----------|---------------------------------|--------|------|
| R0905177 | EB091009-SO1 | Acetone | 4.7U ug/L | А | bt |
| R0905177 | EB091009-SO2 | Acetone | 4.0U ug/L | А | bt |
| R0905177 | SA109-10B | Acetone | 5.5U ug/Kg | А | bt |
| R0905177 | SA109-25B | Acetone | 13U ug/Kg | Α | bt |
| R0905177 | SA109-34B | Acetone | 13U ug/Kg | А | bt |
| R0905177 | SA125-10B | Acetone | 8.9U ug/Kg | А | bt |
| R0905177 | SA126-0.5B | Acetone | 4.8U ug/Kg | А | bt |
| R0905177 | SA126-25B | Acetone | 12U ug/Kg | Α | bt |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905177

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|-----------------------------------|---------------------------------|--------|------|
| R0905177 | SA102-10B | Toluene | 0.48U ug/Kg | Α | be |
| R0905177 | SA102-30B | Toluene | 0.50U ug/Kg | А | be |
| R0905177 | SA109-10B | Acetone Toluene | 5.5U ug/Kg 0.58U ug/Kg | А | be |
| R0905177 | SA109-25B | Dichloromethane Toluene | 0.80U ug/Kg 0.82U ug/Kg | А | be |
| R0905177 | SA109-34B | Toluene | 0.58U ug/Kg | А | be |
| R0905177 | SA124009-10B | Toluene | 0.49U ug/Kg | А | be |
| R0905177 | SA124-0.5B | Toluene | 1.3U ug/Kg | А | be |
| R0905177 | SA124-10B | Toluene | 3.7U ug/Kg | А | be |
| R0905177 | SA125-25B | Toluene | 0.36U ug/Kg | А | be |
| R0905177 | SA125-39B | Dichloromethane Toluene | 0.55U ug/Kg 0.48U ug/Kg | A | be |
| R0905177 | SA125009-39B | Trichlorofluoromethane | 1.8U ug/Kg | А | be |
| R0905177 | SA125-0.5B | Toluene | 0.47U ug/Kg | А | be |
| R0905177 | SA125-10B | Acetone Trichlorofluoromethane | 8.9U ug/Kg 1.8U ug/Kg | А | be |
| R0905177 | SA126-0.5B | Acetone Toluene | 4.8U ug/Kg 0.61U ug/Kg | A | be |
| R0905177 | SA126-10B | Toluene | 1.0U ug/Kg | А | be |
| R0905177 | SA126-18B | Toluene | 0.45U ug/Kg | А | be |
| R0905177 | SA126-25B | Toluene | 0.49U ug/Kg | А | be |
| R0905177 | SA126-40B | Toluene | 0.53U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905177

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|----------------------------|---------------------------------|--------|------|
| R0905177 | SA102-10B | Toluene | 0.48U ug/Kg | А | bf |
| R0905177 | SA102-30B | Toluene | 0.50U ug/Kg | А | bf |
| R0905177 | SA109-10B | Acetone Toluene | 5.5U ug/Kg 0.58U ug/Kg | А | bf |
| R0905177 | SA109-25B | Toluene | 0.82U ug/Kg | А | bf |
| R0905177 | SA109-34B | Toluene | 0.58U ug/Kg | А | bf |
| R0905177 | SA124009-10B | Toluene | 0.49U ug/Kg | А | bf |
| R0905177 | SA125-25B | Toluene | 0.36U ug/Kg | А | bf |
| R0905177 | SA125-39B | Dichloromethane Toluene | 0.55U ug/Kg 0.48U ug/Kg | А | bf |
| R0905177 | SA125-0.5B | Toluene | 0.47U ug/Kg | А | bf |
| R0905177 | SA126-0.5B | Acetone Toluene | 4.8U ug/Kg 0.61U ug/Kg | А | bf |
| R0905177 | SA126-18B | Toluene | 0.45U ug/Kg | А | bf |
| R0905177 | SA126-25B | Toluene | 0.49U ug/Kg | А | bf |
| R0905177 | SA126-40B | Toluene | 0.53U ug/Kg | А | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

| LDC #: | 21991D1 | VALIDATION COMPLETENESS WORKS |
|----------|----------------------|-------------------------------|
| SDG #:_ | R0905177 | _ Stage 2B |
| labarata | ne Columbia Analytic | al Comingo |

Page: _of_\ Reviewer: _**3/** 2nd Reviewer: _

Laboratory: Columbia Analytical Services

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|-----|---|
| l. | Technical holding times | A | Sampling dates: 9/10/69 |
| 11. | GC/MS Instrument performance check | A | • |
| HI. | Initial calibration | ZM | 3 RSD r |
| IV. | Continuing calibration/ | WZ | cw = 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SM | |
| VIII. | Laboratory control samples | SW | · KS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | 2M | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | ZM | |
| XVI. | Field duplicates | SW | $D_1 = 9$, 11 $D_2 = 13,14$ EB = 1, 7 $TB = 22,23,24, 35 TB = FB = 10,12$ |
| XVII. | Field blanks | ∠M, | EB = 1, γ TB = 22,23, γ 4 χ 5 = FB 072 (R0 90 |

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

plicable R = Rinsate et FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water + Soil

| | · · · · · · | τ, | 1 2011 | | | | |
|------------|----------------|------|---------------------------|------|----------------|----------|-----------|
| 1 | EB091009-SO1 | J 11 | 4 SA124-10B D 1 S | 21 4 | SA126-40B | + 31/ | 170936-MB |
| 2 | EB091009-SO2 | / 12 | SA125-25B | 22 | TB091009-SO2 W | 32 | 170888 - |
| 3 7 | SA102-10B | 13 | SA125-39B D | 23 1 | TB091009-SO3 | 33 | 171659- |
| 4 ٢ | SA102-30B | 14 | ⁴ SA125009-39B | + 6 | TB091009-SO4 | 34 4 | 171672- |
| 5 7 | SA109-10B | 15 | 9 SA125-0.5B | 25 6 | TB091009-SO5 | 35 | 171110 - |
| 6 ~ | SA109-25B | 16 | SA125-10B | 26 4 | SA126-40BMS S | 36 | 170 939- |
| 7 3 | SA109-25BDL | 17 | SA126-0.5B | 27 4 | SA126-40BMSD | 37 | |
| 8 4 | SA109-34B | 18 | SA126-10B | 28 | | 38_ | |
| 9 4 | SA124009-10B 4 | 19 | SA126-18B | 29 | | 39 | |
| 10 4 | SA124-0.5B | 20 | SA126-25B | 30 | | 40 | |

ND = No compounds detected

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| B. Bromomethane V. Benzene C. Vinyl chordethane W. trans-1,3-Dichloropropene D. Chloroethane X. Bromoform* E. Methylene Chordethane Y. 4-Methyl-2-pentanone F. Acetone Z. 2-Hexanone | | | | |
|--|---------------------------------|-------------------------------|--|---------------------------|
| | | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| | rcnioropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| | | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| | pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Actyonitrile |
| | | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide AA. Tetrachloroethene | oethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dkchloroethene** BB. 1,1,2,2-Tetr | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP, trans-1,2-Dichloroethene | JJJJ. Methacrytonitrile |
| I. 1,1-Dichloroethane* | | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total DD, Chlorobenzene* | *enez | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL, Ethyl ether |
| K. Chloroform** EE. Ethylbenzene** | ene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane FF. Styrene | | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanol |
| M. 2-Butanone GG. Xylenes, total | total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane HH. Vinyl acatate | ate | BBB. 4-Chlorotoluene | VVV. 4-Ethyttoluene | рррр. |
| O. Carbon tetrachloride II. 2-Chloroethyfvinyl ether | ylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | 0000. |
| P. Bromodichloromethane JJ. Dichlorodifluoromethane | luoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** KK. Trichlorofluoromethane | uoromethane | EEE. sec-Butylbenzene | YYY, tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene LL. Methyl-tert-butyl ether | -butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl akochol | TITI. |
| S. Trichloroethene MM. 1,2-Dibrorr | MM. 1,2-Dibromo-3-chloropropane | GGG. p-isopropyitoluene | AAAA. Ethyl tert-butyl ether | ບບບບ. |
| T. Dibromochloromethane NN. Methyl ethyl ketone | nyi ketone | HHH. 1,4-Dichlorobenzene | BBBB, tert-Amyl methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

| DC #: //141 P/ | 30G#: 32 Car |
|----------------|--------------|

VALIDATION FINDINGS WURNSHEET

Initial Calibration



AETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Ware a curve fit used for evaluation? $\frac{1}{100} = \frac{1}{100}

Did the initial calibration meet the acceptance criteria?

| z X X | A A | Did the initial calibration meet the acceptance oriena? Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? | meet the acceptance RFs within the validation | on criteria of ≤30 %F | RSD and ≥0.05 RRF? | | |
|-------------|----------|--|--|------------------------------|-------------------------------|-----------------------|----------------|
| # | Date | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
| | 7 1/7/04 | 7 \$3 | ZXXZ | | 0, 017 | 1, 2, 22-25 170936-AN | |
| | | | | | | 170931-MB | |
| | | | | | | | |
| | | | | | | | |
| ما | 9/18/69 | 1547 | NNN | | 0,028 | / WINSHIMP | |
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SDG#: See Comme LDC # 21991 D/

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of Reviewer. 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Y N N/A N/A N/A

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of ${\le}25$ %D and ${\ge}0.05$ RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|---|----------|-------------|----------|-------------------------------|-------------------------------|-------------------------|----------------|
| | 4/8/69 | H0910 | (-) 111 | 26.1 | | 3-6, 170888- MB | J-/W/A (c) |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | 9 Na /09 | 27 60 H | (-) 111 | 25.5 | | 8-15, 21, 26, 27 | |
| | | | (-) NNN | 17. | | 171072 -MB | -> |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | 60/81/6 | F2667 | クマンタ | | 0.022 | 1, 2, 22, 23, 170929-MB | 8 JMI/A |
| | | | HUNNN | 29.4 | | | J+ acts A |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | 4/18/69 | F2693 | 2227 | | 0.620 | 24 25, 170931-MB | J/W # |
| | | | | | | | |
| | | | | | | | |
| | , | 1 | | | 1000 | 7 12 16 76 141 | 7 4, 7 4 |
| | 7/23/04 | 2 | 2 2 2 | | , | | 7 |
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219912 LDC #:_ SDG #:

VALIDATION FINDINGS WORKSHEET

Blanks

Page: Reviewer: 2nd Reviewer.

> Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank associated with every sample in this SDG? Was a method blank analyzed at least once every 12 hours for each matrix and concentration? Was there contamination in the method blanks? If yes, please see the qualifications below. Find analysis date: $\frac{1}{1000}$

| Conc. units: vg L | | | As | Associated Samples: 1, 2, | 1,2,22,23 | | (64) | |
|-----------------------------|-----------|--------|-------|---------------------------|-----------------------|-------|------|--|
| Compound | Blank ID | | | | Sample Identification | ation | | |
| | 170936-NB | 1 8 | 7 | | | | | |
| NNN | 0.29 | | | | | | | |
| KKK | 0.2 | | | | | | | |
| II_ | 2.8 | 4.7 /u | 4.0/4 | | | | | |
| 8 | 0.42 | | | | | | | |
| MMM | 6.0 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Blank analysis date: 9/4/64 | | | < | | 24 X | (44) | | |
| | | | AS | Associated Samples: | | /dr. | | |
| Compound | Blank ID | | | | Sample Identification | ıtion | | |
| | 170939-MB | | | | | | | |
| 222 | 0.33 | | | | | | | |
| YXX | 0.28 | | | | | | | |
| P. P. P. | 0.32 | | | | | | | |
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SDG #: Su Cary

VALIDATION FINDINGS WORKSHEET

Page:__

2nd Reviewer: Reviewer

Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a method blank associated with every sample in this SDG?
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 6/21/09 Conc. units:

16-20 Associated Samples:

(AM)

Sample Identification Sample Identification Associated Samples: 176 171659-M 171110-MB Blank ID 0.77 8 Blank analysis date: 9 /23 /6 9 W Compound Compound Ξ Conc. units:

LDC #: 2/ 44 | D |
SDG #: 3 c Cm-

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer: 34 2nd Reviewer: Page:_

МЕТНОD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field blanks identified in this SDG? Y N/N/A

| | 11 | | | | | 3.7/4 | | | | |
|-------------|--|--------------------------|------------------------------|-------------------------------|--------------------------|--------------------------|--|--|---|---|
| | Q | | | | | 1.3/4 | | | | |
| | 6 | | | | | 0.49/W | | | | |
| ıtification | 8 | | | | | 1.58/4 | | | | |
| Sample Ider | J | | | | h/08.0 | 0.82/4 C | | | | |
| | ک | | h/ 5's | • |) | 1 1/850 | | | | |
| | 4 | | | | | h/as 0 | | | | |
| | 4 | | | | | 0,48/y | | | | |
| Blank ID | 9 | | 4.0 | | | 0.32 | 4.4 | | | |
| Blank ID | 9/0/6 | 15.0 | 4.7 | 98.0 | 8.3 | 1.9 | 1 | | | |
| Compound | Samnling Date | ### | 1 | .> | Œ | 3 | メン | | | |
| | Compound Blank ID Blank ID Sample Identification | Sample Identification C | Sample Identification C C 8 | Sample Identification 5.5 /4 | Sample Identification 2 | Sample Identification 4 | Sample Identification 5.5 \(\(\text{V} \) \(\text{Sample Identification} \) 6.80 \(\text{V} \) \(0.58 \text{V} \) | Compound Blank ID 1 Blank ID 2 3 4 5 C C 8 9 10 11 HHH 0,51 +0 5.5 /ч 6.5 /ч 6.8 /ч 6.48 /ч 6.5 /ч 6.5 /ч 6.49 /ч 6.49 /ч 6.28 /ч 6.49 /ч 6.27 /ч 6.49 /ч | Compound Blank ID 7 3 4 5 C C Sample Identification HHH 0.51 4.0 4.0 5.5 /4 6 6 6 11 Y 0.36 4.0 5.5 /4 6.80 /4 6.80 /4 6.80 /4 6.49 /4 1.3/4 3.7 /4 KK 4.4 4.4 4.4 6.50 /4 6.58 /4 6.49 /4 1.3/4 3.7 /4 | Compound Blank ID 1 Blank ID 2 3 4 € C B 9 11 HHH 0,51 4.0 5 4 6 6 6 11 F 4,7 4.0 6.36 6.80/µ 6.80/µ 6.80/µ 6.80/µ 1.37/µ 3.7/µ E 8.3 6.48/µ 6.58/µ 6.58/µ 6.44/µ 1.37/µ 3.7/µ KR 4.4 4.4 4.4 5.5/µ 6.58/µ 6.58/µ 6.44/µ 1.37/µ 3.7/µ |

200

Same Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other. Associated sample units: Blank units:

abre

Z

Associated Samples:

1.0/4 7 4.8/4 و. و ا 7 Sample Identification 2.0 ∞. 0,47/4 28:-0.48/M 0,55/4 D.36/4 Blank ID 0.32 Blank ID 15.0 4.7 0.36 ∞. √ 7 エエエ Sampling Date スト ႘ Compound

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Yof > Reviewer: 36 2nd Reviewer:

(be)

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

SDG# Tre Cony LDC #: 4121171

Y N /N/A Were field blanks identified in this SDG?

V N N/A Were target compounds detected in the field blanks?

Blank units: V5 / L5

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other

Ay Soils Sample Identification Associated Samples: 石田 0.53/4 n 0.49 2 Blank ID 0,32 4.0 4.4 Blank ID 0.36 15.0 8 4.7 Sampling Date キャル 44 Compound

Associated Samples: 84/89 : Blank units: Ng /L Associated sample units: N5/L; Ng/kg Field blank type: (circle one) Field Blank / Rinsate (Trip Blank / Other.

All except

bt.

2

8.9/4

Sample Identification Blank ID 29 Blank ID 24 9 10 10g

3 4.0 Compound

4,4

VALIDATION FINDINGS WORKSHEET Field Blanks

10 15 mm

SDG #: LDC #:

Page: 3 of 2 Reviewer: 372 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Y N /N/A Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Lo L Associated sample units: V6/K5

Lordo Const Early Blank Directed Trin Blank / Other V/N N/A Blank units:

A11 Seile

| | | 13 | | n/25.0 | 0.48/4 | | | | | // | | | | | | | | | |
|--|--------------------------|---------------|-------|--------|---------|--|--|---|--------------------------|---------------------|------------------------------------|---------------|-------|-------|------------------------|---|------|------|--|
| | | / | | 0,0 | | | | | 7 7 | | | | | | | | | | |
| | | /2 | | | 6.36/4 | | | | | | | | | | | | | | |
| Ties | | 6 | | | 0.49/4 | | | | | | | | | | | | | | |
| s: A1/ | Sample Identification | 8 | | | 0.58/4 | | | | | S: | ntification | / < | | | N.53/N | | | | |
| Associated Samples: | Sample Ide | J | 簽 | | 0.82/4 | | | | | Associated Samples: | Sample Identification | 20 | | | 0. 49 /U | | | | |
| Assoc | | ν | h/5'5 | | 0.58/41 | | | | as above | Associ | | 19 | | | 0.45/4 | | | | |
| her: | | 4 | | | b/ 05.0 | | | | Same a | ier: | | 17 | 4.8/4 | | 0.61/4 | | | | |
| ip Blank / Other: | | n | | | 0.48 /u | | | | 9 | ip Blank / Oth | | 15 | | | 0.47/4 | | | | |
| Rinsate / Tr | Blank ID | | | | | | | | le units: | / Rinsate / Tr | 1-50 Blank ID | | | | | | | | |
| Field Blank | F-2072404-50 Blank ID | 7/24/69 | 3.5 | 0.33 | 0,44 | | | · | Associated sample units: |) Field Blank | FB67 29 61-50 Blank ID Blank ID | 7/29/69 | 3.5 | 06.90 | 0.94 | - | | | |
| Field blank type: (circle one) Field Blank/ Rinsate / Trip Blanl | Compound | Sampling Date | Щ | E | 33 | | | | nits: Asso | ype: (circle | Compound | Sampling Date | 4 | T) | $\alpha_{\mathcal{C}}$ | | | | |
| Field bl | | | | Q. | 75 | | | | Blank units: | Field bla | | | | | | | | | |

LDC #: 24 441 D)

SDG #: Cee Cory

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of Reviewer: OLZ

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated YN N/A

MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| * | ę. | di OSM/SM | Compand | MS (1 mits) | MSD %R (Limits) | RPO (Limits) | Aesociated Samples | Oualifications |
|------------|-----|--------------------|---------------------------------------|----------------|--------------------|--------------|--------------------|----------------|
| ╁ | | 1 Comon | 10 10 19 | (of 1.05) | (421 42) 27 | | 21 | No med (108th |
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| | | Compound | punc | ac Li | QC Limits (Soll) | RPD (Soll) | QC Limits (Water) | RPD (Water) |
| | ī | 1,1-Dichloroethene | | 69 | 59-172% | < 22% | 61-145% | < 14% |
| | S. | Trichloroethene | | 62 | 62-137% | < 24% | 71-120% | < 14% |
| | ۷. | Benzene | | 99 | 66-142% | < 21% | 76-127% | < 11% |
| | CC. | Toluene | | 59 | 59-139% | < 21% | 76-125% | < 13% |
| | 2 | Chlorobenzene | | 9 | 60-133% | < 21% | 75-130% | s 13% |

LDC#: 2/441 D) SDG #: 54

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| | \mathcal{Z} | _ | | | | | | | | | | | | | <u> </u> | > | | | | | | | | |
|---------------------|--------------------|---------|-----|-----|-----------------|-----|-----|---------------|---------|-----|-----|-------------------|-----|-------|-----------------|-------------|----------|-----|-----|-----|-----|-----|-----|-----|
| Qualifications | 5 J+1008/P (| J-/MJ/P | , | | J-113 A | | | J-/MT /P | Ţ | | | 5-14519 | | | J-/M/P | | | | | | | | | |
| Associated Samples | 2 22, 23 170986+MB | | | | 24 25 170939-MB | | | 3-6 170888-MB | | | | 8-15 21 171672-MB | | | 16-20 171110-MD | , | | | | | | | | |
| RPD (Limits) | / () | () | () | () | () | () | () | | () | () | () | () | () | () |) (|]() | () | () | () | () | () | () | () |) |
| LCSD %R (Limits) | () | () | () | () | () | () | () | | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () |
| LCS %R (Limits) | (351-55) 06) | (1) % | () | () | () †9 | () | () | 1 7 7 7 7 7 7 | () (| () | (| 73 () | () | (') | 67 (V) | () | () | (| () | () | () | () | () | () |
| Compound | NNN | 77 | 1 | | けら | | | 0 | 157 | | | 7.7 | | | 777 | | | | | | | | | |
| LCS/LCSD ID | 170926-165 | | | | 170939-165 | | | 170688-165 | | | | 171072-165 | | | M1110 - LCS | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | | | • | | | | | | |
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| 191101 | Section |
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| ** | # |
| | SDG |

VALIDATION FINDINGS WORKSHEE! Compound Quantitation and CRQLs

rage: or Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Y N KI/A

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

| ations | J dots 14 (e) | | | | | | | | | | | | |
|--------------------|---------------|---|----------|----------|---|--|---|----------|---|--|---|---|--|
| Associated Samples | 000 | 9 | | | | | | | | | | | |
| Finding | CAS F. | | | | | | | | | | | | |
| Sample ID | 9 | | | | | | | | | | | | |
| Date | | | | | | | , | | | | | | |
| * | | | <u> </u> | <u> </u> | L | | | <u> </u> | L | | 1 |] | |

Comments: See sample calculation verification worksheet for recalculations

SDG #: 24 (200)

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: of A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N/A Was the overall quality and usability of the data acceptable?

| # | Date | Sample ID | Finding | Associated Samples | Qualifications | |
|-------------|-----------|-----------|--------------|--------------------|----------------|---|
| | | 9 | K > CN range | | X /A (6 | |
| | | | 0 | | | _ |
| | | 7 | All except K | di) | | 7 |
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| l o | Comments: | | | | | |
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LDC #: >1991 D/ SDG #: Su Come/

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | <u></u> of_)_ |
|---------------|---------------|
| Reviewer: | JVR |
| 2nd reviewer: | W |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| 1 | Y | N | N/A |
|---|---|---|-----|
| ŀ | Ŋ | N | N/A |

Were field duplicate pairs identified in this SDG? Were target compounds detected in the field duplicate pairs?

| | | Concentration | n us/ter | PA | irent |
|----------|----|---------------|----------|------------------|-------|
| Compound | | ſ | 91 | RPD ⁶ | only |
| | M | 1.3 | 1.6 | 0.3 (=130) | 900 |
| | | 63 | 19 | 44 (<260) Jd | ots/A |
| | K | 0.97 | 0.87 | 0.10 (£ 6.5 A) | _ |
| | cc | 0,49 | 3.7 | 3,21 | |
| | | | | | |

| | | Concentration | n us/se | | Parent |
|----------|----|---------------|---------|----------------|--------|
| Compound | | 13 | 14 | RPD | orly |
| | k | 44 | 41 | 7 (450% RPD) | • |
| | E | 0,55 | 4.8 U | 4.25 (£ 4.8 D) | , |
| | a | 0,48 | 4.8 U | 4.32 | - |
| | M | 11 U | 0.91 | 10.04 (= 110) | , |
| | KK | 5,6 U | 1.8 | 3.8 (45.6D) | - |

| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | |
| | | |

| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
| | | |
| | | |
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| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 9, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905138

Sample Identification

SA187-10B SA122-0.5B SA187-25B SA122-10B SA122-20B SA187-39B SA122-31B SA45-10B SA45-25B TB090909-SO1 TB090909-SO2 SA45-36B TB090909-SO3 SA186-10B RSAQ5-41BMS SA186-25B SA186-37B RSAQ5-41BMSD

SA188-10B SA188-25B

SA188-37B

RSAQ5-0.5B

RSAQ5-10B

RSAQ5-25B

RSAQ5-41B

SA31-20B

SA31-32B

SA31-0.5B

SA31-10B

Introduction

This data review covers 26 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------------|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≥0.05) | All water samples in SDG R0905138 | J (all detects) UJ (all non-detects) | A |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---|--|---|--|--------|
| 9/17/09 | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene n-Butylbenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene | 25.2 25.5 25.3 25.8 43.7 25.5 26.5 | SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B RSAQ5-41B RSAQ5-41BMS RSAQ5-41BMSD 170690-MB | J- (all detects) UJ (all non-detects) | A |
| 9/18/09 | Hexachlorobutadiene | 26.1 | RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B 170888-MB | J- (all detects) UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------------|---|--------|
| 9/22/09 | 2-Methyl-2-propanol | 0.025 (≥0.05) | All water samples in SDG R0905138 | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples TB090909-SO1, TB090909-SO2, and TB090909-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|--|------------------------------------|--|
| TB090909-SO1 | 9/9/09 | 2-Methyl-2-propanol Acetone | 6.0 ug/L 9.1 ug/L | SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B |
| TB090909-SO2 | 9/9/09 | Bromoform Chloromethane Dibromochloromethane | 1.1 ug/L 0.92 ug/L 0.70 ug/L | RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-10B SA122-20B SA122-31B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------|---------------------------|---------------------------------|
| SA45-36B | Acetone | 9.7 ug/Kg | 9.7U ug/Kg |
| SA186-10B | Acetone | 12 ug/Kg | 12U ug/Kg |

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905138 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|---------------------------------------|---------------------------------------|--|
| SA187-10B | Toluene | 0.60 ug/Kg | 0.60U ug/Kg |
| SA187-39B | Toluene | 0.61 ug/Kg | 0.61U ug/Kg |
| SA186-10B | Toluene | 0.37 ug/Kg | 0.37U ug/Kg |
| SA188-10B | Toluene | 0.33 ug/Kg | 0.33U ug/Kg |
| SA188-25B | Toluene | 0.51 ug/Kg | 0.51U ug/Kg |
| RSAQ5-41B | Acetone Toluene | 4.0 ug/Kg 0.36 ug/Kg | 4.0U ug/Kg 0.36U ug/Kg |
| SA122-0.5B | Acetone Dichloromethane Toluene | 3.0 ug/Kg 0.59 ug/Kg 0.65 ug/Kg | 3.0U ug/Kg 0.59U ug/Kg 0.65U ug/Kg |
| SA122-10B | Dichloromethane Toluene | 0.55 ug/Kg 0.54 ug/Kg | 0.55U ug/Kg 0.54U ug/Kg |
| SA122-20B | Acetone | 2.8 ug/Kg | 2.8U ug/Kg |
| SA122-31B | Toluene | 0.41 ug/Kg | 0.41U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|---|---|---|-----------------|--|--------|
| RSAQ5-41BMS/MSD (RSAQ5-41B) | Chloromethane Dichlorodifluoromethane Hexachlorobutadiene | 59 (70-130) 41 (70-130) 49 (70-130) | 64 (70-130) 45 (70-130) 49 (70-130) | - - - | J- (all detects) UJ (all non-detects) | А |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|---|---|--|---|--------|
| 170690-LCS | Chloromethane Dichlorodifluoromethane Hexachlorobutadiene | 71 (75-125) 69 (75-125) 69 (75-125) | SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-10B RSAQ5-41B 170690-MB | J- (all detects) UJ (all non-detects) | Р |
| 170888-LCS | Carbon tetrachloride Dichlorodifluoromethane | 66 (75-125) 71 (75-125) | RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B 170888-MB | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905138 | All compounds reported below the PQL. | J (all detects) | А |

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905138

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---|---|--------|--|
| R0905138 | TB090909-SO1 TB090909-SO2 TB090909-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | Α | Initial calibration (RRF) (c) |
| R0905138 | SA186-10B SA186-25B SA186-27B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene n-Butylbenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene | J- (all detects) UJ (all non-detects) | Α | Continuing calibration (%D) (c) |
| R0905138 | RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | A | Continuing calibration (%D) (c) |
| R0905138 | TB090909-SO1 TB090909-SO2 TB090909-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905138 | RSAQ5-41B | Chloromethane Dichlorodifluoromethane Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Matrix spike/Matrix spike duplicates (%R) (m) |
| R0905138 | SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B | Chloromethane Dichlorodifluoromethane Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905138 | RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B | Carbon tetrachloride Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---------------------------------------|-----------------|--------|--|
| R0905138 | SA187-10B SA187-25B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-25B SA186-25B SA188-37B SA188-10B SA188-25B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-20B SA31-20B SA31-20B SA31-20B SA31-20B SA31-20B SA31-20B SA31-2-31B TB090909-SO1 TB090909-SO2 TB090909-SO3 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (PQL) (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905138

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905138

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-----------|----------|---------------------------------|--------|------|
| R0905138 | SA45-36B | Acetone | 9.7U ug/Kg | A | bt |
| R0905138 | SA186-10B | Acetone | 12U ug/Kg | А | bt |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905138

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-----------|----------|---------------------------------|--------|------|
| R0905138 | SA187-10B | Toluene | 0.60U ug/Kg | А | bf |

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|---------------------------------------|--|--------|------|
| R0905138 | SA187-39B | Toluene | 0.61U ug/Kg | А | bf |
| R0905138 | SA186-10B | Toluene | 0.37U ug/Kg | А | bf |
| R0905138 | SA188-10B | Toluene | 0.33U ug/Kg | А | bf |
| R0905138 | SA188-25B | Toluene | 0.51U ug/Kg | А | bf |
| R0905138 | RSAQ5-41B | Acetone Toluene | 4.0U ug/Kg 0.36U ug/Kg | Α | bf |
| R0905138 | SA122-0.5B | Acetone Dichloromethane Toluene | 3.0U ug/Kg 0.59U ug/Kg 0.65U ug/Kg | A | bf |
| R0905138 | SA122-10B | Dichloromethane Toluene | 0.55U ug/Kg 0.54U ug/Kg | A | bf |
| R0905138 | SA122-20B | Acetone | 2.8U ug/Kg | А | bf |
| R0905138 | SA122-31B | Toluene | 0.41U ug/Kg | Α | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991E1 VALIDATION COMPLETENESS

SDG #: R0905138 Stage 4

Laboratory: Columbia Analytical Services

Date: \(\frac{12/63/c}{\rm Page: \(\ldots \) of \(\frac{1}{\rm Page: \ldots \) Of \(\frac{1}{\rm Page: \ldots \} \) According to the second Reviewer: \(\frac{1}{\rm Page: \ldots \} \)

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|----------|---|
| 1. | Technical holding times | A | Sampling dates: 9/69/69 |
| II. | GC/MS Instrument performance check | À | · |
| ИІ. | Initial calibration | SW | 3 RSD + |
| IV. | Continuing calibration/(EV | SW | ca = 25] |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SW | |
| VIII. | Laboratory control samples | SW | ics |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | <u> </u> | |
| XII. | Compound quantitation/CRQLs | A | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | A | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | SW | TB= 25, 26, 27 FB= FB 072909-50 (R09042>6 |

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:

Soil + Water

| | | >011 T | vater | | | - Autor D | | | |
|-----|-----------|--------|------------|---|------------------|--------------|--------------|------------------|-----------|
| 1 1 | SA187-10B | S 11 7 | SA188-25B | S | 21 3 | SA122-0.5B | 5 | 31 l | 170485-MB |
| 2 1 | SA187-25B | 12 | SA188-37B | | 22 3 | SA122-10B | | 32 Y | 170690- |
| 3 | SA187-39B | 13 | RSAQ5-0.5B | | 23 | SA122-20B | | 33 3 | 170858- |
| 4 | SA45-10B | 14 | RSAQ5-10B | | 24 3 | SA122-31B | | - 34 4 | 171241 - |
| 5 | SA45-25B | 15 | RSAQ5-25B | | † 25 † | TB090909-SO1 | W | 35 | |
| 6 | SA45-36B | 16 | RSAQ5-41B | | 1 26 | TB090909-SO2 | | 36 | |
| 7 | SA186-10B | 17 | SA31-20B | | - 9 27 | TB090909-SO3 | \downarrow | 37 | |
| 8 7 | SA186-25B | 18 | SA31-32B | | 28 28 | RSAQ5-41BMS | ς | 38 | |
| 9 | SA186-37B | 19 | SA31-0.5B | | 29 | RSAQ5-41BMSD | | 39 | |
| 10 | SA188-10B | 20 3 | SA31-10B | ↓ | 30 | | | 40 | |

DC#: DIGGIE)
DG#: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 1/7
2nd Reviewer: 1

Method: Volatiles (EPA SW 846 Method 8260B)

| Validation Area | Yes | No | NA | Findings/Comments |
|--|-----|----|----|-------------------|
| Technical holding times | | | | |
| All technical holding times were met. | _ | | | |
| Cooler temperature criteria was met. | | | | |
| II. GC/MS instrument performance check | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | _ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | | | | |
| Was a curve fit used for evaluation? | | | | |
| Did the initial calibration meet the curve fit acceptance criteria of > 0.990? | _ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05? | | | | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | / | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | | | | |
| Were all percent differences (%D) < 25% and relative response factors (RRF) > 0.05? | | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | | | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | / | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | / | | | |

DC#: 21991 E)
DG#: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1
2nd Reviewer: 1

| Validation Area | Yes | No | NA | Findings/Comments |
|--|-----|----------|---------|-------------------|
| Was an LCS analyzed per analytical batch? | | .,,_ | 1 | ·ago. commona |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | / | | |
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | / | | | |
| Were retention times within + 30 seconds of the associated calibration standard? | | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | / | | ļ | |
| Were chromatogram peaks verified and accounted for? | | | | |
| XII. Compound quantitation/CRQLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | / | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | / | |
| Were relative intensities of the major ions within <u>+</u> 20% between the sample and the reference spectra? | | | / | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | | / | |
| XIV. System performance | | 7 | · | |
| System performance was found to be acceptable. | | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | | | |
| Target compounds were detected in the field duplicates. | | | | |
| XVII. Field blanks | | | <u></u> | |
| Field blanks were identified in this SDG. | | | _ | |
| Target compounds were detected in the field blanks. | | | | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A Chloromethane* | U. 1.1.2-Trichloroethane | OO. 2.2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. kopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIIi. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2 - METhyl - 2 program of |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether. | CCC. tert-Butylbenzene | WWW. Ethanol | 0000 |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-kopropyltoluene | AAAA. Ethyl ten-butyl ether | uuuu. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

Initial Calibration

2nd Reviewer:_ Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

SDG#: 214 Cm LUC# 21771 C

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

Did the laboratory perform a 5 point calibration prior to sample analysis?

Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $V \geq 0.49$

Did the initial calibration meet the acceptance criteria?

| 一儿 | ₹ | Y N N/A | Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.03 RRF | KKFS within the Validat | Ion criteria oi sou 70r | אח 20.03 אחר בייבי :- | | | Г |
|--|--|---------|--|-------------------------|---------------------------------|-------------------------------|--------------------|----------------|-----------------|
| · | * | Date | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications | - ir |
| <u> </u> | | 4/8/09 | 1941 | スススス | | 0,028 | 25-27, 171241-MB | J/13/A (C) | Т |
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SDG #: 250 C2-2

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 1 of 1 Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

N N/A

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ? Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

| | T | 1 | 1 | | | | - Т | | 1 | | | | - | | | _ | - i- | 7 | - | ī | T | | | _ | |
|-------------------------------|--------------|----------------|--------|---------|---------|---------|---------|-------------|--------------------|-------------|-------------|-----------------|--------------|-------------|---|---|-----------------|------|--------------|---|---|-------------|---|---|--|
| | J-/45/A (CC) | | | | | | | | W. | | | J/WJ/A | | | | | | | | | | | | | |
| Associated Samples | 7-1416 28,29 | 170690-MB | | | | | > | | 15 17-24 170888-MB | | | 25-27 171241-MB | | | | | | | | | | | | | |
| Finding RRF (Limit: >0.05) | | | | | | | | | | | | 250.0 | | | | | | | - | | | | | | |
| Finc (Limit | | | | | 43.7 | | 26,5 | | 26.1 | | | | | | | | | | | | | | | | |
| Compound | (3) (3) | (·) <u>444</u> | 966 F) | (-) 11t | (-) 111 | (-) MMM | NNN (-) | | (上して) | | | N N N N | | | | | | | | | | | | | |
| Standard ID | 40875 | | | | | | | | H 0 410 | | | C 0 874 | | | | | | | | | | | | | |
| Date | 60/41/6 | | | | | | | | 9/0/04 | <u> </u> | | 9/22/69 | | | | | | | | | | | | | |
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VALIDATION FINDINGS WORKSHEET

Page: __lof_

Reviewer:__ 2nd Reviewer.

(61)

7 -

Field Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

3/49/E

LDC #:

Were field blanks identified in this SDG? Y N/A N/A

Sociated blank type: (circle one) Field Blank / Rinsate / Trip Blank) Other:

Sample Identification Associated Samples: h/21 Blank ID Blank ID 2 Sampling Date Compound NNNN

13- 24 Associated Samples: Blank units: W5/L Associated sample units: W5/E5
Field blank type: (circle one) Field Blank / Rinsate (Trip Blank) Other.

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| | Sample Identification | | | | | | | | |
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| | Blank ID 26 Blank ID | 9/64/65 | 1. | 0.97 | * 0 | | | | |
| (2010 2010) | | oling Date | 1 | I | - | | | | |
| Diality types | Compound | 25 | | | | | | | |
| 5 | | | | | | | | | <u>.</u> |

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|------------------|--------|
| 1 2 | See |
| LDC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Y of Y 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field blanks identified in this SDG? Y N N/A

| V/N N/A | Were target compounds detected in the field blanks? | Blank units: | Ng / L | Associated sample units: | Ng / L | Associated s

A11 30115 Associated Samples:

| | 74 | | | 0.41/ | n/ | | | |
|-------------------------|---------------|-------|---------------|------------------------------------|----|-------------|---|---|
| | रेंद | 2.8/4 | | 0 | | | | |
| | 25 | | 0.55/U | 10.52 M | | | | |
| | 2. | 3,0/4 | 0,59/4 0.55/4 | 1/50.0 1/26.0 1/12,0 1/66,0 1/76.0 | | | | |
| Sample Identification | <u>3</u> | 4.0/4 | | 11/96.0 | - | | | |
| Sample to | 11 | | | N/ 15'0 | / | | | : |
| | 10 | | | h/ee'0 | / | 7 FB) | / | |
| | 7 | | | 0.37 /u | | ND W | | |
| | m | | | h/ 19.0 | | either 1 | | |
| S ^O Blapk110 | | | | 0.60/4 0.61/ | | | | |
| FB 0729 09-50 Black ID | 7/20/64 | 3.5 | 06.0 | 0.44 | | (All others | | |
| Compound | Sampling Date | # | Th. | 20 | | | | |

Associated sample units: Blank units:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other.

Associated Samples:

| ntification | | | | | | |
|-----------------------|---------------|--|--|--|--|--|
| Sample Identification | | | | | | |
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| | | | | | | |
| Blank ID | | | | | | |
| Blank ID | | | | | | |
| pund | Sampling Date | | | | | |
| Compound | | | | | | |

SDG #: 274 (M2) LDC #: -1:"1 F

VALIDATION FINDINGS WORKSHEE! Matrix Spike/Matrix Spike Duplicates

Page: ___ot_ 2nd Reviewer:_ Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated

MS/MSD. Soil / Water. YN N/A

Was a MS/MSD analyzed every 20 samples of each matrix? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| | | | | MS | MSD | | | |
|---|------|--------------------|----------|-------------|------------------|--------------|--------------------|-------------------|
| * | Date | MS/MSD ID | Compound | %R (Limits) | - 13 | RPD (Limits) | Associated Samples | Qualifications |
| | | bc/ 8c | Sexcras | compound | have 2 R | and & RPB) | 91 | No mal |
| | | | Star | | | | | (citur ms/mos /cc |
| | | | 5) | ' | Summer | (| | |
| | | | |) | |) | | |
| | | | 4 | Sp (70-130) | 64 (20-120) | () | | J-143 A (F) |
| | | | 7,7 | 4) (1) | 45 (1) | | | |
| | | | 711 | (/) 64 | 49 (1 | () | | / / |
| | | | | | | | | , A |
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| | | Compound | punc | ac Um | QC Limits (Soli) | RPD (Soll) | QC Limits (Water) | RPD (Water) |
| | Ŧ | 1,1-Dichloroethene | | 59-1 | 59-172% | < 22% | 61-145% | < 14% |
| | S. | Trichloroethene | | 62-1 | 62-137% | < 24% | 71-120% | < 14% |
| | ۷. | Benzene | | 66-1 | 66-142% | < 21% | 76-127% | < 11% |
| | CC. | Toluene | | 59-1 | 59-139% | < 21% | 76-125% | < 13% |
| | DD. | Chlorobenzene | | 60-1 | 60-133% | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905138 Date Collected: 9/9/09 Date Received: 9/10/09

Date Analyzed: 9/17/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

RSAQ5-41B

Lab Code:

R0905138-016

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Iatrix Spike Q0908733-0: | | | | ate Matrix Q0908733-0 | | | % Rec | | RPD |
|----------------------------------|--------|--------|-----------------------------|-------|---|--------------|--------------------------|-------|---|-----------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | | Limits | RPD | Limit |
| 1,1,1,2-Tetrachloroethane | ND | 37.5 | 55.4 | 68 | * | 34.0 | 54.3 | 63 | * | 70 - 130 | 10 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 40.3 | 55.4 | 73 | | 40.9 | 54.3 | 75 | | 70 - 130 | 1 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 37.7 | 55.4 | 68 | * | 38.4 | 54.3 | 71 | | 70 - 130 | 2 | 30 |
| 1,1,2-Trichloroethane | ND | 39.8 | 55.4 | 72 | | 39.1 | 54.3 | 72 | | 70 - 130 | 2 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 39.0 | 55,4 | 70 | | 39.8 | 54.3 | 73 | | 70 - I30 | 2 | 30 |
| 1,1-Dichloroethene (1,1-DCE) | ND | 36.2 | 55.4 | 65 | * | 39.2 | 54.3 | 72 | | 70 - 130 | 8 | 30 |
| 1,1-Dichloropropene | ND | 39.9 | 55.4 | 72 | | 37.6 | 54.3 | 69 | * | 70 - 130 | 6 | 30 |
| 1,2,3-Trichlorobenzene | ND | 31.1 | 55.4 | 56 | * | 34.3 | 54.3 | 63 | * | 70 - 130 | 10 | 30 |
| 1,2,3-Trichloropropane | ND | 36.7 | 55.4 | 66 | * | 38.8 | 54.3 | 72 | | 70 - 130 | 6 | 30 |
| 1,2,4-Trichlorobenzene | ND | 31.9 | 55.4 | 58 | * | 34.0 | 54.3 | 63 | * | 70 - 130 | 6 | 30 |
| 1,2,4-Trimethylbenzene | ND | 33.1 | 55.4 | 60 | * | 32.3 | 54.3 | 59 | * | 70 - 130 | 2 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 35.7 | 55,4 | 64 | | 40.3 | 54.3 | 74 | | 50 - 150 | 12 | 30 |
| 1,2-Dibromoethane | ND | 39.3 | 55.4 | 71 | | 38.1 | 54.3 | 70 | | 70 - 130 | 3 | 30 |
| 1,2-Dichlorobenzene | ND | 33.6 | 55.4 | 61 | * | 34.0 | 54.3 | 63 | * | 70 - 130 | 1 | 30 |
| 1,2-Dichloroethane | ND | 38.1 | 55.4 | 69 | * | 38.4 | 54.3 | 71 | | 70 - 130 | 1 | 30 |
| 1,2-Dichloropropane | ND | 39.0 | 55.4 | 70 | | 37 .4 | 54.3 | 69 | | 70 - 130 | 4 | 30 |
| 1,3,5-Trimethylbenzene | ND | 34.3 | 55.4 | 62 | * | 33.0 | 54.3 | 61 | | 70 - 130 | 4 | 30 |
| 1,3-Dichlorobenzene | ND | 33.3 | 55.4 | 60 | * | 32.7 | 54.3 | 60 | * | 70 - 130 | 2 | 30 |
| 1,3-Dichloropropane | ND | 38.7 | 55.4 | 70 | | 37.4 | 54.3 | 69 | * | 70 - 130 | 4 | 30 |
| 1,4-Dichlorobenzene | ND | 33.5 | 55.4 | 60 | * | 31.9 | 54.3 | 59 | * | 70 - 130 | 5 | 30 |
| 2,2-Dichloropropane | ND | 38.6 | 55.4 | 70 | | 41.6 | 54.3 | 77 | | 70 - 130 | 8 | 30 |
| 2-Butanone (MEK) | ND | 43.0 | 55.4 | 78 | | 45.4 | 54.3 | 84 | | 50 - 150 | 6 | 30 |
| 2-Chlorotoluene | ND | 33.4 | 55.4 | 60 | * | 33.3 | 54.3 | 61 | * | 70 - 130 | 0 | 30 |
| 2-Hexanone | ND | 41.1 | 55.4 | 74 | | 42.2 | 54.3 | 78 | | 70 - 130 | 3 | 30 |
| 2-Methyl-2-propanol | ND | 777 | 1110 | 70 | | 882 | 1090 | 81 | | 50 - 150 | 13 | 30 |
| 4-Chlorotoluene | ND | 33.6 | 55.4 | 61 | * | 32.9 | 54,3 | 61 | * | 70 - 130 | 2 | 30 |
| 4-Isopropyltoluene | ND | 32.7 | 55.4 | 59 | * | 30.3 | 54.3 | 56 | * | 70 - 130 | 8 | 30 |
| 4-Methyl-2-pentanone | ND | 41.6 | 55.4 | 75 | | 41.9 | 54.3 | 77 | | 70 - 130 | 1 | 30 |
| Acetone | 4.0 | 52.3 | 55.4 | 87 | | 66.7 | 54.3 | 116 | | 50 - 150 | 24 | 30 |
| Benzene | ND | 36.6 | 55.4 | 66 | * | 37.3 | 54.3 | 69 | * | 70 - 130 | 2 | 30 |
| Bromobenzene | ND | 34.5 | 55.4 | 62 | * | 34.8 | 54.3 | 64 | * | 70 - 130 | 1 | 30 |
| Bromochloromethane | ND | 37.1 | 55.4 | 67 | ¥ | 38.5 | 54.3 | 71 | | 70 - 130 | 4 | 30 |
| Bromodichloromethane | ND | 38.2 | 55.4 | 69 | * | 39.2 | 54.3 | 72 | | 70 - 130 | 2 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905138 **Date Collected:** 9/9/09

Date Collected: 9/9/09 Date Received: 9/10/09 Date Analyzed: 9/17/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

RSAQ5-41B

Lab Code:

R0905138-016

Units: μg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Iatrix Spike Q0908733-03 | | | - | cate Matrix Q0908733-0 | - | % Rec | | RPD |
|----------------------------------|--------|--------|------------------------------------|-------|---|--------|---------------------------|-------|------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| Bromoform | ND | 40.3 | 55.4 | 73 | | 37.7 | 54.3 | 70 | 70 - 130 | 7 | 30 |
| Bromomethane | ND | 30.0 | 55.4 | 54 | | 33.0 | 54.3 | 61 | 50 - 150 | 10 | 30 |
| Carbon Tetrachloride | ND | 40.2 | 55.4 | 73 | | 40.9 | 54.3 | 75 | 70 - 130 | 2 | 30 |
| Chlorobenzene | ND | 36.6 | 55.4 | 66 | * | 34.2 | 54.3 | 63 | * 70 - 130 | 7 | 30 |
| Chloroethane | ND | 34.8 | 55.4 | 63 | * | 35.2 | 54.3 | 65 | * 70 - 130 | 1 | 30 |
| Chloroform | ND | 39,4 | 55.4 | 71 | | 39.6 | 54.3 | 73 | 70 - 130 | 1 | 30 |
| Chloromethane | ND | 32.8 | 55.4 | 59 | * | 34.7 | 54.3 | 64 | * 70 - 130 | 6 | 30 |
| Dibromochloromethane | ND | 40.5 | 55.4 | 73 | | 38.4 | 54.3 | 71 | 70 - 130 | 5 | 30 |
| Dibromomethane | ND | 38,5 | 55.4 | 69 | * | 38,3 | 54.3 | 71 | 70 - 130 | 0 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 22.9 | 55.4 | 41 | * | 24.5 | 54.3 | 45 | * 70 - 130 | 7 | 30 |
| Dichloromethane | ND | 36.4 | 55.4 | 66 | * | 38.1 | 54.3 | 70 | 70 - 130 | 4 | 30 |
| Diisopropyl Ether | ND | 40.5 | 55.4 | 73 | | 41.0 | 54.3 | 75 | 70 - 130 | 1 | 30 |
| Ethyl tert-Butyl Ether | ND | 41.2 | 55.4 | 74 | | 41.4 | 54 .3 | 76 | 70 - 130 | 0 | 30 |
| Ethylbenzene | ND | 38.3 | 55.4 | 69 | * | 33.7 | 54.3 | 62 | * 70 - 130 | 13 | 30 |
| Hexachlorobutadiene | ND | 26.9 | 55.4 | 49 | * | 26.4 | 54.3 | 49 | * 70 - 130 | 2 | 30 |
| Isopropylbenzene (Cumene) | ND | 36.9 | 55.4 | 67 | * | 33.7 | 54.3 | 62 | * 70 - 130 | 9 | 30 |
| Methyl tert-Butyl Ether | ND | 39.2 | 55.4 | 71 | | 38.2 | 54.3 | 70 | 70 - 130 | 2 | 30 |
| Naphthalene | ND | 35.1 | 55.4 | 63 | | 40.5 | 54.3 | 75 | 50 - 150 | 14 | 30 |
| Styrene | ND | 38.3 | 55.4 | 69 | * | 35.3 | 54.3 | 65 | * 70 - 130 | 8 | 30 |
| Tetrachloroethene (PCE) | ND | 40.0 | 55.4 | 72 | | 36.4 | 54.3 | 67 | * 70 - 130 | 10 | 30 |
| Toluene | 0.36 | 38.7 | 55.4 | 69 | * | 36.6 | 54.3 | 67 | * 70 - 130 | 5 | 30 |
| Trichloroethene (TCE) | ND | 38.6 | 55.4 | 70 | | 38.1 | 54.3 | 70 | 70 - 130 | 1 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 38.3 | 55.4 | 69 | * | 41.4 | 54.3 | 76 | 70 - 130 | 8 | 30 |
| Vinyl Chloride | ND | 35.1 | 55.4 | 63 | * | 38.8 | 54.3 | 72 | 70 - 130 | 10 | 30 |
| cis-1,2-Dichloroethene | ND | 35.7 | 55.4 | 64 | * | 38.0 | 54.3 | 70 | 70 - 130 | 6 | 30 |
| cis-1,3-Dichloropropene | ND | 39.1 | 55.4 | 71 | | 37.2 | 54.3 | 69 | * 70 - 130 | 5 | 30 |
| m,p-Xylenes | ND | 73.3 | 111 | 66 | * | 66.7 | 109 | 61 | * 70 - 130 | 9 | 30 |
| n-Butylbenzene | ND | 32.0 | 55.4 | 58 | * | 29.4 | 54.3 | 54 | * 70 - 130 | 8 | 30 |
| n-Propylbenzene | ND | 33.5 | 55.4 | 60 | * | 32.0 | 54.3 | 59 | * 70 - 130 | 5 | 30 |
| o-Xylene | ND | 36.3 | 55.4 | 65 | * | 33.8 | 54.3 | 62 | * 70 - 130 | 7 | 30 |
| sec-Butylbenzene | ND | 33.5 | 55,4 | 60 | * | 31.4 | 5 4,3 | 58 | * 70 - 130 | 6 | 30 |
| tert-Amyl Methyl Ether | ND | 39.8 | 55.4 | 72 | | 40.4 | 54.3 | 74 | 70 - 130 | 1 | 30 |
| tert-Butylbenzene | ND | 33.2 | 55.4 | 60 | * | 32.1 | 54.3 | 59 | * 70 - 130 | 3 | 30 |
| trans-1,2-Dichloroethene | ND | 35.7 | 55,4 | 65 | * | 37.7 | 54.3 | 69 | * 70 - 130 | 5 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905138

Date Collected: 9/9/09 **Date Received:** 9/10/09

....

Date Analyzed: 9/17/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

RSAQ5-41B

Lab Code:

R0905138-016

Units: μg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Matrix Spike Q0908733-0 | | | ate Matrix Q0908733-0 | % Rec | | RPD | |
|---------------------------|--------|--------|----------------------------|-------|--------|--------------------------|-------|------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | Result | Amount | % Rec | Limits | RPD | Limit |
| trans-1,3-Dichloropropene | ND | 39,3 | 55.4 | 71 | 36.5 | 54.3 | 67 | * 70 - 130 | 7 | 30 |

Comments:

1C#: 21991 E

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of

Reviewer: 2nd Reviewer:

ETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| Date | LCS/LCSD ID | Compound | %R (I | %R (Limits) | %R | %R (Limits) | RPD (Limits) | | Associate | Associated Samples | | Qualifications | |
|------|-------------|----------|-------|-------------|----|------------------|--------------|---------------|-----------|--------------------|------|----------------|----------|
| | 577 -069921 | 0 |) 0/ | (75-125) | | (|) | | 7-14,16 | 170 696-MB | - 1 | No gral | (MS/MCD" |
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日からた See Cover SDG #: LDC#:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET



METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following

calculations:

RRF = $(A_*)(C_*)/(A_*)(C_*)$ average RRF = sum of the RRFs/number of standards %RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

 $A_{\rm s}$ = Area of associated internal standard $C_{\rm s}$ = Concentration of internal standard

| | | | | | Reported | Recalculated | Reported | Recalculated | Reported | Recalculated |
|---|-------------|---------------------|----------|--|-----------------|------------------|--------------------------|-----------------------|----------|--------------|
| # | Standard ID | Calibration Date | Compound | Compound (Reference Internal Standard) | RRF (50 std) | RRF (STO std) | Average RRF (initial) | Average RRF (initial) | %RSD | %RSD |
| - | 12/2 | 9/2/69 | J | (1st internal standard) | 0.922 | 0.422 | 4140 | 0,414 | 11. 5 | 6-11 |
| | - | | 9 | (2nd internal standard) | 480 | 0.327 | 6.319 | 0.319 | 11.7 | 7.11 |
| | ms 7 | | £E | (3rd internal standard) | 1.5% | 1,521 | 1.497 | 1.497 | 9.7 | 4.2 |
| 2 | | | g B | (1st internal standard) | 1.159 | 1-159 | 1.143 | 1.143 | 10.8 | 8'01 |
| | | | | (2nd internal standard) | | | | | | |
| | | | | (3rd internal standard) | | | | | | |
| 3 | | 2/0/6 | 2 | (1st internal standard) | 6,523 | 0,523 | 0. (Tey | 0,521 | 7.7 | 7.7 |
| | 7 | 60/01 | S | (2nd internal standard) | 0,250 | 0.250 | 0,2X | 525.0 | 9.9 | 9.9 |
| | MS 1D | | 2.3 | (3rd internal standard) | 5660 | 565 O | 514.0 | 0,416 | 6.9 | 6.9 |
| 4 | | | A A | (1st internal standard) | Eps.0 | 6,543 | C \$5.0 | 2ts.0 | 38 | りゃ |
| | | | | (2nd internal standard) | | | | | | |
| | | | | (3rd internal standard) | | | | | | |

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

SDG #: 300 Cm

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: of Reviewer: NC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF RRF = $(A_{\rm x})(C_{\rm s})/(A_{\rm s})(C_{\rm x})$

Where: ave. RRF = initial calibration average RRF RRF = continuing calibration RRF

 $A_x = Area of compound,$ $A_s = Concentration of compound,$ $C_s = Concentration of compound,$

 $A_{\rm k}$ = Area of associated internal standard $C_{\rm k}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Refer | Compound (Reference internal Standard) | Average RRF | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|-----|-------------|---------------------|-----------------|--|-------------|-------------------------|-----------------------------|----------------|--------------------|
| _ | Ξ. | 4/10/04 | 2 | (1st internal standard) | 0,414 | 0.4h | 0.412 | 0.5 | カ・タ |
| Ī | | - | 5 | (2nd internal standard) | 6.319 | 6, 303 | 6,36,0 | 5.0 | 5,0 |
| ı | | | <i>EE</i> | (3rd internal standard) | 1. 497 | 1, 3>5 | 1.335 | 8 '01 | 10.8 |
| 1 I | | | BB | (4th internal standard) | 1.142 | 1,071 | 1.671 | 6.3 | 6.3 |
| 5 | 278 oH | 4/2/64 | 2 | (1st internal standard) | | 0, 410 | 0.410 | ١. ٥ | 1.0 |
| l | | | 5 | (2nd internal standard) | | 0.24 | 0.261 | 18.2 | 18.3 |
| I | | | 33 | (3rd internal standard) | | 712.1 | 1.212 | 19.0 | 19.1 |
| i l | | | ag | (4th internal standard) | | 866.0 | 0.998 | 7.0 | 12.7 |
| м | 016 011 | 9 /8/ba | 2 | (1st internal standard) | | 6.38.0 | 0.383 | 7.5 | 7.4 |
| l | | | ζ | (2nd internal standard) | | 0.277 | 0,277 | 73.7 | (3.3 |
| l | | | 23 | (3rd internal standard) | | 1.238 | 1,338 | 2.0) | 10,0 |
| ı l | | | 98 | (4th internal standard) | | (1053 | 1.000 | 7.9 | 7.7 |
| 4 | C0879 | 9/2/5 | 0 | (1st internal standard) | 0,52 | 6.52.0 | 652,0 | 6.1 | 6.7 |
| | | later | 5 | (2nd internal standard) | 0.275 | 0.299 | 0,299 | ۲. ۶ | 8.7 |
| ì | | | 廷 | (3rd internal standard) | 0,415 | 0, 445 | to 445 | 7,7 | 7,2 |
| ĺ | | | BB | (4th internal standard) | 6,547 | 605.0 | رده. ه | 8.8 | 8,3 |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: _ 71991 E | SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

| Page:_ | 1 of 1 |
|---------------|--------|
| Reviewer: | SVE |
| 2nd reviewer: | ~ |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:

| , | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | 50 | 51.42 | 103 | 103 | ဉ |
| Bromofluorobenzene | | 46.33 | 93 | 93 | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | \ \ | 50.65 | 101 | /01 | V |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

Sample ID:

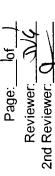
| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

La Gary LDC#: 2111 E) SDG #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET



METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentration

MSDC = Matrix spike duplicate concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration

MS/MSD sample:

| | S | oike | Sample | Spiked Sample | ample | Matrix Spike | Spike | Matrix Spike Duplicate | • Duplicate | M | MS/MSD |
|--------------------|----------|----------|---------------|---------------|---------|------------------|---------|------------------------|-------------|----------|--------------|
| , | ¥ | | Concentration | Concentration | tration | | | | | | |
| Compound | 3 | 15/FC | (k/E) | (| | Percent Recovery | ecovery | Percent Recovery | ecovery | | RPD |
| | MS | MSD | 0 5 | MS | MSD | Reported | Recalc | Reported | Recaic | Reported | Recalculated |
| 1,1-Dichloroethene | 25, 4 | 54.3 | Q- | 36.7 | 29.2 | 57 | اوکر | 77 | 77 | 8 | 8 |
| Trichloroethene | | | | 38.6 | 381 | 70 | 20 | 20 | 20 | 1 | |
| Benzene | | | _~ | ファチ | 37.3 | 94 | 99 | 69 | 69 | 7 | 7 |
| Toluene | | | 96'0 | 38.7 | 372 | 67 | 63 | 67 | 63 | 7 | 2 |
| Chlorobenzene | → | A | Þ | 3.78 | 34.2 | 97 | 99 | 63 | 63 | 7 | 7 |

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

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification

Reviewer: 10f 1.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC =

Where: SSC = Spiked sample concentration SA = Spike added

RPD = I LCS - LCSD I* 2/(LCS + LCSD)

LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 1712-41- LCS

| | 1 5 | pike | Spiked S | ample | SOI | S | l CSD | ເກ | SUL | CS/I CSD |
|--------------------|------------|---------------|---------------------------|---------------------------------------|------------------|---------|------------------|---------|---------|--------------------|
| Compound | \$2 | Added Log (L) | Concentration (μ_5/L) | tration | Percent Recovery | ecovery | Percent Recovery | ecovery | | RPD |
| | 1.08 | I CSD | 1.08 | 1.CSD | Reported | Recalc | Renorted | Pacalc | potocoo | |
| 1,1-Dichloroethene | 0.05 | NA | ۲,۲ | ¥. | 701 | 901 | | | | nament in the last |
| Trichloroethene | | | ۲.8 | | 0.04 | 109 | | | | |
| Benzene | | | 19.6 | | 86 | 96 | | | | |
| Toluene | | | 20.9 | | 70 | 201 | | | | |
| Chlorobenzene | 1 | X | 7.92 | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 5- | 101 | | | | |
| | | | | | | | | | | |
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| | - | | | | | | | | | |

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

| _DC #:_ | 7 | 991 | E | 1 |
|---------|---|-----|---|---|
| SDG #:_ | | | X | |

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

| Page: | <u>l</u> of <u>l</u> |
|---------------|----------------------|
| Reviewer: | SVE |
| 2nd reviewer: | × |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y) N N/A Were all reported results recalculated and verified for all level IV samples?

X N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $(A_x)(I_x)(DF)$ $(A_{is})(RRF)(V_o)(\%S)$ Area of the characteristic ion (EICP) for the A, compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms Relative response factor of the calibration standard. **RRF** = Volume or weight of sample pruged in milliliters (ml) V_{o} or grams (g). Df Dilution factor. %S Percent solids, applicable to soils and solid matrices Example: Sample I.D. $\frac{1}{2}$, $\frac{1}{2}$. Conc. = $\frac{4378}{45666}$, $\frac{50}{(0.902)}$, $\frac{1}{0.912}$

= 0.58 mg/leg

| | only. | | | | |
|---|---------------------------------------|----------|----------------------------------|------------------------------------|---------------|
| # | Sample ID | Compound | Reported Concentration () | Calculated Concentration () | Qualification |
| | | | | | |
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LDC Report# 21991F1

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 10 through September 16, 2009

LDC Report Date: January 7, 2010

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905192

Sample Identification

SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3 SA128-10BSPLP3 SA128-29BSPLP3

Introduction

This data review covers 5 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|--------------|------|--|--|--------|
| 9/30/09 | Bromomethane | 35.2 | SA128-10BSPLP3 SA128-29BSPLP3 172647-MB SPLP-BLK2 | J- (all detects) UJ (all non-detects) | Α |

All of the continuing calibration RRF values were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---|----------------------------------|--|
| SPLP-BLK1 | 9/28/09 | 4-Methyl-2-pentanone Acetone Chloroform | 1.1 ug/L 4.7 ug/L 2.9 ug/L | SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3 |
| SPLP-BLK2 | 9/30/09 | Acetone Chloroform Dichloromethane | 4.0 ug/L 2.4 ug/L 4.0 ug/L | SA128-10BSPLP3 SA128-29BSPLP3 |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|----------------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA102-10BSPLP3 | Acetone | 4.8 ug/L | 4.8U ug/L |
| | Chloroform | 2.8 ug/L | 2.8U ug/L |
| SA102-30BSPLP3 | Acetone | 4.8 ug/L | 4.8U ug/L |
| | Chloroform | 2.9 ug/L | 2.9U ug/L |
| SA30-9BSPLP3 | Acetone | 4.1 ug/L | 4.1U ug/L |
| | Chloroform | 2.7 ug/L | 2.7U ug/L |
| SA128-10BSPLP3 | Acetone | 7.0 ug/L | 7.0U ug/L |
| | Chloroform | 2.1 ug/L | 2.1U ug/L |
| | Dichloromethane | 3.8 ug/L | 3.8U ug/L |
| SA128-29BSPLP3 | Acetone | 4.8 ug/L | 4.8U ug/L |
| | Chloroform | 3.1 ug/L | 3.1U ug/L |
| | Dichloromethane | 4.0 ug/L | 4.0U ug/L |

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905192 | All compounds reported below the PQL. | J (all detects) | А |

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905192

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|-----------|--|---------------------------------------|--|--------|--|
| *R0905192 | SA128-10BSPLP3 SA128-29BSPLP3 | Bromomethane | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905192 | SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3 SA128-10BSPLP3 SA128-29BSPLP3 | All compounds reported below the PQL. | J (all detects) | А | Project Quantitation Limit (PQL) (sp) |

^{*}Corrected Samples for Continuing Calibration qualification.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905192

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|----------------|--|-------------------------------------|--------|------|
| R0905192 | SA102-10BSPLP3 | Acetone Chloroform | 4.8U ug/L 2.8U ug/L | А | bl |
| R0905192 | SA102-30BSPLP3 | Acetone Chloroform | 4.8U ug/L 2.9U ug/L | Α | bl |
| R0905192 | SA30-9BSPLP3 | Acetone Chloroform | 4.1U ug/L 2.7U ug/L | А | bl |
| R0905192 | SA128-10BSPLP3 | Acetone Chloroform Dichloromethane | 7.0U ug/L 2.1U ug/L 3.8U ug/L | А | bl |
| R0905192 | SA128-29BSPLP3 | Acetone Chloroform Dichloromethane | 4.8U ug/L 3.1U ug/L 4.0U ug/L | А | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905192

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

| | | gate trestance | |
|----------|-------------------|-----------------------------------|----------------|
| LDC #:_ | 21991F1 | VALIDATION COMPLETENESS WORKSHEET | Date: <u>l</u> |
| SDG #: | R0905192 | Stage 4 | Page: |
| Laborato | ory: Columbia Ana | alvtical Services | Reviewer:_ |
| | ., | | 2nd Reviewer |

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|----------|---------------------------------------|
| 1. | Technical holding times | A | Sampling dates: 9/10 - 14/09 |
| H. | GC/MS Instrument performance check | A | ' |
| 111. | Initial calibration | A | 2 95D m |
| IV. | Continuing calibration/LCV | SW | ca € 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | <u> </u> | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec |
| VIII. | Laboratory control samples | A | Client spec |
| IX. | Regional Quality Assurance and Quality Control | N N | , , , , , , , , , , , , , , , , , , , |
| X. | Internal standards | A_ | |
| XI. | Target compound identification | A | |
| XII. | Compound quantitation/CRQLs | A | |
| XIII. | Tentatively identified compounds (TICs) | Ŋ | |
| XIV. | System performance | Α | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | 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

Page: of

Validated Samples:

| | 501 | | | | | |
|-----|------------------|------|------------|----|----|--|
| 1 | SA102-10BSPLP3 | 11 | 172327- MB | 21 | 31 | |
| 2 | SA102-30BSPLP3 | 担 | SPLP-BK 1 | 22 | 32 | |
| 3 | SA30-9BSPLP3 | 13 7 | 172647-MB | 23 | 33 | |
| 4 - | SA128-10BSPLP3 | 14 2 | SPLP-BLEZ | 24 | 34 | |
| 5 | 7 SA128-29BSPLP3 | 15 | | 25 | 35 | |
| 6 | , | 16 | | 26 | 36 | |
| 7 | | 17 | | 27 | 37 | |
| 8 | | 18 | | 28 | 38 | |
| 9 | | 19 | | 29 | 39 | |
| 10 | | 20 | | 30 | 40 | |

DC #: 2 | 991 F | DG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 2nd Reviewer:

Method: Volatiles (EPA SW 846 Method 8260B)

| Method: Volatiles (EPA SW 846 Method 8260B) | | T | | r |
|--|-------------|-----------|----|-------------------|
| Validation Area | Yes | No | NA | Findings/Comments |
| l. Technical holding times | | | | |
| All technical holding times were met. | | | | |
| Cooler temperature criteria was met. | | <u> </u> | | |
| II. GC/MS Instrument performance check | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | / | | | |
| Were all samples analyzed within the 12 hour clock criteria? | | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | _ | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | | | | |
| Was a curve fit used for evaluation? | | | | |
| Did the initial calibration meet the curve fit acceptance criteria of > 0.990? | / | <u> </u> | | |
| Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05? | | | | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | / | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | | | | |
| Were all percent differences (%D) < 25% and relative response factors (RRF) > 0.05? | <u> </u> | | Ł | |
| V Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | | <u> [</u> | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | | _ | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | [, | | |
| VI. Surrogate spikes | | , | , | Y |
| Were all surrogate %R within QC limits? | _ | 1_ | _ | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | / | 1 | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | / | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | - | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | 1 | 1 | 1 | |

DC #: 21991 F1
DG #: See Cover

VALIDATION FINDINGS CHECKLIST

| Validation Area | Yes | No | NA | Findings/Comments |
|--|-----|-------|----------|-------------------|
| Was an LCS analyzed per analytical batch? | / | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | | | |
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | _ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | ••••• | | |
| X. Internat standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | | | | |
| Were retention times within + 30 seconds of the associated calibration standard? | | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within + 0.06 RRT units of the standard? | | | <u> </u> | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | / | | | |
| Were chromatogram peaks verified and accounted for? | | | | |
| XII. Compound quantitation/CRQLs | | | <u> </u> | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | | \ | | |
| XIII. Tentatively identified compounds (TICs) | 1 | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | / | |
| Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra? | | | / | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | / | | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | | | • | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | | | |
| Target compounds were detected in the field duplicates. | | | - | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | | | Ĺ | |
| Target compounds were detected in the field blanks. | | | | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|-------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. kopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ, 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. kopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC, Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m.p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | .0000 |
| N. 1, 1, 1-Trichloroethane | HH. Vinyi acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | . 0000 |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether. | CCC. tert-Butylbenzene | WWW. Ethanol | 0000 |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE, sec-Buty/benzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | ບບບບ. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

LDC # 2 | 99 | F SDG #: Sta

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 1 of Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

| SE | nderd ID | Compound | Finding %D (Limit: <25,0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|----|----------|----------|-------------------------------|-------------------------------|--------------------|----------------|
| × | X 4567 | B (-) | 35.~ | | 45 17247-MB | J-14TA (C) |
| | | | | | SPLP-BIKY | |
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SDG# See Gray LDC#: 21991 F)

VALIDATION FINDINGS WORKSHEET

Blanks

2nd Reviewer. Page: Reviewer

> Phease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank associated with every sample in this SDG?

Y N/A

Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

Was there contamination in the method blanks? If yes, please see the qualifications below. 1269 Blank analysis date: Y/N N/A

(PF) Sample Identification Associated Samples: Ψ N, 4 λ 4.8 u e 2.9 /W 4.8/4 SPLP-B) Blank ID 4.7 Conc. units: 45 Compound

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|---------------------|-----------------------|-----------|--------|-------|-------|--|---|--|
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| | Sample Identification | | | | | | | |
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| 4 | S | | | | | | | |
| ples: | | | | | | | | |
| Associated Samples: | | | | | | | | |
| Asso | | | λ, | 7,7 | 12 | | | |
| | | 7 | 4, | 3.1/ | 4.0/ | | | |
| | | 4 | 7.0 /4 | 2,1/4 | 3.8/4 | | | |
| | | 7 7 | | | | | | |
| | Blank ID | SPLP-BLAZ | 4,0 | 2,4 | 0.4 | | | |
| | | | щ | * | 177 | | | |
| / bu | Compound | | | | | | | |
| Conc. units: 416 | Col | | | | | | | |
| S | | | | | | | | |

Blank analysis date:

21 adi FI See Cover SDG #: LDC #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $\label{eq:RFS} $$RF = (A_i)(C_b_s)(C_s)$$ average RRF = sum of the RRFs/number of standards $$RSD = 100 \cdot (S/X)$$$

 $A_{\rm s}$ = Area of associated internal standard $C_{\rm s}$ = Concentration of internal standard A, = Area of compound,
C, = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

| | | | | | Reported | Recalculated | Reported | Recalculated | Reported | Recalculated |
|----|-------------|---------------------|----------|--|-----------------|------------------|--------------------------|--------------------------|----------|--------------|
| * | Standard ID | Calibration Date | Compound | Compound (Reference Internal Standard) | RRF (S7 std) | RRF (Co std) | Average RRF (initial) | Average RRF (initial) | %RSD | %RSD |
| - | 1(4) | , , , | O | (1st internal standard) | 0.699 | 0.699 | 0.648 | ه. د ۶۶ | 6.8 | د, 8 |
| | 3 | 60/51/n | 4 | (2nd internal standard) | 80.8. g | 804 '0 | 906.9 | 706.0 | 4.4 | 4,8 |
| | ., | | 77 | 1 | 145.0 | 0.57 | 0. 528 | 822.0 | 3.7 | 3.7 |
| 2 | | | 88 | it i | 565'0 | h65.0 | 0.58) | 0.58/ | ط ۶ | £,3 |
| | | | | (2nd internal standard) | | | | | | |
| | - | | | (3rd internal standard) | | | | | | |
| ۳. | | | | (1st internal standard) | | | | | | |
| | | | | (2nd internal standard) | | | | | | |
| | | | | (3rd internal standard) | | | | | | |
| 4 | | | | (1st internal standard) | | | | | | |
| | | | | (2nd internal standard) | | | | | | |
| | | | | (3rd internal standard) | | | | | | V |

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

21 A A A I F SDG #: Sec Cover LDC #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 Reviewer: 2nd Reviewer._

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF RRF = (4,)(C_s)/(A_s)(C_s)

Where: ave. RRF = initial calibration average RRF RRF = continuing calibration RRF

A_x = Area of compound, C_x = Concentration of compound,

 A_{s} = Area of associated internal standard C_{s} = Concentration of internal standard

Recalculated %D

8.7

o V

7

4 ر م

Ö

0,651 6.367

157.0

0.307

(2nd internal standard)

8

(1st internal standard)

0

60/0c/ 6

4517X

5,50

Reported %D ≈ 7 ゲイ 7.) Recalculated RRF o. 283 CO9,0 0, 43 217.0 7 7090 Reported RRF 0.283 0.539 ٥ Average RRF K D. 64X 0,306 3 0 Compound (Reference internal Standard) (2nd internal standard) (2nd internal standard) (3rd internal standard) (1st internal standard) (3rd internal standard) (1st internal standard) 88 EF ೮ 40/82/4 Calibration Standard ID x4565

o, 6,0 0.576 16510 (3rd internal standard) (2nd internal standard) (3rd internal standard) (1st internal standard) 85

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 21 991 F1 SDG #: See cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

| Page:_ | 1 | _of_ | 1 |
|---------------|---|------|--------------------------|
| Reviewer: | | 7 | 14 |
| 2nd reviewer: | | A | $\overline{\mathcal{L}}$ |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| The percent recoveries (% | | | |
|---------------------------|--|--|--|
| | | | |
| | | | |

% Recovery: SF/SS * 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #)

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | 7) | 52.00 | 104 | 104 | 9 |
| Bromofluorobenzene | | 50,18 | 102 | 102 | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 51.5/ | 103 | 103 | 4 |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | ! | | |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

Sample ID:

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|-----------------------|---------------------|--------------------|---------------------------------|-------------------------------------|-----------------------|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

LDC #: 21491 FJ SDG #: Ste Coner

VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: 5/6
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spik

Where: SSC = Spiked sample concentration SA = Spike added

RPD = ILCS - LCSD I* 2/(LCS + LCSD)

LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 172647 - VCS

| | JS. | oike | Spiked S | ample | וט | CS | usoı | g | /รวา | I CS/I CSD |
|--------------------|------|----------------|-------------------|--------|--|---------|------------------|---------|----------|--------------|
| Compound | A A | Added Mg/L) | Concentration (1) | ration | Percent Recovery | ecovery | Percent Recovery | scovery | ī. | RPD |
| | 801 | I.GSD | 1.68 | 1 CSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| 1,1-Dichloroethene | 20.0 | ₩. | 6,52 | N.A | 71 4 | 114 | | | | |
| Trichloroethene | | | 24,0 | | 201 | 701 | | | | |
| Benzene | | | 7.02 | | 104 | 104 | | | | |
| Toluene | | | 21.15 | | 701 | 107 | | | | |
| Chlorobenzene | 7 | X | ۲.۲ | \ \ | 801 | 801 | | | | |
| | | 7 | | | | \ | \ | | | |
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Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. DC #: 21991 F1 SDG #: See Cover

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VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

| Page:_ | 1 of 1 |
|---------------|--------|
| Reviewer: | JV4 |
| 2nd reviewer: | 4 |

WETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Percent solids, applicable to soils and solid matrices

Dilution factor.

Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

(A,)(I,)(DF) Example: Concentration = (A_s)(RRF)(V_o)(%S) Sample I.D. Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Conc. = (38238) (50)() Amount of internal standard added in nanograms Relative response factor of the calibration standard. RRF = 2.80 mg/L Volume or weight of sample pruged in milliliters (ml) v. or grams (g).

| # | Sample ID | Compound | Reported Concentration | Calculated Concentration () | Qualification |
|----------|-----------|----------|---------------------------|------------------------------------|---------------|
| | Sample 1D | Compound | | <u> </u> | |
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 11, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905198

Sample Identification

RSAQ6-0.5B

RSAQ6-10B

RSAQ6-25B

RSAQ6-38B

RSAQ6009-38B

SA41-12B

SA41-25B

SA41-38B

SA40-10B

SA40-25B

SA40-41B

SA114-10B

SA114-30B

SA124-25B

SA124-42B

TB091109-SO1

TB091109-SO2

SA40-41BMS

SA40-41BMSD

Introduction

This data review covers 17 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------------|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | All water samples in SDG R0905198 | J (all detects) UJ (all non-detects) | Α |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|--------------------|---|--------------------------------------|--|--|--------|
| 9/22/09 (H1021) | Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene | 34.6 29.4 25.3 28.4 27.0 | RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA114-10B SA114-30B SA114-30B SA124-25B SA124-42B 171297-MB | J+ (all detects) | A |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|--------------------|---------------------|---------------|--------------------------------------|---|--------|
| 9/22/09 (C0879) | 2-Methyl-2-propanol | 0.025 (≤0.05) | All water samples in SDG R0905198 | J (all detects) UJ (all non-detects) | Α |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|---|
| 171110-MB | 9/21/09 | Dichloromethane | 0.77 ug/Kg | RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B SA40-41B |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.

Samples TB091109-SO1 and TB091109-SO2 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|----------------------------|------------------------|---|
| TB091109-SO2 | 9/11/09 | Bromoform Chloromethane | 0.23 ug/L 0.22 ug/L | RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA124-25B SA124-42B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905198 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|--------------------|---------------------------|---------------------------------|
| RSAQ6009-38B | Toluene | 0.54 ug/Kg | 0.54U ug/Kg |
| SA41-12B | Toluene | 0.56 ug/Kg | 0.56U ug/Kg |
| SA40-10B | Acetone | 1.6 ug/Kg | 1.6U ug/Kg |
| SA114-10B | Acetone Toluene | 6.0 ug/Kg 0.44 ug/Kg | 6.0U ug/Kg 0.44U ug/Kg |
| SA124-42B | Toluene | 0.77 ug/Kg | 0.77U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|-------------------------|---------------------|----------------------|-----------------|--|--------|
| SA40-41BMS/MSD (SA40-41B) | Dichlorodifluoromethane | 53 (70-130) | 50 (70-130) | - | J- (all detects) UJ (all non-detects) | A |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|-------------------------|-------------|--|--|--------|
| 171110-LCS | Dichlorodifluoromethane | 67 (75-125) | RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B SA40-41B 171110-MB | J- (all detects) UJ (all non-detects) | P |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905198 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples RSAQ6-38B and RSAQ6009-38B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | 555 | | | |
|------------|-----------------------|--------------|-----------------|------------------------|-------|--------|
| Compound | RSAQ6-38B | RSAQ6009-38B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| Chloroform | 43 | 33 | - | 10 (≤7.3) | - | - |
| 2-Butanone | 14U | 1.4 | - | 12.6 (≤14) | • | - |
| Toluene | 7.2U | 0.54 | - | 6.66 (≤7.2) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905198

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---|--|--------|---|
| R0905198 | TB091109-SO1 TB091109-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905198 | RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA114-10B SA114-30B SA1124-25B SA124-42B | Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene | J+ (all detects) | A | Continuing calibration (%D) (c) |
| R0905198 | TB091109-SO1 TB091109-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905198 | SA40-41B | Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) | А | Matrix spike/Matrix spike duplicates (%R) (m) |
| R0905198 | RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B SA40-41B | Dichlorodifluoromethane | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905198 | RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-25B RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA114-30B SA124-25B SA124-42B TB091109-SO1 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905198

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|--------------------|---------------------------------|--------|------|
| R0905198 | RSAQ6009-38B | Toluene | 0.54U ug/Kg | А | bf |
| R0905198 | SA41-12B | Toluene | 0.56U ug/Kg | А | bf |
| R0905198 | SA40-10B | Acetone | 1.6U ug/Kg | А | bf |
| R0905198 | SA114-10B | Acetone Toluene | 6.0U ug/Kg 0.44U ug/Kg | A | bf |
| R0905198 | SA124-42B | Toluene | 0.77U ug/Kg | А | bf |

Tronox Northqate Henderson

| LDC #:_ | 21991G1 | VALIDATION COMPLETENESS WORKSHEET |
|----------|------------------------|-----------------------------------|
| SDG #:_ | R0905198 | Stage 2B |
| Laborato | ry. Columbia Analytica | al Services |

| Date: | 12/02/09 |
|---------------|----------|
| Page:_ | lof' |
| Reviewer: | JV6 |
| 2nd Reviewer: | 0 |

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/11/09 |
| II. | GC/MS Instrument performance check | A | , |
| III. | Initial calibration | SW | 2 RSD r2 |
| IV. | Continuing calibration/JCV | SW | cay & 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | Wک | |
| VIII. | Laboratory control samples | _cw | US |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | <u> </u> | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | SM | D = 4,5 |
| XVII. | Field blanks | SM, | TB = 14, 17 FB = FB 072909-SO (R0904) |

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:

Coil + Water

| , | 7110 | 1 00 | Mer | | | |
|------------|-----------------------|------|--------------|------|-------------|----|
| 1 1 | RSAQ6-0.5B | 11 | SA40-41B 5 | 21 / | 171110 - MB | 31 |
| 2 1 | RSAQ6-10B | 12 | SA114-10B | 22 | 171241- | 32 |
| 3 1 | RSAQ6-25B | 133 | SA114-30B | 23 > | 171297- | 33 |
| † 1 4 | RSAQ6-38B | 14 3 | SA124-25B | 24 | | 34 |
| 5 3 | RSAQ6009-38B b | 15 3 | SA124-42B | 25 | | 35 |
| 6 | SA41-12B | 16 | TB091109-SO1 | 26 | | 36 |
| 7 3 | SA41-25B | 17 > | TB091109-SO2 | 27 | | 37 |
| 8 3 | SA41-38B | 18 | SA40-41BMS 5 | 28 | | 38 |
| 9) | SA40-10B | 19 \ | SA40-41BMSD | 29 | | 39 |
| 10 3 | SA40-25B | 20 | | 30 | | 40 |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|-----------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropy/ alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichioropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| E. Methyene allonde | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disuffide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene™ | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropyłbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m.p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform⁴ | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl. 2. propanol |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyttoluene | РРРР. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Buty/benzene | www. Ethanol | 0000. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. ds-1,3-Dichloropropene | LL. Methyf-tert-butyf ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyf alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyttoluene | AAAA. Ethyl tert-butyl ether | תחחח. |
| T. Dibromochioromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amy methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

raye. Reviewer:_ 2nd Reviewer:

AETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

3DG#: Ca Con

.DC#:

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? $\frac{r^2}{2} = \frac{2}{6} \cdot \frac{9}{7} \cdot \frac{9}{7$

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

| N | N/A |

| | | Word all 701000 and 1010 with the veneral circle of 1010000 | | in an in minor in | | | |
|----------|------------------|---|----------|------------------------------|-------------------------------|--------------------|----------------|
| #2 | | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
| | 9/2/6 | | 2 2 2 2 | | 0,028 | 16 17 171241- MB | J/M3/A (C) |
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SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of] Reviewer._ 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

N N/A

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF? N/A/N

| Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|---------|-------------|----------|-------------------------------|-------------------------------|--------------------|----------------|
| 4/25/64 | | NNNN | | 520 a | 16,17, 171241-MB | 5/YZ/A (C) |
| | | | | | | |
| | | | | | | |
| 22/09 | H102 | JJ (t) | 34.6 | | 5-10, 12-15 | J+dots/A |
| | | (+) O | 29.4 | _ | 712 | |
| | | (t) | 25.3 | | | |
| | | , | 28.4 | | | |
| | | \sim | 27.0 | | | |
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SDG #: La and LDC#: 21991 6/

VALIDATION FINDINGS WORKSHEET Blanks

2nd Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

N N/A Was a method blank associated with every sample in this SDG?

N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Associated Samples: Conc. units:

(an)

Sample Identification 1-4 11 171110-M# Blank ID 0.77 μ Compound Blank analysis date:

Sample Identification Associated Samples: Blank ID Compound Conc. units:

LDC #: 21 991 H)

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of Reviewer: 316 2nd Reviewer:

МЕТНОD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field blanks identified in this SDG? Y N/A

Y/N N/A

Were target compounds detected in the field blanks?

Blank units: 49 / Associated sample units: 45 / F

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank) Other:

14 15

<u>S</u>

Associated Samples:

| Compound | Blank ID 17 Blank ID | Blank ID | | | | Sample Identification | tification | | | |
|---|---|---|---------------------------|-----|---------|-----------------------|------------|-----------|------|--|
| Sampling Date | 9/11/6 | | | | | | | | | |
| × | 6,23 | | | | | | | | | |
| ¥ | 0, 22 | | | | | | | | | |
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| Blank units: 16 /L Associated sample units: 16 /k $_{8}$ Field blank/ Rinsate / Trip Blank / Other: | ocja ted sa mp e)(Fjeld Blank | ole units: ^h V Rinsate / Tr | 19/ks rip Blank / Othe | er: | Associa | Associated Samples: | | Slios liA | (79) | |
| | 67 18 67 29 68 CD | 8 | | | | | | | | |

| г | | | | | | | | | |
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| | ntification | 15 | | | 0.77/4 | | 7 FB | | |
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| ני (חווחום חוונ | nnd | Sampling Date | L | حلا | CC | | | | |
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100 #: 2/99/6 SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: of 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. YN N/A

Was a MS/MSD analyzed every 20 samples of each matrix? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| - | | | | | | | |
|--------|--------------------|----------|-------------------|--------------------|-----------------|--------------------|----------------|
| # Date | MS/MSD ID | Compound | MS %R (Limits) | MSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
| | 18/19 | Several | compands) | have BR an | ¥ | | No mal (e)the |
| | | out sive | (Whits) | () | () | | MS/MSB or Le |
| | | | - | rehit (Gynn)a | \(\frac{1}{2}\) | | |
| | | | | | () | | |
| | | りり | 53 (76-170) | (061-87) OZ |) | | J-/47/4 (A) |
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| | Compound | pund | QC Limits (Soil) | ts (Soll) | RPD (Soil) | QC Limits (Water) | RPD (Water) |
| ï | 1,1-Dichloroethene | | 59-1 | 59-172% | < 22% | 61-145% | < 14% |
| Ŋ. | Trichloroethene | | 62-1 | 62-137% | < 24% | 71-120% | < 14% |
| ۷. | Benzene | | 66-1 | 66-142% | < 21% | 76-127% | <11% |
| CC. | Toluene | | 59-1 | 59-139% | < 21% | 76-125% | < 13% |
| DD. | Chlorobenzene | | 60-1 | 60-133% | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905198

Date Collected: 9/11/09 Date Received: 9/12/09 Date Analyzed: 9/21/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA40-41B

Lab Code:

R0905198-011

Units: μg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Aatrix Spike Q0908828-03 | | | | ate Matrix : | | % Rec | | RPD |
|----------------------------------|--------|--------|------------------------------------|-------|---|--------|--------------|-------|------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | | RPD | Limit |
| 1,1,1,2-Tetrachloroethane | ND | 58.9 | 78.8 | 75 | | 59.6 | 79.6 | 75 | 70 - 130 | 1 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 74.0 | 78.8 | 94 | | 74.3 | 79.6 | 93 | 70 - 130 | 0 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 58.7 | 78.8 | 74 | | 64.6 | 79.6 | 81 | 70 - 130 | 10 | 30 |
| 1,1,2-Trichloroethane | ND | 58.0 | 78.8 | 74 | | 60.7 | 79.6 | 76 | 70 - 130 | 5 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 69.6 | 78.8 | 88 | | 68.4 | 79.6 | 86 | 70 - 130 | 2 | 30 |
| 1,1-Dichloroethene (1,1-DCE) | 0.88 | 67.8 | 78.8 | 85 | | 67.8 | 79.6 | 84 | 70 - 130 | 0 | 30 |
| 1,1-Dichloropropene | ND | 62.8 | 78.8 | 80 | | 65.7 | 79.6 | 83 | 70 - 130 | 5 | 30 |
| 1,2,3-Trichlorobenzene | ND | 41.1 | 78.8 | 52 | * | 47.1 | 79.6 | 59 | * 70 - 130 | 14 | 30 |
| 1,2,3-Trichloropropane | ND | 54.2 | 78.8 | 69 | * | 58.2 | 79.6 | 73 | 70 - 130 | 7 | 30 |
| 1,2,4-Trichlorobenzene | ND | 44.0 | 78.8 | 56 | * | 51.1 | 79.6 | 64 | * 70 - 130 | 15 | 30 |
| 1,2,4-Trimethylbenzene | ND | 53.9 | 78.8 | 68 | * | 61.4 | 79.6 | 77 | 70 - 130 | 13 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 49.3 | 78.8 | 63 | | 55.4 | 79.6 | 70 | 50 - 150 | 12 | 30 |
| 1,2-Dibromoethane | ND | 55.7 | 78.8 | 71 | | 57.8 | 79.6 | 73 | 70 - 130 | 4 | 30 |
| 1,2-Dichlorobenzene | ND | 52.9 | 78.8 | 67 | * | 61.4 | 79.6 | 77 | 70 - 130 | 15 | 30 |
| 1,2-Dichloroethane | ND | 58.3 | 78.8 | 74 | | 63.2 | 79.6 | 79 | 70 - 130 | 8 | 30 |
| 1,2-Dichloropropane | ND | 59.3 | 78.8 | 75 | | 64.2 | 79.6 | 81 | 70 - 130 | 8 | 30 |
| 1,3,5-Trimethylbenzene | ND | 57.2 | 78.8 | 73 | | 60.8 | 79.6 | 76 | 70 - 130 | 6 | 30 |
| 1,3-Dichlorobenzene | ND | 54.2 | 78.8 | 69 | * | 60.5 | 79.6 | 76 | 70 - 130 | 11 | 30 |
| 1,3-Dichloropropane | ND | 55.9 | 78.8 | 71 | | 57.8 | 79.6 | 73 | 70 - 130 | 3 | 30 |
| 1,4-Dichlorobenzene | ND | 55.4 | 78.8 | 70 | | 60.4 | 79.6 | 76 | 70 - 130 | 9 | 30 |
| 2,2-Dichloropropane | ND | 70.1 | 78.8 | 89 | | 66.6 | 79.6 | 84 | 70 - 130 | 5 | 30 |
| 2-Butanone (MEK) | 1.6 | 56.9 | 78.8 | 70 | | 52.6 | 79.6 | 64 | 50 - 150 | 8 | 30 |
| 2-Chlorotoluene | ND | 55.8 | 78.8 | 71 | | 60.9 | 79.6 | 77 | 70 - 130 | 9 | 30 |
| 2-Hexanone | ND | 34.4 | 78.8 | 44 | * | 38.5 | 79.6 | 48 | * 70 - 130 | 11 | 30 |
| 2-Methyl-2-propanol | ND | 1210 | 1580 | 77 | | 1130 | 1590 | 71 | 50 - 150 | 7 | 30 |
| 4-Chlorotoluene | ND | 55.6 | . 78.8 | 71 | | 63.9 | 79.6 | 80 | 70 - 130 | 14 | 30 |
| 4-Isopropyltoluene | ND | 53.6 | 78.8 | 68 | * | 59.4 | 79.6 | 75 | 70 - 130 | 10 | 30 |
| 4-Methyl-2-pentanone | ND | 50.1 | 78.8 | 64 | * | 51.9 | 79.6 | 65 | * 70 - 130 | 4 | 30 |
| Acetone | ND | 83.2 | 78.8 | 106 | | 61.8 | 79.6 | 78 | 50 - 150 | 30 | 30 |
| Benzene | ND | 57.8 | 78.8 | 73 | | 63.4 | 79.6 | 80 | 70 - 130 | 9 | 30 |
| Bromobenzene | ND | 57.0 | 78.8 | 72 | | 63.4 | 79.6 | 80 | 70 - 130 | 11 | 30 |
| Bromochloromethane | ND | 62.4 | 78.8 | 79 | | 60.0 | 79.6 | 75 | 70 - 130 | 4 | 30 |
| Bromodichloromethane | ND | 61.5 | 78.8 | 78 | | 65.4 | 79.6 | 82 | 70 - 130 | 6 | 30 |

Comments:

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Matrix Spike Summary

SuperSet Reference:

09-0000120541 rev 00

00082

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Tronox LLC Henderson/2027.001 Project:

Sample Matrix:

Soil

Service Request: R0905198 Date Collected: 9/11/09 Date Received: 9/12/09

Date Analyzed: 9/21/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name: Lab Code:

SA40-41B

R0905198-011

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Iatrix Sp ike Q0908828-0 | | | | cate Matrix Q0908828-0 | | % Rec | | RPD |
|----------------------------------|--------|--------------|------------------------------------|-------|---|--------|---------------------------|-----------|------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| Bromoform | ND | 56.2 | 78.8 | 71 | | 59.6 | 79.6 | 75 | 70 - 130 | 6 | 30 |
| Bromomethane | ND | 52.9 | 78.8 | 67 | | 56.8 | 79.6 | 71 | 50 - 150 | 7 | 30 |
| Carbon Tetrachloride | ND | 70.2 | 78.8 | 89 | | 72.1 | 79.6 | 91 | 70 - 130 | 3 | 30 |
| Chlorobenzene | ND | 57.0 | 78.8 | 72 | | 59.2 | 79.6 | 74 | 70 - 130 | 4 | 30 |
| Chloroethane | ND | 64.9 | 78.8 | 82 | | 60:0 | 79.6 | 75 | 70 - 130 | 8 | 30 |
| Chloroform | 61 | 134 | 78.8 | 94 | | 148 | 79.6 | 110 | 70 - 130 | 10 | 30 |
| Chloromethane | ND | 61.4 | 78.8 | 78 | | 59.4 | 79.6 | 75 | 70 - 130 | 3 | 30 |
| Dibromochloromethane | ND | 60.2 | 78.8 | 76 | | 62.0 | 79.6 | 78 | 70 - 130 | 3 | 30 |
| Dibromomethane | ND | 54.5 | 78.8 | 69 | * | 60.2 | 79.6 | 76 | 70 - 130 | 10 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 42.1 | 78.8 | 53 | * | 40.0 | 79.6 | 50 | * 70 - 130 | 5 | 30 |
| Dichloromethane | ND | 69 .0 | 78.8 | 88 | | 64.9 | 79.6 | 82 | 70 - 130 | 6 | 30 |
| Diisopropyl Ether | ND | 69.3 | 78.8 | 88 | | 67.4 | 79.6 | 85 | 70 - 130 | 3 | 30 |
| Ethyl tert-Butyl Ether | ND | 71.0 | 78.8 | 90 | | 69.7 | 79.6 | 88 | 70 - 130 | 2 | 30 |
| Ethylbenzene | ND | 59.1 | 78.8 | 75 | | 61.8 | 79.6 | 78 | 70 - 130 | 5 | 30 |
| Hexachlorobutadiene | ND | 45.3 | 78.8 | 57 | * | 51.3 | 79.6 | 64 | * 70 - 130 | 13 | 30 |
| Isopropylbenzene (Cumene) | ND | 59.9 | 78.8 | 76 | | 64.1 | 79.6 | 81 | 70 - 130 | 7 | 30 |
| Methyl tert-Butyl Ether | ND | 63.0 | 78.8 | 80 | | 63.3 | 79.6 | 80 | 70 - 130 | 1 | 30 |
| Naphthalene | ND | 48.3 | 78.8 | 61 | | 58.8 | 79.6 | 74 | 50 - 150 | 20 | 30 |
| Styrene | ND | 59.1 | 78.8 | 75 | | 65.0 | 79.6 | 82 | 70 - 130 | 9 | 30 |
| Tetrachloroethene (PCE) | ND | 58.6 | 78.8 | 74 | | 63.3 | 79.6 | 79 | 70 - 130 | 8 | 30 |
| Toluene | ND | 61.1 | 78.8 | 77 | | 61.9 | 79.6 | 78 | 70 - 130 | 1 | 30 |
| Trichloroethene (TCE) | 12 | 72.8 | 78.8 | 78 | | 80.9 | 79.6 | 87 | 70 - 130 | 11 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 70.0 | 78.8 | 89 | | 66.7 | 79.6 | 84 | 70 - 130 | 5 | 30 |
| Vinyl Chloride | ND | 60.1 | 78.8 | 76 | | 63.6 | 79.6 | 80 | 70 - 130 | 6 | 30 |
| cis-1,2-Dichloroethene | ND | 67.3 | 78.8 | 85 | | 63.6 | 79.6 | 80 | 70 - 130 | 6 | 30 |
| cis-1,3-Dichloropropene | ND | 57.4 | 78.8 | 73 | | 62.9 | 79.6 | 79 | 70 - 130 | 9 | 30 |
| m,p-Xylenes | ND | 113 | 158 | 72 | | 118 | 159 | 74 | 70 - 130 | 4 | 30 |
| n-Butylbenzene | ND | 52.4 | 78.8 | 66 | * | 58.1 | 79.6 | 73 | 70 - 130 | 10 | 30 |
| n-Propylbenzene | ND | 57.4 | 78.8 | 73 | | 62.6 | 79.6 | 79 | 70 - 130 | 9 | 30 |
| o-Xylene | ND | 56.8 | 78.8 | 72 | | 59.6 | 79.6 | 75 | 70 - 130 | 5 | 30 |
| sec-Butylbenzene | ND | 56.4 | 78.8 | 71 | | 62.9 | 79.6 | 79 | 70 - 130 | 11 | 30 |
| tert-Amyl Methyl Ether | ND | 66.6 | 78,8 | 85 | | 64.5 | 79.6 | 81 | 70 - 130 | 3 | 30 |
| tert-Butylbenzene | ND | 57.5 | 78.8 | 73 | | 61.3 | 79.6 | 77 | 70 - 130 | 6 | 30 |
| trans-1,2-Dichloroethene | ND | 65.3 | 78.8 | 83 | | 66.1 | 79.6 | 83 | 70 - 130 | 1 | 30 |

Comments:

Printed 10/26/09 8:50 \Unflow2\Starlims\LimsReps\MatrixSpike.rpt Matrix Spike Summary

SuperSet Reference:

09-0000120541 rev 00

LDC #: 21 991 61 SDG #:

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: Reviewer:

2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| | | | | 1 | I | | | | T | T | T | 7 | | Π | Τ | T | Γ | Γ | T | T | T | 7 | - | T | T | <u> </u> | |
|-----|---------------------|----------------|------------------|---------|-----|---|---|---|-----|-----|-----|----------|-----|-----|-----|-----|-------|---|---|-----|-----|---|---|---|---|----------|-----|
| | | Qualifications | J-/MI/P | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ociated | 1-4 11 171110-MB | | | | | | | | | | | | | | | | | | | | | | | | |
| | RPO (Limite) | (cumma) |) | ` | | | | (| () | () | () | | 1 | (| () |) | | (| (| · · |) | - | , | (| _ | | |
| | LCSD %R (Limits) | | - | <u></u> | _ | | | - | () | () | () | ~ | | - - | - | ^ · | | | ^ | ^) | () | (| | | |) | T , |
| 30. | "R (Limits) | 67 (75 125) | - 1 |) | () |) |) | | | | ~ | <u> </u> | | | | (| | | | () | () | ~ | | , | • | | |
| | Compound | トナー | | | | | | | | | | | | | | | | | | | | | | | | | - |
| | TCS/TCSD ID | (71110 - 15C | | | | | | | | | | | | | | | | | | | | | | | | | |
| | # Date | | | | | | | | | | 1 | + | | | | | | | | + | | | | | | | |
| | # | | l | - | - | | | ı | | 1 | | 1 | - [| | 1 | | | 1 | | Ì | | | | | 1 | | |

LDC #: 2/99/H/ SDG #: Su Cme/

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | <u>\</u> of |
|---------------|-------------|
| Reviewer: | JVI |
| 2nd reviewer: | ~ |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| Y | N | N/A |
|---|---|-----|
| y | Ŋ | N/A |

Were field duplicate pairs identified in this SDG?
Were target compounds detected in the field duplicate pairs?

| | | Concentratio | n ug/ky | | Parent |
|----------|---|--------------|---------|------------|--------|
| Compound | | 4 | 7 | RPD | mly |
| | K | 43 | 33 | 10 (47.30) | |
| | М |)4 y | 1. 4 | 12.6(=14) | |
| | a | 7.21 | 0,54 | 666(£7.2D) | |
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| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
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| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
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| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
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| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 14, 2009

LDC Report Date: December 8, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905218

Sample Identification

EB091409-SO1 TB091409-SO2 SA42-10B TB091409-SO3 SA42009-10B RSAR6-37BMS SA42-25B RSAR6-37BMSD

SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B

RSAR6-37B RSAR6-25B

RSAR6-0.5B

RSAR6-9B

RSAO8-43B

RSAO8-11.5B

RSAO8-21.5B

TB091409-SO1

Introduction

This data review covers 20 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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 with the following exceptions:

| Sample | Compound | Total Days From Sample Collection Until Analysis | Required Holding Time (in Days) From Sample Collection Until Analysis | Flag | A or P |
|------------|-------------------|--|--|--|--------|
| SA43-25BRE | All TCL compounds | 17 | 14 | J- (all detects) UJ (all non-detects) | Α |

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 RSAR6-37BMS RSAR6-37BMSD 171241-WMB 171241-SMB | J (all detects) UJ (all non-detects) | Α |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|--------------------|---|--------------------------------------|--|--|--------|
| 9/22/09 (H1021) | Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene | 34.6 29.4 25.3 28.4 27.0 | SA42-10B SA42009-10B SA42-38B 171297-MB | J+ (all detects) | А |
| 9/24/09 | Hexachlorobutadiene | 31.6 | RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B 171735-MB | J- (all detects) UJ (all non-detects) | А |
| 10/1/09 | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | 28.1 25.2 25.5 25.6 45.9 | SA43-25BRE 172787-MB | J- (all detects) UJ (all non-detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|--------------------|---------------------|---------------|--|---|--------|
| 9/22/09 (C0879) | 2-Methyl-2-propanol | 0.025 (≤0.05) | EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 RSAR6-37BMS RSAR6-37BMSD 171241-WMB 171241-SMB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--------------------|
| 171241-SMB | 9/22/09 | 2-Butanone | 88 ug/Kg | RSAR6-37B |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|-----------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| RSAR6-37B | 2-Butanone | 140 ug/Kg | 140U ug/Kg |

Samples TB091409-SO1, TB091409-SO2, and TB091409-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|----------|---------------|---|
| TB091409-SO1 | 9/14/09 | Acetone | 11 ug/L | EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B |

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|---------------|---------------|---|
| TB091409-SO2 | 9/14/09 | Acetone | 2.0 ug/L | RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B |
| TB091409-SO3 | 9/14/09 | Chloromethane | 0.21 ug/L | EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------|---------------------------|---------------------------------|
| EB091409-SO1 | Acetone | 7.9 ug/Kg | 7.9U ug/Kg |
| SA42-25B | Acetone | 2.1 ug/Kg | 2.1U ug/Kg |
| SA42-38B | Acetone | 17 ug/Kg | 17U ug/Kg |
| SA43-10B | Acetone | 9.8 ug/Kg | 9.8U ug/Kg |
| SA44-10B | Acetone | 7.9 ug/Kg | 7.9U ug/Kg |
| SA44-42B | Acetone | 13 ug/Kg | 13U ug/Kg |

Sample EB091409-SO1 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|---|-----------------------------------|---|
| EB091409-SO1 | 9/14/09 | Acetone Dichloromethane Chlorobenzene | 7.9ug/L 0.21 ug/L 0.42 ug/L | SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-12B RSAR6-37B RSAR6-37B RSAR6-9B |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|----------|---------------------------|---------------------------------|
| SA42-25B | Acetone | 2.1 ug/Kg | 2.1U ug/Kg |
| SA43-10B | Acetone | 9.8 ug/Kg | 9.8U ug/Kg |
| SA44-10B | Acetone | 7.9 ug/Kg | 7.9U ug/Kg |
| SA44-42B | Acetone | 13 ug/Kg | 13U ug/Kg |
| RSAR6-0.5B | Acetone | 14 ug/Kg | 14U ug/Kg |

Samples FB072909-SO (from SDG R0904226) and FB082809-SO (from SDG R0904894) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|--|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-25B RSAR6-0.5B |
| FB082809-SO | 8/28/09 | Acetone Toluene | 9.2 ug/L 0.44 ug/L | RSAO8-43B RSAO8-11.5B RSAO8-21.5B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-------------|----------------------------|---------------------------|---------------------------------|
| SA42-10B | Dichloromethane | 0.48 ug/Kg | 0.48U ug/Kg |
| SA42-25B | Acetone Dichloromethane | 2.1 ug/Kg 0.43 ug/Kg | 2.1U ug/Kg 0.43U ug/Kg |
| SA43-43B | Toluene | 0.70 ug/Kg | 0.70U ug/Kg |
| SA44-42B | Dichloromethane | 0.50 ug/Kg | 0.50U ug/Kg |
| RSAR6-25B | Toluene | 0.70 ug/Kg | 0.70U ug/Kg |
| RSAR6-9B | Toluene | 0.61 ug/Kg | 0.61U ug/Kg |
| RSAO8-43B | Toluene | 0.73 ug/Kg | 0.73U ug/Kg |
| RSAO8-11.5B | Acetone | 8.6 ug/Kg | 8.6U ug/Kg |
| RSAO8-21.5B | Toluene | 0.51 ug/Kg | 0.51U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS or MSD percent recoveries (%R) were not within QC limits for some compounds, the MSD or LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recoveries (%R) were not within QC limits for some compounds, the LCS percent recoveries (%R) for a second LCS analysis were within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|----------|---|--|-------------------|--|--------|
| SA43-25B | Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4 | 124883 (285820-1143278) 229271 (473981-1895922) 203306 (424973-1699892) 86736 (190690-762760) | All TCL compounds | J (all detects) R (all non-detects) | A |

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905218 | All compounds reported below the PQL. | J (all detects) | А |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|----------|-------------------|------|--------|
| SA43-25B | All TCL compounds | Х | А |

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

XVI. Field Duplicates

Samples SA42-10B and SA42009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | 222 | 5.77 | | |
|-----------------|-----------------------|-------------|-----------------|------------------------|-------|--------|
| Compound | SA42-10B | SA42009-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| Dichloromethane | 0.48 | 5.7U | - | 5.22 (≤5.7) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905218

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---|--|--------|-------------------------------------|
| R0905218 | SA43-25BRE | All TCL compounds | J- (all detects) UJ (all non-detects) | А | Technical holding times (h) |
| R0905218 | EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905218 | SA42-10B SA42009-10B SA42-38B | Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene | J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905218 | RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905218 | SA43-25BRE | tert-Butylbenzene sec-Butylbenzene p-Isopropyttoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905218 | EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905218 | SA43-25B | All TCL compounds | J (all detects) R (all non-detects) | A | Internal standards (area) |
| R0905218 | SA43-25B | All TCL compounds | х | А | Overall assessment of data (o) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---------------------------------------|-----------------|--------|---------------------------------|
| R0905218 | EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-35B SA42-35B SA43-25B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-25B SA44-25B RSAR6-37B RSAR6-37B RSAR6-0.5B RSAR6-9B RSAR6-9B RSAO8-43B RSAO8-411.5B RSAO8-21.5B TB091409-SO1 TB091409-SO2 TB091409-SO3 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905218

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|-----------|---------------------------------|---------------------------------|--------|------|
| R0905218 | RSAR6-37B | 2-Butanone | 140U ug/Kg | Α | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905218

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|----------|---------------------------------|--------|------|
| R0905218 | EB091409-SO1 | Acetone | 7.9U ug/Kg | А | bt |
| R0905218 | SA42-25B | Acetone | 2.1U ug/Kg | А | bt |
| R0905218 | SA42-38B | Acetone | 17U ug/Kg | А | bt |
| R0905218 | SA43-10B | Acetone | 9.8U ug/Kg | А | bt |
| R0905218 | SA44-10B | Acetone | 7.9U ug/Kg | Α | bt |
| R0905218 | SA44-42B | Acetone | 13U ug/Kg | А | bt |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905218

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|----------|---------------------------------|--------|------|
| R0905218 | SA42-25B | Acetone | 2.1U ug/Kg | А | be |
| R0905218 | SA43-10B | Acetone | 9.8U ug/Kg | А | be |
| R0905218 | SA44-10B | Acetone | 7.9U ug/Kg | А | be |
| R0905218 | SA44-42B | Acetone | 13U ug/Kg | А | be |
| R0905218 | RSAR6-0.5B | Acetone | 14U ug/Kg | Α | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905218

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|---------|-------------|----------------------------|---------------------------------|--------|------|
| R090218 | SA42-10B | Dichloromethane | 0.48U ug/Kg | А | bf |
| R090218 | SA42-25B | Acetone Dichloromethane | 2.1U ug/Kg 0.43U ug/Kg | А | bf |
| R090218 | SA43-43B | Toluene | 0.70U ug/Kg | А | bf |
| R090218 | SA44-42B | Dichloromethane | 0.50U ug/Kg | Α | bf |
| R090218 | RSAR6-25B | Toluene | 0.70U ug/Kg | А | bf |
| R090218 | RSAR6-9B | Toluene | 0.61U ug/Kg | А | bf |
| R090218 | RSAO8-43B | Toluene | 0.73U ug/Kg | А | bf |
| R090218 | RSAO8-11.5B | Acetone | 8.6U ug/Kg | А | bf |
| R090218 | RSAO8-21.5B | Toluene | 0.51U ug/Kg | А | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991H1 SDG #: R0905218 Stage 2B Laboratory: Columbia Analytical Services

Date: 4/62/09 Page: 1 of 1 Reviewer: 3/4 2nd Reviewer: _Q

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|----------|--|
| 1. | Technical holding times | SW | Sampling dates: 9/14/09 |
| H. | GC/MS Instrument performance check | <u> </u> | ' |
| 111. | Initial calibration | WZ | 7 RSD r~ |
| IV. | Continuing calibration/ICV | SW | ca € 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SW | |
| VIII. | Laboratory control samples | SW | LCS /D |
| IX. | Regional Quality Assurance and Quality Control | N | · |
| Χ. | Internal standards | | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | SW | |
| XVI. | Field duplicates | Su | D = 2,3 |
| KVII. | Field blanks | SW | EB = 1 $TB = 20, 21, 22$ $TB = FB 0729 09-50$ ($R = FB 0828 09-50$ (R |

N = Not provided/applicable

SW = See worksheet

R = Rinsate

FB = Field blank

TB = Trip blank

EB = Equipment blank

Validated Samples:

mater + Soil

| | WATE | r | 1 30) | | | | |
|----------------|---------------------------|------|----------------|---------|---------------|-----------------|----------------|
| 1 1 | EB091409-SO1 W | 11 3 | SA44-25B \$ | 21 | TB091409-SO2 | 7 31 | 1 171241 - WMB |
| 2 | SA42-10B D 5 | 12 | SA44-42B | + 22 | TB091409-SO3 | 32 | + 17/297- MB |
| 3 ? | SA42009-10B D | 13 | RSAR6-37B | 23 | RSAR6-37BMS S | 33 | 3 171498- |
| 4 3 | SA42-25B | 14 | RSAR6-25B | 24 | SRSAR6-37BMSD | 34 | 172787- |
| 5 7 | SA42-38B | 15 3 | RSAR6-0.5B | 25 | | † 35 | 9 171241- SMB |
| 6 3 | SA43-10B | 16 6 | RSAR6-9B | 26 | | 36 | 6 171735 - MB |
| ₇ 3 | SA43-25B | 17 6 | RSAO8-43B | 27 | | 37 | |
| 8 4 | SA43-25B DL RE | 18 6 | RSAO8-11.5B | 28 | | 38 | |
| 9 3 | SA43-43B | 19 6 | RSAO8-21.5B | 29 | | 39 | |
| 10 | SA44-10B | 20 1 | TB091409-SO1 W | / 30 | | 40 | |

TARGET COMPOUND WORKSHEET

AETHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------|
| B. Bromomethane | V. Benzane | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| E. Methylane chonc than e | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrytontrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform⁴ | EE. Ethylbenzane** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chiorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanel |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyttoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Buty/benzene | WWW. Ethanol | <u>aaaa.</u> |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE, sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyf-tert-butyf ether | FFF, 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-isopropyltoluene | AAAA, Ethyl tert-butyl ether | חחחם. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB, tert-Amy methyl ether | ww. |

⁼ System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

| LDC #:_ | 21991 | <u>#</u> |
|---------|-------|----------|
| SDG #:_ | See | Comer |

VALIDATION FINDINGS WORKSHEET Technical Holding Times

| Page:_ | <u></u> of |
|---------------|------------|
| Reviewer: | SVC |
| 2nd Reviewer: | |
| | |

All circled dates have exceeded the technical holding times.

| | temperatures within | |
|--|---------------------|--|

| METHOD : GC/M | IS VOA (EPA S | W 846 Method | 8260B) | | | | |
|---------------|---------------------------------------|--------------|--|-----------------|---------------|---------|-----------|
| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # | Qualifier |
| 8 | 5 | N | Sampling Date 9 /14 /0 9 | | Analysis date | 17 | J-/WJ/1 |
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FECHNICAL HOLDING TIME CRITERIA

Vater unpreserved:

Aromatic within 7 days, non-aromatic within 14 days of sample collection. Both within 14 days of sample collection. Both within 14 days of sample collection.

Vater preserved:

Boil:

| 14 101 K | ところ |
|----------|-----|
| # | #: |
| DC. | DG |

VALIDATION FINDINGS WORNSHEET **Initial Calibration**



METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? $\frac{1}{2} \frac{2}{2} \frac{2}{2} \frac{2}{3} \frac{2}{3$

Did the initial calibration meet the acceptance criteria?

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF?

| 4 (λ β δ η 1 (Δ L | ł | | | | | | | |
|--|----|---------|-------------|----------|------------------------------|-------------------------------|--------------------|----------------|
| 4/264 1(AL WNN 0,028 1,13,20-24, 17124-WAD 17124-SMB | | Date | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
| 171241-WNB 171241-SNB 171241-SNB | ╢ | 1/8 /ca | 17.41- | 722 | | 0,028 | 1, 13 20-24, | J/WS A (C) |
| (7)241-SNP | + | 2/8/ | | | | | 171241-WMB, | |
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1H 16/12 # 7071 SDG #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 1 of /

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? N N N X

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ? Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

| * | Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications | |
|----------|-----------|-------------|----------|-------------------------------|-------------------------------|--------------------|----------------|---|
| | 9 /22/09 | 66800 | N N N N | | 220.0 | 1, 13, 20-24. | J/W/A (c) | 7 |
| | | | | | | 171241- WMB | | |
| | | | | | | 171241-5MB | | |
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| | 9/22/8 | H 1021 | (+) 0 | 29,4 | | 2 3 5 171297- MB | J+1045 A | 1 |
| | , | | YY (+) | 25.3 | | | | |
| | | | (+) 7,7 | 28.4 | | | | |
| | | | (+) III | 0 , ۲ ح | | 7 | ` | |
| | | | JJ (+) | 34.6 | | | | |
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| | 60/ HZ/ H | H 108) | (-) 111 | 3).6 | | 16-19 171735-MB | J-/NJ /A | J |
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| | 10/01/69 | 41236 | (-) 222 | 28.1 | | 8 172787-MB | T-/NJ/A | |
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| | | | (-) WW | 25.6 | | | | |
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کرده که 一本 100 元 SDG #: LDC #:

VALIDATION FINDINGS WODKSHEFT

Page: Reviewer: 2nd Reviewer.

| VALIDALION TINDINGO WORKUHELI | Blanks | |
|-------------------------------|--------|--|
| L 2 | ш | |

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank associated with every sample in this SDG?

Was a method blank analyzed at least once every 12 hours for each matrix and concentration? Was there contamination in the method blanks? If yes, please see the qualifications below.

Slank analysis date: 9

| Colic. units: 712/ Ke/ | | | Associated Samples: | (2) | | \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | r, |
|------------------------|------------|-------|---------------------|-----------------------|-------|---------------------------------------|-------------|
| Compound | Blank ID | | | Sample Identification | ıtion | | |
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| Blank analysis date: | | | - | | | | =1 |
| | | | Associated Samples. | | | | |

| | Sample Identification | | | | | | | | |
|---------------------|-----------------------|--|--|--|--|--|--|--|--|
| Associated Samples: | | | | | | | | | |
| | Blank ID | | | | | | | | |
| colle, utilis. | Compound | | | | | | | | |

Se Carr 21991 4) SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of > Reviewer: 31/6 2nd Reviewer:_

(be)

2-16

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METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A

Were field blanks identified in this SDG? Were target compounds detected in the field blanks? Were Associated sample units: $\frac{1}{2}$ $\frac{1}{4}$ OHank units:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:

EB Sample Identification Associated Samples: ٤ 4 Ş 6. ther <u>v</u> のなれる d 7 <u>8</u>. Blank-ID 9/14/09 Blank ID 0.47 0.2 Sampling Date. 2 Ш ىلا Compound <u>4.</u>

Associated Samples: 13 / Es Blank units: 45/L Associated sample units: 45/L ; 49/L ; 49/L ; Field blank type: (circle one) Field Blank / Rinsate /(Tip Blank) Other:

7

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| | ntification | 10 | 7.9/4 | | | | | |
| Associated Sallipies. | Sample Identification | و | 4.8/4 | | 7 78) | | | |
| TOSSEL | | تر | 1/6.7 4/8.8 W/71 | | ND ~ 78) | | | |
| | 2 | 4 | 2.1/4 | | others | | | |
| Specification of the second of | | | 7.9 /y | | (A11 0 | | | |
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| י יפום בימווג | Blank ID 20 | 9/14/09- | = | | | | | |
| oi (all ala all | punc | Sampling Date 9/4 /69 | ı | A | | | | |
| 16 | Compound | | 3 | | | | | |
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VALIDATION FINDINGS WORKSHEET

Page: of 3 Reviewer: N6

2nd Reviewer:

Field Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

2/99/ #/

LDC#: SDG #:

Were field blanks identified in this SDG? Y N N/A

Were target compounds detected in the field blanks?

49 / Associated sample units: 49 / E

13- 19 Associated Samples: Blank units: いり /上 Associated sample units: いっぱん たん Field blank type: (circle one) Field Blank / Rinsate / 「Trip Blank / Other:

| Compound | Blank ID 2 | Blank ID | | | | Sample Identification | intification | | | |
|--|------------------------|------------------------------|------------------------------|----------|---------|-----------------------|-----------------------|---|------|--|
| Sampling Date | Sampling Date 4/4/69 | | | | | | | | | |
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| Blank units: 45 / Associated sample units: 49 /kg Field blank type: (circle one) (Field Blank) Rinsate / Trip Blank) | sociated sam | ple units: V/ Rinsate / T | us /kg rip Blank / Other: | ier: | Associa | Associated Samples: | s. 2-16 | , | (Pt) | |
| Compound | FB 0729 09 CO Blank 10 | Blankto | | | | Sample Ide | Sample Identification | | | |
| Sampling Date | 1 | 2 | 4 | 9 | 2 | <u> </u> | 16 | | | |
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10.48/4 10,43/4

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SDG #: 54 Cres (414117)

LDC #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field blanks identified in this SDG? Y N/N/A N/N N/A

Were target compounds detected in the field blanks?

Slank units: 19 / Associated sample units: 19 / S

Field blank type: (circle one) (Field Blank) Rinsate / Trip Blank / Other:

17-19

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| Compound | Sampling Date | 4 | 3 | | | | | | | |
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| | F 203 28 09 - \$0 Blank ID Blank ID | F P S S S S S S S S S | Compound Fp.03-38 09-50 Blank ID Sampling Date 8/28/09 17 18 19 F 9.2 3.6 4 | Compound Fp.08.28 09-50 Blank ID 17 18 19 Sampling Date 8/28/09 17 18 19 Ellow Co. 44 0.75/4 8.6 /4 0.51 /4 | Compound Fp.03.28 09-50 Blank ID 17 18 19 Sampling Date 8/28/09 17 18 19 E 9.2 8.6 /y 0.51 /y C 0.44 0.51 /y 0.51 /y | Compound Fp.08.38.69-10 | Compound Fp.08.38.69—50 Blank ID 17 18 19 19 15 18 19 15 18 19 15 18 19 15 18 19 15 18 19 19 19 19 19 19 19 | Compound Fp.08.38.69-50 Blank ID | Compound Fp.08.38.69-10 17 18 19 19 15 18 19 15 18 19 15 18 19 15 18 19 15 18 19 19 19 19 19 19 19 | Compound Fb68.28.69 |

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other. Associated sample units:_ Blank units:

Associated Samples:

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| Blank ID | | | | | | | |
| Compound | Sampling Date | | | | | | |

SDG #: See Cory LDC #: 21791 # /

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of Reviewer:_ 2nd Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associate

MS/MSD. Soil / Water.

V N/A

Was a MS/MSD analyzed every 20 samples of each matrix? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | QI QSW/SW | Compound | ₩. | MS %R (Limits) | MSD %R (Umits) | RPD (Limits) | Associat | Associated Samples | Qualifications | |
|---|------|--------------------|---------------------------------------|----|-------------------|-------------------|--------------|----------|--------------------|----------------|-----|
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| | | Compound | puno | | ac Lim | QC Limits (Soil) | RPD (Soll) | ac Limit | QC Limits (Water) | RPD (Water) | |
| | ï | 1,1-Dichloroethene | | | 59-1 | 59-172% | < 22% | 61-1 | 61-145% | < 14% | |
| | S. | Trichloroethene | | | 62- | 62-137% | < 24% | 71-1 | 71-120% | < 14% | |
| | ۷. | Benzene | | | -99 | 66-142% | < 21% | 76-1 | 76-127% | < 11% | |
| | CC. | Toluene | | | -69 | 59-139% | < 21% | 76-1 | 76-125% | < 13% | |
| | ä | Chlorobenzene | | | 90- | 60-133% | < 21% | 75-1 | 75-130% | < 13% | |

LDC#: 21991 H)

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: __lof_ Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| CS/LCSD ID | puno | ¥ | LCS %R (Limits) | LCSD %R (Limits) | | RPD (Limits) | Associated Samples | Qualifications |
|------------|------|----|--------------------|---------------------|-----|--------------|--------------------|---------------------|
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VALIDATION FINDINGS WORNSHEEL Internal Standards

SDG #: See

Reviewer: 2nd Reviewer:

Page:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

| | (: | | | \ | | | | | | | | | | | |
|---------------|--------------------|-------------------------|--------------------|-----------------|-----------|--|---|--|--|--|--|--|--|--|--|
| | J/R/A | | | | (411 766) | | | | | | | | | | |
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| Area (Limits) | 124883 (285820-11. | 229271 (473981-1895922) | 203 306 (424 973 - | -069 061) 98238 | | | | | | | | | | | |
| Internal | PFB | DFB | CBZ | 4 DCB | | | | | | | | | | | |
| Sample ID | | _ | | | | | | | | | | | | | |
| Date | | | | | | | - | | | | | | | | |
| ** | | | ا | 7 | | | | | | | | | | | |

(BCM) = Bromochloromethane (DFB) = 1,4-Difluorobenzene (CBZ) = Chlorobenzene-d5

(FBZ) = Fluorobenzene

(PFB) = Pentafluorobenzene (4DCB) = 1,4-Dichlorobenzene-d4 (2DCB) = 1,2-Dichlorobenzene-d4

SDG# 500 (Porty

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: of Areviewer: 3/6.2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Was the overall quality and usability of the data acceptable?

| * | Date | Sample ID | Finding | Associated Samples | Qualifications | |
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| Com | Comments: | | | | | |

LDC #: 21991 4) SDG #: Su Green

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

| Page:_ | of |
|---------------|-----|
| Reviewer: | J/C |
| 2nd reviewer: | 9 |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| <u></u> | γ | N | N/A |
|---------|----------|---|-----|
| J | Y. | Ν | N/A |

Were field duplicate pairs identified in this SDG?
Were target compounds detected in the field duplicate pairs?

| | Concentra | tion (15/kg | | Parent |
|----------|-----------|--------------|-------------|--------|
| Compound | 2 | 3 | RPD | only |
| E | 0.48 | 5.7U | 5,22(45.70) | _ |
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| | Concentration (| _ |
|----------|-----------------|-----|
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 15 through September 16, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905260

Sample Identification

EB091509-SO1 SA128-10B SA136-0.5B SA128-29B SA136-10B SA65-0.5B SA136-25B SA65009-0.5B SA136-40B TB091609-SO1 SA30-5B SA153-25BMS SA30-9B SA153-25BMSD

SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B

SA172-25B SA172-40B

TB091509-SO1

TB091509-SO2

TB091509-SO3 EB091609-SO1

SA128-0.5B

Introduction

This data review covers 21 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 171659-SMB 171659-WMB | J (all detects) UJ (all non-detects) | A |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---------------------|------|---|--|--------|
| 9/24/09 | Hexachlorobutadiene | 31.6 | SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA153-25B SA153-25BMS SA153-25BMSD 171735-MB | J- (all detects) UJ (all non-detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 9/23/09 | 2-Methyl-2-propanol | 0.027 (≤0.05) | EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 171659-SMB | J (all detects) UJ (all non-detects) | A |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--------------------|
| 171659-SMB | 9/23/09 | 2-Butanone | 80 ug/Kg | SA128-29B |

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|---|
| 171962-MB | 9/25/09 | Dichloromethane | 0.42 ug/Kg | SA30-9B SA30-25B SA30-38B SA153-10B SA153-38B SA172-10B SA172-25B SA172-40B SA128-0.5B SA128-10B SA65-0.5B SA65-0.5B |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|-----------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA128-29B | 2-Butanone | 130 ug/Kg | 130U ug/Kg |

Samples TB091509-SO1, TB091509-SO2, TB091509-SO3, and TB091609-SO1 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|--|------------------------------------|---|
| TB091509-SO2 | 9/15/09 | Bromoform Chloromethane Dibromochloromethane | 1.6 ug/L 0.24 ug/L 0.77 ug/L | SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B |
| TB091509-SO3 | 9/25/09 | Chloromethane | 0.22 ug/L | EB091509-SO1 SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B |
| TB091609-SO1 | 9/16/09 | Acetone | 1.9 ug/L | EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------------------|---------------------------|---------------------------------|
| SA30-38B | Dibromochloromethane | 0.57 ug/Kg | 0.57U ug/Kg |
| SA128-10B | Acetone | 3.0 ug/Kg | 3.0U ug/Kg |
| SA65009-0.5B | Acetone | 3.4 ug/Kg | 3.4U ug/Kg |

Samples EB091509-SO1 and EB091609-SO1 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|---------------------------------------|------------------------------------|---|
| EB091509-SO1 | 9/15/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.28 ug/L 0.41 ug/L | SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B |
| EB091609-SO1 | 9/16/09 | Acetone | 4.9 ug/L | SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------|---------------------------|---------------------------------|
| SA136-10B | Toluene | 0.60 ug/Kg | 0.60U ug/Kg |
| SA136-25B | Toluene | 0.54 ug/Kg | 0.54U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|--------------------|---------------------------|---------------------------------|
| SA30-5B | Toluene | 0.47 ug/Kg | 0.47U ug/Kg |
| SA30-9B | Toluene | 0.62 ug/Kg | 0.62U ug/Kg |
| SA30-25B | Acetone Toluene | 2.9 ug/Kg 0.67 ug/Kg | 2.9U ug/Kg 0.67U ug/Kg |
| SA128-10B | Acetone | 3.0 ug/Kg | 3.0U ug/Kg |
| SA65009-0.5B | Acetone | 3.4 ug/Kg | 3.4U ug/Kg |

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905260 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|--------------------|---------------------------|---------------------------------|
| SA136-10B | Toluene | 0.60 ug/Kg | 0.60U ug/Kg |
| SA136-25B | Toluene | 0.54 ug/Kg | 0.54U ug/Kg |
| SA30-5B | Toluene | 0.47 ug/Kg | 0.47U ug/Kg |
| SA30-9B | Toluene | 0.62 ug/Kg | 0.62U ug/Kg |
| SA30-25B | Acetone Toluene | 2.9 ug/Kg 0.67 ug/Kg | 2.9U ug/Kg 0.67U ug/Kg |
| SA128-10B | Acetone | 3.0 ug/Kg | 3.0U ug/Kg |
| SA65-0.5B | Toluene | 0.45 ug/Kg | 0.45U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------|---------------------------|---------------------------------|
| SA65009-0.5B | Acetone | 3.4 ug/Kg | 3.4U ug/Kg |
| | Toluene | 0.63 ug/Kg | 0.63U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) and relative percent differences (RPD) were not within QC limits for several compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905260 | All compounds reported below the PQL. | J (all detects) | А |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SA65-0.5B and SA65009-0.5B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentrat | ion (ug/Kg) | DDD | Diff | | |
|------------|------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA65-0.5B | SA65009-0.5B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 1.3 | 1.2 | - | 0.1 (≤14) | - | - |
| Acetone | 27U | 3.4 | - | 23.6 (≤27) | - | _ |
| Toluene | 0.45 | 0.63 | _ | 0.18 (≤6.8) | - | • |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905260

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---------------------------------------|--|--------|-------------------------------------|
| R0905260 | EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905260 | SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA153-25B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | A | Continuing calibration (%D) (c) |
| R0905260 | EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | A | Continuing calibration (RRF) (c) |
| R0905260 | EB091509-SO1 SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-25B SA153-10B SA153-25B SA153-10B SA172-10B SA172-10B SA172-40B TB091509-SO1 TB091509-SO1 TB091509-SO3 EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B TB091609-SO1 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905260

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|-----------|---------------------------------|---------------------------------|--------|------|
| R0905260 | SA128-29B | 2-Butanone | 130U ug/Kg | А | Ы |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905260

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|----------------------|---------------------------------|--------|------|
| R0905260 | SA30-38B | Dibromochloromethane | 0.57U ug/Kg | А | bt |
| R0905260 | SA128-10B | Acetone | 3.0U ug/Kg | А | bt |
| R0905260 | SA65009-0.5B | Acetone | 3.4U ug/Kg | А | bt |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905260

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|--------------------|---------------------------------|--------|------|
| R0905260 | SA136-10B | Toluene | 0.60U ug/Kg | А | be |
| R0905260 | SA136-25B | Toluene | 0.54U ug/Kg | А | be |
| R0905260 | SA30-5B | Toluene | 0.47U ug/Kg | А | be |
| R0905260 | SA30-9B | Toluene | 0.62U ug/Kg | А | be |
| R0905260 | SA30-25B | Acetone Toluene | 2.9U ug/Kg 0.67U ug/Kg | А | be |
| R0905260 | SA128-10B | Acetone | 3.0U ug/Kg | А | be |
| R0905260 | SA65009-0.5B | Acetone | 3.4U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905260

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|--------------------|---------------------------------|--------|------|
| R0905260 | SA136-10B | Toluene | 0.60U ug/Kg | А | bf |
| R0905260 | SA136-25B | Toluene | 0.54U ug/Kg | А | bf |
| R0905260 | SA30-5B | Toluene | 0.47U ug/Kg | А | bf |
| R0905260 | SA30-9B | Toluene | 0.62U ug/Kg | А | bf |
| R0905260 | SA30-25B | Acetone Toluene | 2.9U ug/Kg 0.67U ug/Kg | А | bf |
| R0905260 | SA128-10B | Acetone | 3.0U ug/Kg | А | bf |
| R0905260 | SA65-0.5B | Toluene | 0.45U ug/Kg | А | bf |
| R0905260 | SA65009-0.5B | Acetone Toluene | 3.4U ug/Kg 0.63U ug/Kg | A | bf |

Tronox Northgate Henderson

| LDC #: 21991I1 | VALIDATION COMPLETENESS WORKSHEET | |
|--------------------------------|-----------------------------------|--|
| SDG #: R0905260 | Stage 2B | |
| Laboratory: Columbia Analytica | al Services | |

Reviewer:___ 2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|-----|--|
| l. | Technical holding times | A | Sampling dates: 9/15-16/09 |
| 11. | GC/MS Instrument performance check | Ā | , ' |
| III. | Initial calibration | SW | 3 RSD r2 |
| IV. | Continuing calibration/ICV | SW | (a) € 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | | |
| VII. | Matrix spike/Matrix spike duplicates | ŚW | |
| VIII. | Laboratory control samples | A | ICS |
| IX. | Regional Quality Assurance and Quality Control | N N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | N N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | SN | D = 23,24 |
| XVII. | Field blanks | SW | EB= 1, 19 TB= 16, 17, 18, 25 FB= FB072909-50 |

(from R0904226)

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

X ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

water + Soil

| 1 | EB091509-SO1 W | 112 | SA153-25B | 21 | SA128-10B S | 31 1 | 171659 - WMB |
|---------------|----------------|------|----------------|----|--------------------------------|-------------|--------------|
| | | 3 | SA153-23B | | SA128-29B | 32 | 171735 MB |
| 2 7 | SA136-0.5B | 12 | SA153-38B | 22 | | | |
| 3 | SA136-10B | 13 | SA172-10B | 23 | SA65-0.5B D | ↑ ≥ | 171962- |
| 4 | SA136-25B | 14 3 | SA172-25B | 24 | \Rightarrow SA65009-0.5B b | 34 4 | 171659- SMB |
| 5 > | SA136-40B | 15 3 | SA172-40B | 25 | TB091609-SO1 W | 35 | |
| 6 ~ | SA30-5B | 16 | TB091509-SO1 W | 26 | SA153-25BMS | 36 | |
| 7 3 | SA30-9B | 17 1 | TB091509-SO2 | 27 | SA153-25BMSD | 37 | |
| 8 3 | SA30-25B | 18 1 | TB091509-SO3 | 28 | | 38 | |
| 9 3 | SA30-38B | 19 | EB091609-SO1 | 29 | | 39 | |
| 10 > | SA153-10B | 20 3 | SA128-0.5B | 30 | | 40 | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III n-Riththeores | |
|---|--|-------------------------------|--|--|
| B. Bromomethane | V. Benzene | PP Bromochiocomethose | II-Daiyinelizelle | CCCC.1-Chlorohexane |
| C. Vinyl choride** | W tenne 1 2 0:11 | | JJJ. 1,2-Dichlorobenzene | DDDD. kopropyl alcohol |
| | vv. uaris-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| U. Crioroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN 123-Trickloss | GGGG. Actylonitrile |
| G. Carbon disulfide | AA. Tetrachloroethene | 1 1 2 Tetrachland | aliaziago o librillo del como | HHHH. 1,4-Dioxane |
| H. 1,1-Dichloroethene** | BB 1100 Tatasalla | oo i'i'i'z-reuachooemane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| | DE: 1,1,2,2-1 etractilot cettane | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| r. r. r. Diction of the second | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK Dronicostrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RBB m r Vulance | |
| K. Chloroform** | TH THICKENSONS** | | .v.v. m.p-vyienes | LLLL. Ethyl ether |
| | Lt. Luiyibelizerle | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1.1.2-Trichloro-1 2 2-triffmornethane | NAME OF THE PROPERTY OF THE PR |
| M. 2-Butanone | GG. Xylenes, total | AAA 12 E T.: | | |
| N 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | | AAA: 1,3,5-1 filmethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000 |
| v. i, i, r. iiicilloloethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | dddd |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | www Ethanol | |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX Di isonomul attor | מממני |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | FFF sec. Rut/henvene | ialia iddoidos como | KRRR. |
| R. cis-1.3-Dichloropropene | Manual Ma | | YYY. tert-Butanol | SSSS. |
| | LL. Meury-Lert-Dutyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | 1111 |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-lsopropyltoluene | AAAA. Ethyl tert-butyl ether | ======================================= |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | RRRR tot American | |
| | | | DODD: telt-Alliyi metnyi ether | WW |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

VALIDATION FINDINGS WORNSHELL **Initial Calibration**

Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

3DG #: La Conny DC #: 21 471 4/

N/A". Not applicable questions are identified as "N/A". Not applicable questions are identified as "N/A".

| N | N/A |

Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? $\frac{1}{2}$ $\frac{2}{2}$ $\frac{2}{3}$

1 I by K # 707

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of Reviewer:__ 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and > 0.05 RRF?

| standard ID | Standard ID | 1 | Compound | Finding %D (Limit: <25.0%) | | Associated Samples | dons |
|-----------------------|-------------|------|----------|-------------------------------|-------|--------------------|-------------|
| 4 60946 | | NNNN | | | 0.027 | 1, 16-19 22 25 | I/NJ/A (C) |
| | | | | | | 171659-WMB | |
| | | | | | | 171654-5MR | |
| | | | | | | | |
| (S) 177 1801T 89 87 8 | | İ | | 31.6 | | 76 16 11 9-8 | J- MJ A (C) |
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LDC# 21991 II SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

Page: 2nd Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a method blank associated with every sample in this SDG?

Was a method blank analyzed at least once every 12 hours for each matrix and concentration? Y/N N/A

Was there contamination in the method blanks? If yes, please see the qualifications below. Blank analysis date: 4 A/N N

(79) Sample Identification 22 Associated Samples: 4 30 171659-5MB Blank ID 80 2 Compound Conc. units:_

| Associated Samples: 7-10 12-15 20,21 23 24 (Mb) | | | | | | |
|---|----------|-----------|------|--|--|--|
| | Blank ID | 171962-MB | 0.42 | | | |
| Blank analysis date: 9/25/09 Conc. units: 1/6 /k < | Compound | | lυ | | | |

| | /w/s |
|-------|-------|
| 18615 | |
| DC #: | DC #: |

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: Vof Reviewer: JW 2nd Reviewer.

Were field blanks identified in this SDG? Y N /N/A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

No N/A Were target compounds detected in the field blanks?

Blank units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "15 Associated sample units: "16 Associated sample units: "17 Associated sample units: "18 Associated sample units: "

(bt)Associated Samples: 2 – 9 Sample Identification 0.57 4 Blank ID Blank ID 17 0.24 Sampling Date Compound

Blank units: $\frac{46/L}{(\text{circle one})}$ Associated sample units: $\frac{49/L}{(\text{circle one})}$ bight $\frac{45/L}{(\text{circle one})}$ Field Blank / Rinsate $\sqrt{\text{Trip Blank}}$ Other:

Associated Samples:

10-15

(an)

Sample Identification Blank ID 6 Blank ID 0, 22 Sampling Date. Compound

| 1 | 3 |
|--------|--------|
| -14617 | |
| DC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET

Page: of 3 Reviewer: 16 2nd Reviewer:

(be)

2-15

品

Field Blanks

WETHOD: GC/MS VOA (EPA SW 846 Method 8260B) Y N /N/A

Were field blanks identified in this SDG?
Were target compounds detected in the field blanks?
No A Associated sample units: NS Ks Y/N N/A

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other. Blank units:

Sample Identification Associated Samples: 0, 57 ď 67 Z 0.47 O n/ ts 0 Blankto 0.00 9/12/6 Blank ID 0.28 3 4 ò Sampling Date W) Compound

ب

Associated Samples: 石田 Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: NS /RS Blank units: No 1/2 Associated sample units:

20-24

Sample Identification 24 3 Blankto 3 ى ە Blank ID 19 9/16/ Sampling Date Compound

Sre Cones 21991 I) LDC #: SDG #:

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 3 of 3 Reviewer:_ 2nd Reviewer:_

WETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

V N /N/A Were field blanks identified in this SDG?

N N/A Were target compounds detected in the field blanks?

Blank units: 1/2 Associated sample units: 1/45 Associated blank / Rinsate / Trip Blank / Other.

19 20-24 Associated Samples:

| Compound | Blank ID 25 Blank ID | Blank ID | | | | Sample Identification | ntification | | |
|--|------------------------|--------------|-----------------|------------------|---------|-----------------------|-------------|----------|--------|
| Sampling Date | 9 No/09 | | 72 | 24 | | | | | |
| 4 | 1,9 | | 2,0/4 | 3.4/4 | | | | | |
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| | | | CAII OTE | others either ND | er ND | 6 7 | (87 | | |
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| | | | | | | | | | |
| Blank units: 49 /L Associated sample units: 49/kg | ociated samp | le units: | 45/kg | | | | | | () 4) |
| Field blank type: (circle one) Field Blank > Rinsate / Trip Blank / Other. | e) K ield Blank | ≯Rinsate / T | rip Blank / Oth | ier: | Associa | Associated Samples: | | 7165 JIH | |

| The factor of th | | Tangara L |) / Williams | | Assor | Associated Salliples. | 3. | 1 | , | \ |
|--|------------------------------------|-------------------|--------------|-------------------------------------|--------|-----------------------|--------------|-------|---------------|--------|
| Compound | F B 072909-50 Blank ID Blank ID | 09-50 Blank ID | | | | Sample Identification | ntification | | | |
| Sampling Date | 19/50/2 | 4 | 5 | 4 | 3 | 7 | 8 | 7 | 23 | 7, |
| 11 | 3,5 | | • | | | | 2.9 /y 3.0/y | 3.0/4 | | 34/4 |
| 44 | 0.30 | | | | | | | | | |
| 2) | 0,44 | | 0,60/4 | 0.60/4 0.54 /4 0.47/4 0.62/4 0.57/4 | 0.47/4 | W/23.0 | 0.67/4 | | 0 45/4 0.63/4 | 0.63/4 |
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LDC#: 2491 I)

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Reviewer:_ 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated

MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| | | | | SW | QSW | | | |
|---|------|---|----------|------------------|-------------|--------------|--------------------|----------------|
| * | Date | MS/MSD ID | Compound | %R (Limits) | %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
| | | 26/27 | Several | compounds) | | and ?RPAS | | No gul |
| | | | ontsi | extend l'aits in | · |) | | (L(S in) |
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| | | Compound | punc | QC Limits (Soil) | its (Soil) | RPD (Soll) | QC Limits (Water) | RPD (Water) |
| | ェ | 1,1-Dichloroethene | | 59-1 | 59-172% | < 22% | 61-145% | < 14% |
| | si | Trichloroethene | | 62-1 | 62-137% | < 24% | 71-120% | < 14% |
| | > | Benzene | | 66-1 | 66-142% | < 21% | 76-127% | <11% |
| | | Toluene | | 59-1 | 59-139% | < 21% | 76-125% | < 13% |
| | DD. | Chlorobenzene | | 60-1 | 60-133% | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027,001

Sample Matrix:

Soil

Service Request: R0905260 Date Collected: 9/15/09 Date Received: 9/16/09

Date Analyzed: 9/24/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA153-25B

Lab Code:

R0905260-011

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | 1atrix Spike Q0909047-0 | | | | cate Matrix Q0909047-0 | | | % Rec | | RPD |
|----------------------------------|--------|--------|----------------------------|------------|---|--------|-----------------------------|------------|---|----------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | 4 % Rcc | : | Limits | RPD | Limit |
| 1,1,1,2-Tetrachloroethane | ND | 39.3 | 57.4 | 68 | * | 39.7 | 58.9 | 67 | * | 70 - 130 | 1 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 43.2 | 57.4 | 75 | | 44.4 | 58.9 | 75 | | 70 - 130 | 3 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 40.6 | 57.4 | 71 | | 44.9 | 5 8.9 | 76 | | 70 - 130 | 10 | 30 |
| 1,1,2-Trichloroethane | ND | 42.1 | 57.4 | 73 | | 44.2 | 58.9 | 75 | | 70 - 130 | 5 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 42.4 | 57.4 | 74 | | 42.2 | 58.9 | 72 | | 70 - 130 | 0 | 30 |
| 1,1-Dichloroethene (1,1-DCE) | ND | 37.3 | 57.4 | 65 | * | 40.1 | 58.9 | 68 | * | 70 - 130 | 7 | 30 |
| 1,1-Dichloropropene | ND | 39.2 | 57.4 | 68 | * | 42.4 | 58.9 | 72 | | 70 - 130 | 8 | 30 |
| 1,2,3-Trichlorobenzene | ND | 28.2 | 57.4 | 49 | * | 29.5 | 58.9 | 50 | * | 70 - 130 | 4 | 30 |
| 1,2,3-Trichloropropane | ND | 41.4 | 57.4 | 72 | | 44.9 | 58.9 | 76 | | 70 - 130 | 8 | 30 |
| 1,2,4-Trichlorobenzene | ND | 27.5 | 57.4 | 48 | * | 29.0 | 58.9 | 49 | * | 70 - 130 | 5 | 30 |
| 1,2,4-Trimethylbenzene | ND | 30.6 | 57.4 | 53 | * | 33.3 | 58.9 | 56 | * | 70 - 130 | 8 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 41.2 | 57.4 | 72 | | 47.6 | 58.9 | 81 | | 50 - 150 | 14 | 30 |
| 1,2-Dibromoethane | ND | 41.5 | 57.4 | 72 | | 43.5 | 58.9 | 74 | | 70 - 130 | 5 | 30 |
| 1,2-Dichlorobenzene | ND | 33.7 | 57.4 | 5 9 | * | 34.0 | 58.9 | 58 | * | 70 - 130 | 1 | 30 |
| 1,2-Dichloroethane | ND | 42.5 | 57.4 | 74 | | 43.7 | 58.9 | 74 | | 70 - 130 | 3 | 30 |
| 1,2-Dichloropropane | ND | 43.3 | 57.4 | 75 | | 43.8 | 5 8.9 | 74 | | 70 - 130 | 1 | 30 |
| 1,3,5-Trimethylbenzene | ND | 31.7 | 57.4 | 55 | * | 33.9 | 58.9 | 57 | * | 70 - 130 | 7 | 30 |
| 1,3-Dichlorobenzene | ND | 32.6 | 57.4 | 57 | * | 33.5 | 58.9 | 57 | * | 70 - 130 | 3 | 30 |
| 1,3-Dichloropropane | ND | 41.4 | 57.4 | 72 | | 42.4 | 58.9 | 72 | | 70 - 130 | 2 | 30 |
| 1,4-Dichlorobenzene | ND | 32.3 | 57.4 | 56 | * | 33.9 | 58,9 | 58 | * | 70 - 130 | 5 | 30 |
| 2,2-Dichloropropane | ND | 41.6 | 57.4 | 73 | | 45.2 | 58.9 | 77 | | 70 - 130 | 8 | 30 |
| 2-Butanone (MEK) | 1.2 | 47.9 | 57.4 | 81 | | 53.7 | 58.9 | 89 | | 50 - 150 | 11 | 30 |
| 2-Chlorotoluene | ND | 32.2 | 57.4 | 56 | * | 37.4 | 58.9 | 63 | * | 70 - 130 | 15 | 30 |
| 2-Hexanone | ND | 42.0 | 57.4 | 73 | | 47.0 | 58.9 | 80 | | 70 - 130 | 11 | 30 |
| 2-Methyl-2-propanol | ND | 917 | 1150 | 80 | | 994 | 1180 | 84 | | 50 - 150 | 8 | 30 |
| 4-Chlorotoluene | ND | 31.6 | 57.4 | 55 | * | 34.3 | 58.9 | 58 | * | 70 - 130 | 8 | 30 |
| 4-Isopropyltoluene | ND | 29,8 | 57.4 | 52 | * | 31.1 | 58.9 | 53 | * | 70 - 130 | 4 | 30 |
| 4-Methyl-2-pentanone | ND | 43.2 | 57.4 | 75 | | 48.1 | 58.9 | 82 | | 70 - 130 | 11 | 30 |
| Acetone | ND | 56.3 | 57.4 | 98 | | 64.2 | 58.9 | 109 | | 50 - 150 | 13 | 30 |
| Benzene | ND | 38.9 | 57.4 | 68 | * | 40.8 | 58.9 | 69 | * | 70 - 130 | 5 | 30 |
| Bromobenzene | ND | 35.2 | 57.4 | 61 | * | 36.8 | 58.9 | 62 | * | 70 - 130 | 4 | 30 |
| Bromochloromethane | ND | 40.4 | 57.4 | 70 | | 40.5 | 58.9 | 69 | * | 70 - 130 | 0 | 30 |
| Bromodichloromethane | ND | 43.1 | 57.4 | 75 | | 44.3 | 58.9 | 75 | | 70 - 130 | 3 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905260 **Date Collected:** 9/15/09

Date Collected: 9/15/09 Date Received: 9/16/09 Date Analyzed: 9/24/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA153-25B

Lab Code:

R0905260-011

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Aatrix Spike Q0909047-0 | | | | cate Matrix Q0909047-0 | | % Rec | | RPD |
|----------------------------------|--------|--------|----------------------------|------------|---|--------|---------------------------|------------|------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| Bromoform | ND | 43.8 | 57.4 | 76 | | 45.7 | 58.9 | 77 | 70 - 130 | 4 | 30 |
| Bromomethane | ND | 34.9 | 57.4 | 61 | | 37.2 | 58.9 | 63 | 50 - 150 | 6 | 30 |
| Carbon Tetrachloride | ND | 42.6 | 57.4 | 74 | | 46.7 | 58.9 | 79 | 70 - 130 | 9 | 30 |
| Chlorobenzene | ND | 35.7 | 57.4 | 62 | * | 37.5 | 58.9 | 64 | * 70 - 130 | 5 | 30 |
| Chloroethane | ND | 35.5 | 57.4 | 62 | * | 35.1 | 58.9 | 60 | * 70 - 130 | 1 | 30 |
| Chloroform | 1.8 | 44.8 | 57.4 | 75 | | 45,6 | 58.9 | 74 | 70 - 130 | 2 | 30 |
| Chloromethane | ND | 27.6 | 57.4 | 48 | * | 30.1 | 58.9 | 51 | * 70 - 130 | 8 | 30 |
| Dibromochloromethane | ND | 42.0 | 57.4 | 73 | | 44.1 | 58.9 | 75 | 70 - 130 | 5 | 30 |
| Dibromomethane | ND | 41.6 | 57.4 | 73 | | 43,7 | 58.9 | 74 | 70 - 130 | 5 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 23.9 | 57.4 | 42 | * | 25.3 | 58.9 | 43 | * 70 - 130 | 6 | 30 |
| Dichloromethane | ND | 40.4 | 57.4 | 70 | | 40.4 | 58.9 | 68 | * 70 - 130 | 0 | 30 |
| Diisopropyl Ether | ND | 43.3 | 57.4 | 75 | | 44.0 | 58.9 | 75 | 70 - 130 | 2 | 30 |
| Ethyl tert-Butyl Ether | ND | 46.4 | 57.4 | 81 | | 46.6 | 58.9 | 7 9 | 70 - 130 | 0 | 30 |
| Ethylbenzene | ND | 37.4 | 57.4 | 65 | * | 38.0 | 58.9 | 64 | * 70 - 130 | 2 | 30 |
| Hexachlorobutadiene | ND | 24.1 | 57.4 | 42 | * | 24.4 | 58.9 | 41 | * 70 - 130 | 1 | 30 |
| Isopropylbenzene (Cumene) | ND | 36.4 | 57.4 | 63 | * | 38.0 | 58.9 | 64 | * 70 - 130 | 4 | 30 |
| Methyl tert-Butyl Ether | ND | 43.4 | 57.4 | 7 6 | | 43.7 | 58.9 | 74 | 70 - 130 | 1 | 30 |
| Naphthalene | ND | 34.6 | 57.4 | 60 | | 41,6 | 58.9 | 71 | 50 - 150 | 18 | 30 |
| Styrene | ND | 38.6 | 57.4 | 67 | * | 39.5 | 58.9 | 67 | * 70 - 130 | 2 | 30 |
| Tetrachloroethene (PCE) | ND | 37.6 | 57.4 | 66 | * | 37.9 | 58.9 | 64 | * 70 - 130 | 1 | 30 |
| Toluene | ND | 37.9 | 57.4 | 66 | * | 39.9 | 58.9 | 68 | * 70 - 130 | 5 | 30 |
| Trichloroethene (TCE) | ND | 39.6 | 57.4 | 69 | * | 42.3 | 58.9 | 72 | 70 - 130 | 7 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 40.6 | 57.4 | 71 | | 41.6 | 58.9 | 71 | 70 - 130 | 3 | 30 |
| Vinyl Chloride | ND | 33.9 | 57.4 | 59 | * | 38.5 | 58.9 | 65 | * 70 - 130 | 13 | 30 |
| cis-1,2-Dichloroethene | ND | 40.5 | 57.4 | 71 | | 42.5 | 58.9 | 72 | 70 - 130 | 5 | 30 |
| cis-1,3-Dichloropropene | ND | 40.0 | 57.4 | 70 | | 42.5 | 58.9 | 72 | 70 - 130 | 6 | 30 |
| m,p-Xylenes | ND | 71.5 | 115 | 62 | * | 73,4 | 118 | 62 | * 70 - 130 | 3 | 30 |
| n-Butylbenzene | ND | 27.6 | 57.4 | 48 | * | 27.6 | 58.9 | 47 | * 70 - 130 | 0 | 30 |
| n-Propylbenzene | ND | 31.9 | 57.4 | 5 6 | * | 34.2 | 58.9 | 58 | * 70 - 130 | 7 | 30 |
| o-Xylene | ND | 36.4 | 57.4 | 63 | * | 36,9 | 58.9 | 63 | * 70 - 130 | 1 | 30 |
| sec-Butylbenzene | ND | 31.7 | 57.4 | 55 | * | 34.3 | 58.9 | 58 | * 70 - 130 | 8 | 30 |
| tert-Amyl Methyl Ether | ND | 44.0 | 57.4 | 77 | | 45.0 | 58.9 | 76 | 70 - 130 | 2 | 30 |
| tert-Butylbenzene | ND | 32.8 | 57.4 | 57 | * | 34,8 | 58.9 | 59 | * 70 - 130 | 6 | 30 |
| trans-1,2-Dichloroethene | ND | 38.1 | 57.4 | 66 | * | 39.0 | 58.9 | 66 | * 70 - 130 | 2 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905260

Date Collected: 9/15/09 **Date Received:** 9/16/09

Date Analyzed: 9/24/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA153-25B

Lab Code:

R0905260-011

Units: µg/Kg

Basis: Dry

Analytical Method: 8260B

| | | N | Aatrix Spike | : | | Duplic | ate Matrix | Spike | | | |
|---------------------------|--------|--------|--------------|-------|--------------|--------|------------|-------|----------|-----|-------|
| | Sample | R | RQ0909047-03 | | RQ0909047-04 | | % Rec | | RPD | | |
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| trans-1,3-Dichloropropene | ND | 39.8 | 57.4 | 69 | * | 41.1 | 58.9 | 70 | 70 - 130 | 3 | 30 |

| Comments: | | |
|-----------|--|------|
| | | |

LDC # 2/99 I1 SDG #: See Corel

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | |
|---------------|----|
| Reviewer: | WY |
| 2nd reviewer: | V |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| \widehat{Y} | N | N/A |
|---------------|---|-----|
| Y | N | N/A |
| | | |

Were field duplicate pairs identified in this SDG? Were target compounds detected in the field duplicate pairs?

| | Concentratio | n us/kex | | Parent |
|----------|--------------|----------|---------------|--------|
| Compound | 23 | 24 | RPD . | |
| M | 1,3 | 1.2 | 0,1(£14D) | _ |
| F | 2711 | 3,4 | 23,6 (4270) | |
| ec | 0,45 | 0.63 | 0.18 (= 6.80) | |
| | | | | |
| | | | | |

| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | |
| | | |

| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
| | | |
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| | | |

| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
| | | |
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| | | |
| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 17, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905331

Sample Identification

SA165-0.5B

SA165-10B

SA165-28B

SA151-0.5B

SA151-10B

SA151-25B

SA151-39B

SA151009-39B

SA51-10B

SA51009-10B

SA51-25B

SA51-36B

TB091709-SO1

TB091709-SO3

SA165-10BMS

SA165-10BMSD

Introduction

This data review covers 14 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | SA165-28B TB091709-SO1 TB091709-SO3 171659-SMB 171659-WMB | J (all detects) UJ (all non-detects) | А |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---------------------|------|--|--|--------|
| 9/28/09 | Hexachlorobutadiene | 30.8 | SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA165-10BMS SA165-10BMSD 172205-MB | J- (all detects) UJ (all non-detects) | A |
| 9/29/09 | Acetone | 27.5 | SA51009-10B SA51-25B 172392-MB | J+ (all detects) | А |
| 9/29/09 | Hexachlorobutadiene | 28.4 | SA51009-10B SA51-25B 172392-MB | J- (all detects) UJ (all non-detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|---|---|--------|
| 9/23/09 | 2-Methyl-2-propanol | 0.027 (≤0.05) | SA165-28B TB091709-SO1 TB091709-SO3 171659-SMB 171659-WMB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--------------------|
| 171659-MB | 9/23/09 | 2-Butanone | 80 ug/Kg | SA165-28B |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|-----------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA165-28B | 2-Butanone | 120 ug/Kg | 120U ug/Kg |

Samples TB091709-SO1 and TB091709-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905331 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|--------------------|---------------------------|---------------------------------|
| SA165-0.5B | Toluene | 0.40 ug/Kg | 0.40U ug/Kg |
| SA165-10B | Toluene | 0.38 ug/Kg | 0.38U ug/Kg |
| SA151-0.5B | Toluene | 0.41 ug/Kg | 0.41U ug/Kg |
| SA151-10B | Toluene | 0.48 ug/Kg | 0.48U ug/Kg |
| SA151-25B | Acetone | 6.8 ug/Kg | 6.8U ug/Kg |
| SA151009-39B | Toluene | 0.38 ug/Kg | 0.38U ug/Kg |
| SA51-10B | Acetone Toluene | 1.5 ug/Kg 0.77 ug/Kg | 1.5U ug/Kg 0.77U ug/Kg |
| SA51-25B | Acetone Toluene | 1.9 ug/Kg 0.34 ug/Kg | 1.9U ug/Kg 0.34U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|---------------------|---------------------|----------------------|-----------------|---|--------|
| SA165-10BMS/MSD (SA165-10B) | Hexachlorobutadiene | 52 (70-130) | 67 (70-130) | 40 (≤30) | J (all detects) UJ (all non-detects) | А |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|---------------------|-------------|---|--|--------|
| 172205-LCS | Hexachlorobutadiene | 63 (75-125) | SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B 172205-MB | J- (all detects) UJ (all non-detects) | Р |
| 172392-LCS | Hexachlorobutadiene | 74 (75-125) | SA51009-10B SA51-25B 172392-MB | J- (all detects) UJ (all non-detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample Finding | | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905331 | All compounds reported below the PQL. | J (all detects) | А |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SA151-39B and SA151009-39B and samples SA51-10B and SA51009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | 222 | D.W. | | |
|------------|-----------------------|--------------|-----------------|------------------------|-----------------|--------|
| Compound | SA151-39B | SA151009-39B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 2.0 | 0.99 | | 1.01 (≤14) | - | - |
| Acetone | 10 | 23U | _ | 13 (≤23) | - | - |
| Chloroform | 6.5 | 90 | - | 83.5 (≤6.9) | J (all detects) | Α |
| Toluene | 6.9U | 0.38 | - | 6.52 (≤6.9) | - | - |

| | Concentration (ug/Kg) | | 222 | D:# | | |
|------------|-----------------------|-------------|-----------------|------------------------|-------|--------|
| Compound | SA51-10B | SA51009-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 1.4 | 11U | - | 9.6 (≤11) | • | - |
| Acetone | 1.5 | 21U | - | 19.5 (≤21) | - | - |
| Chloroform | 4.3 | 6.0 | - | 1.7 (≤5.3) | - | • |

| | Concentration (ug/Kg) | | RPD | Difference | | |
|-----------------|-----------------------|-------------|----------|------------------------|-------|--------|
| Compound | SA51-10B | SA51009-10B | (Limits) | Difference (Limits) | Flags | A or P |
| Dichloromethane | 0.61 | 5.3U | - | 4.69 (≤5.3) | - | - |
| Toluene | 0.77 | 5.3U | - | 4.53 (≤5.3) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905331

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---------------------|--|--------|---|
| R0905331 | SA165-28B TB091709-SO1 TB091709-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905331 | SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA51009-10B SA51-25B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905331 | SA51009-10B SA51-25B | Acetone | J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905331 | SA165-28B TB091709-SO1 TB091709-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905331 | SA165-10B | Hexachlorobutadiene | J (all detects) UJ (all non-detects) | А | Matrix spike/Matrix spike duplicates (%R)(RPD) (m,ld) |
| R0905331 | SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA51009-10B SA51-25B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---------------------------------------|-----------------|--------|---------------------------------------|
| R0905331 | SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51009-10B SA51-25B SA51-36B TB091709-SO1 TB091709-SO3 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |
| R0905331 | SA151-39B SA151009-39B | Chloroform | J (all detects) | А | Field duplicates (Difference) (fd) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905331

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|-----------|---------------------------------|---------------------------------|--------|------|
| R0905331 | SA165-28B | 2-Butanone | 120U ug/Kg | А | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905331

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|----------|---------------------------------|--------|------|
| R0905331 | SA165-0.5B | Toluene | 0.40U ug/Kg | А | bf |
| R0905331 | SA165-10B | Toluene | 0.38U ug/Kg | А | bf |
| R0905331 | SA151-0.5B | Toluene | 0.41U ug/Kg | А | bf |
| R0905331 | SA151-10B | Toluene | 0.48U ug/Kg | Α | bf |
| R0905331 | SA151-25B | Acetone | 6.8U ug/Kg | А | bf |

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|--------------------|---------------------------------|--------|------|
| R0905331 | SA151009-39B | Toluene | 0.38U ug/Kg | А | bf |
| R0905331 | SA51-10B | Acetone Toluene | 1.5U ug/Kg 0.77U ug/Kg | А | bf |
| R0905331 | SA51-25B | Acetone Toluene | 1.9U ug/Kg 0.34U ug/Kg | А | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

| SDG #: R0905331 | Stage 2B |
|--|----------|
| Laboratory: Columbia Analytical Services | _ |

LDC #: 21991J1

Page: of Reviewer: WG 2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/17/09 |
| H. | GC/MS Instrument performance check | A | |
| 191. | Initial calibration | SW | 7 RSP +~ |
| IV. | Continuing calibration/JCV | ML | COV = 25 Z |
| V, | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SW | |
| VIII. | Laboratory control samples | MZ | |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | SW | $D_1 = 7.8$ $D_2 = 9.10$ TB = 13.14 $FB = FB 072909-50$ (from R0904. |
| XVII. | Field blanks | SM | +TB = 13, 14 FB = FB072909-50 (from R09)04. |

A = Acceptable Note:

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:

Soil + Water

| | | | | | | | <u> </u> | | |
|----------------|--------------|----------------|------|--------------|----------|-----------------|--------------|----|--|
| 1 [| SA165-0.5B | S | 113 | SA51-25B | ح | <u>기</u> | 17 2205- MB | 31 | |
| 2 1 | SA165-10B | | 12 1 | SA51-36B | <u>J</u> | † 22 2 | 171659 -SMB | 32 | |
| 3 7 | SA165-28B | | 13 ¢ | TB091709-SO1 | W | 23 3 | 172392-MB | 33 | |
| 4 | SA151-0.5B | | 14 4 | TB091709-SO3 | | 24 4 | 171659 - WMB | 34 | |
| 5 I | SA151-10B | | 15 | SA165-10BMS | 5 | 25 | | 35 | |
| 6 I | SA151-25B | | 16 | SA165-10BMSD | | 26 | | 36 | |
| 7 1 | SA151-39B | 01 | 17 | | | 27 | | 37 | |
| 8 | SA151009-39B | D, | 18 | | | 28 | | 38 | |
| 9 | SA51-10B | D | 19 | | | 29 | | 39 | |
| 10 > | SA51009-10B | D ₁ | 20_ | | | 30 | | 40 | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A Chlomethane* | U. 1.1.2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------|
| B. Bromomethane | V. Benzene | PP, Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| E. Methylone chlonde | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrytonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disutifde | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. teobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| 1. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. ds-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chlorofom** | EE. Ethylbenzane** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanol |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethyfvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | <u>aaaa.</u> |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE, sec-Butylbenzene | YYY, tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyf-tert-butyf ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-tsopropyttoluene | AAAA. Ethyl tert-butyl ether | ບນບບ. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB, tert-Arry/ methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

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| DC#: | ¿DG#: |

VALIDATION FINDINGS WURNSHEET Initial Calibration

Reviewer: 2nd Reviewer: ר מעה.

AETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

NA NA

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Were percent relative standard deviation? $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

X N N/A

Were all %RSDs and RRFs within the validation criteria of ${\le}30$ %RSD and ${\ge}0.05$ RRF ? Did the initial calibration meet the acceptance criteria? N/A N/A

| | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|--------|-------------|----------|---------------------------------|-------------------------------|---------------------|----------------|
| | 1CA1_ | NNN | | 850,0 | 3, 19,14 171659-5MB | 5/W (c) |
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SDG #: See Coney LDC#: 219917

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF? Y N N/A

| 9/29/09 H1166 LLL 9/29/09 H1166 LLL 9/29/09 H1190 F | (+) 30.8 | 0.027 | 3, 13, 14, 171659-5MB 171659-WMB 1, 2, 4-9, 12, 15, 16 172205-MB | 5/MJ/A (C) |
|---|---|-------|---|------------|
| 9911H | (+) 30, 30, 30, 30, 30, 30, 30, 30, 30, 30, | | 171659-WMB 1,2 4-9 12,15 16 172205-MB | |
| 128/07 H1166 | (+) 30°. | | 1, 2, 4-9, 12, 15, 16 172205-MB | |
| 1/28/07 H1166 | (+) 30°. | | 1, 2, 4-9 12, 15 16 172205-MB | |
| 1,28/07 H1166 29/09 H1190 | (±) | | 1, 2 4-9 12 15 16 172205-MB | |
| 29 69 H 1190 | (+) | | 1 1 1 1 | · J-/NJ-A |
| 129 /29 H 1190 | (+) | | = | |
| 129 169 H 1190 | (+) | | = | |
| 29 69 H 1190 | (+) 27, | | 71 | |
| 129 169 H 1190 | (+) 27, | | <u>.</u> | |
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SDG #: See Cun LDC#: 2/96/J

VALIDATION FINDINGS WORKSHEET

Blanks

2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". | Was a method blank associated with every sample in this SDG? |
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Was a method blank associated with every sample in this SDG? Was a method blank analyzed at least once every 12 hours for each matrix and concentration? N N/A

Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: $\frac{9}{25}/69$

Conc. units:

3

| | Sample Identification | | | | | | |
|---------------------|-----------------------|-------------|---------|---|--|--|--|
| ples: | Samp | | | | | | |
| Associated Samples: | | | | | | | |
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| | | aw: | | | | | |
| ` | Blank ID | 171659-5 MB | 80 | | | | |
| Conc. units: 49/kg | Compound | | M | | | | |

Blank analysis date:

Conc. units:

Associated Samples:

| Blank ID Sample Identification | - | | | T | | | T | |
|--------------------------------|--------------|---|----------|---|-------------|---|---|---------------------|
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| .DC #: | |

VALIDATION FINDINGS WORKSHEET Field Blanks

2nd Reviewer: Q Page: of) Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y) N /N/A

Were field blanks identified in this SDG? Were target compounds detected in the field blanks? N N/A

0,34/4 J AI 50:12 17/4 O 1.5.1 σ 10.38/4 Sample Identification Associated Samples: 6.8/4 0.48/4 0. 4 Field blank type: (circle one) Field Blank Rinsate / Trip Blank / Other:

Compound Blank ID Blank ID 10.78/4 0.40 1/20/00/ 0,30 (V) p '0 Sampling Date m

Associated sample units: Blank units:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:

Associated Samples:

| - | - | į | | | | | |
|---------------|----------|----------|--|-----------------------|-------------|--|--|
| Compound | Blank ID | Blank ID | | Sample Identification | ntification | | |
| Sampling Date | | | | | | | |
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LDC#: 21 49 | J |
SDG#: C+c 6m->

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 2nd Reviewer: Reviewer:__

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated

MS/MSD. Soil / Water. Was a MS/MSD analyzed every 20 samples of each matrix? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| | | | | | | | _ |
|--------|--------------------|----------|--------------------|--------------------|---------------|--------------------|---|
| # Date | QI QSW/SW | Compound | MS %R (Limits) | MSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
| | 91/51 | Sprenay | come ounds | have 21/4 | nn (2 RPD) | ر ر | No sare |
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| | Compound | punc | QC Limit | Limits (Soll) | RPD (Soil) | QC Limits (Water) | RPD (Water) |
| Ĭ | 1,1-Dichloroethene | | 59-172% | .2% | < 22% | 61-145% | < 14% |
| S) | Trichloroethene | | 62-137% | 37% | < 24% | 71-120% | < 14% |
| > | Benzene | | 66-142% | | < 21% | 76-127% | < 11% |
| | Toluene | | 59-139% | %68 | < 21% | 76-125% | < 13% |
| da | Chlorobenzene | | 60-133% | 33% | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905331
Date Collected: 9/17/09
Date Received: 9/18/09

Date Received: 9/18/09 Date Analyzed: 9/28/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA165-10B

Lab Code:

R0905331-002

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

| | Sample | | Latrix Spike Q0909187-0 | | | | cate Matrix Q0909187-0 | | % Rec | | RPD |
|----------------------------------|--------|--------|-----------------------------------|-------|---|--------|---------------------------|-------|------------|------|-------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| 1,1,1,2-Tetrachloroethane | ND | 39.5 | 51.3 | 77 | | 47.7 | 59.3 | 81 | 70 - 130 | 19 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 46.5 | 51.3 | 91 | | 54.0 | 59.3 | 91 | 70 - 130 | 15 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 40.1 | 51.3 | 78 | | 47.4 | 59.3 | 80 | 70 - 130 | 17 | 30 |
| 1,1,2-Trichloroethane | ND | 39.9 | 51.3 | 78 | | 48.2 | 59.3 | 81 | 70 - 130 | 19 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 45.5 | 51.3 | 89 | | 52.2 | 59.3 | 88 | 70 - 130 | 14 | 30 |
| 1,1-Dichloroethene (1,1-DCE) | ND | 41.3 | 51.3 | 81 | | 46.5 | 59.3 | 78 | 70 - 130 | 12 | 30 |
| 1,1-Dichloropropene | ND | 41.0 | 51.3 | 80 | | 49.3 | 59.3 | 83 | 70 - 130 | 18 | 30 |
| 1,2,3-Trichlorobenzene | ND | 27.5 | 51.3 | 54 | * | 39.9 | 59.3 | 67 | * 70 - 130 | 37 ' | * 30 |
| 1,2,3-Trichloropropane | ND | 38.7 | 51.3 | 75 | | 47.6 | 59.3 | 80 | 70 - 130 | 21 | 30 |
| 1,2,4-Trichlorobenzene | ND | 27.3 | 51.3 | 23 | * | 39.2 | 59.3 | 66 | * 70 - 130 | 36 ' | * 30 |
| 1,2,4-Trimethylbenzene | ND | 35.1 | 51.3 | 69 | * | 45.9 | 59,3 | 77 | 70 - 130 | 27 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 39.1 | 51.3 | 76 | | 48.5 | 59.3 | 82 | 50 - 150 | 21 | 30 |
| 1,2-Dibromoethane | ND | 40.0 | 51.3 | 78 | | 47.8 | 59.3 | 81 | 70 - 130 | 18 | 30 |
| 1,2-Dichlorobenzene | ND | 35.9 | 51.3 | 70 | | 46.7 | 59.3 | 79 | 70 - 130 | 26 | 30 |
| 1,2-Dichloroethane | ND | 42.0 | 51.3 | 82 | | 49.2 | 59.3 | 83 | 70 - 130 | 16 | 30 |
| 1,2-Dichloropropane | ND | 42.3 | 51.3 | 82 | | 50.7 | 59.3 | 85 | 70 - 130 | 18 | 30 |
| 1,3,5-Trimethylbenzene | ND | 35.9 | 51.3 | 70 | | 47.0 | 59.3 | 79 | 70 - 130 | 27 | 30 |
| 1,3-Dichlorobenzene | ND | 36.7 | 51.3 | 72 | | 46.2 | 59.3 | 78 | 70 - 130 | 23 | 30 |
| 1,3-Dichloropropane | ND | 39.7 | 51.3 | 77 | | 46.3 | 59.3 | 78 | 70 - 130 | 15 | 30 |
| 1,4-Dichlorobenzene | ND | 37.5 | 51.3 | 73 | | 47.2 | 59.3 | 80 | 70 - 130 | 23 | 30 |
| 2,2-Dichloropropane | ND | 45.8 | 51.3 | 89 | | 53.4 | 59.3 | 90 | 70 - 130 | 15 | 30 |
| 2-Butanone (MEK) | 0.87 | 47.6 | 51.3 | 91 | | 55.2 | 59.3 | 92 | 50 - 150 | 15 | 30 |
| 2-Chlorotoluene | ND | 37.8 | 51.3 | 74 | | 47.2 | 59.3 | 80 | 70 - 130 | 22 | 30 |
| 2-Hexanone | ND | 37.6 | 51.3 | 73 | | 48.1 | 59.3 | 81 | 70 - 130 | 24 | 30 |
| 2-Methyl-2-propanol | ND | 915 | 1030 | 89 | | 1080 | 1190 | 91 | 50 - 150 | 17 | 30 |
| 4-Chlorotoluene | ND | 38.8 | 51.3 | 76 | | 49.5 | 59.3 | 83 | 70 - 130 | 24 | 30 |
| 4-Isopropyltoluene | ND | 34.7 | 51.3 | 00 | * | 46.5 | 59.3 | 78 | 70 - 130 | 29 | 30 |
| 4-Methyl-2-pentanone | ND | 40.4 | 51.3 | 79 | | 49.5 | 59.3 | 83 | 70 - 130 | 20 | 30 |
| Acetone | ND | 58.7 | 51.3 | 114 | | 73.4 | 59.3 | 124 | 50 - 150 | 22 | 30 |
| Benzene | ND | 39.7 | 51.3 | 77 | | 46.5 | 59.3 | 78 | 70 - 130 | 16 | 30 |
| Bromobenzene | ND | 37.7 | 51.3 | 73 | | 47.5 | 59,3 | 80 | 70 - 130 | 23 | 30 |
| Bromochloromethane | ND | 41.9 | 51.3 | 82 | | 49.4 | 59.3 | 83 | 70 - 130 | 16 | 30 |
| Bromodichloromethane | ND | 42.7 | 51.3 | 83 | | 49.6 | 59.3 | 84 | 70 - 130 | 15 | 30 |

Matrix Spike Summary

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Project: Northgate Environmental

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905331 Date Collected: 9/17/09 Date Received: 9/18/09 Date Analyzed: 9/28/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name: Lab Code:

SA165-10B R0905331-002 Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Tatrix Spike Q09 <mark>0</mark> 9187-03 | | D | uplicate Matrix RQ0909187-0 | | % Rec | | RPD |
|----------------------------------|--------|--------|--|-------|--------------|--------------------------------|-------|------------|------|-------|
| Analyte Name | Result | Result | Amount | % Rec | Res | ult Amount | % Rec | Limits | RPD | Limit |
| Bromoform | ND | 41.4 | 51.3 | 81 | 49 | .8 59.3 | 84 | 70 - 130 | 19 | 30 |
| Bromomethane | ND | 32.8 | 51.3 | 64 | 36 | .9 59.3 | 62 | 50 - 150 | 12 | 30 |
| Carbon Tetrachloride | ND | 44.6 | 51.3 | 87 | 55 | .0 59.3 | 93 | 70 - 130 | 21 | 30 |
| Chlorobenzene | ND | 38.5 | 51.3 | 75 | 46 | .6 59.3 | 79 | 70 - 130 | 19 | 30 |
| Chloroethane | ND | 38.3 | 51.3 | 75 | 43 | .9 59.3 | 74 | 70 - 130 | 14 | 30 |
| Chloroform | 0.50 | 46.7 | 51.3 | 90 | 53 | 8 59.3 | 90 | 70 - 130 | 14 | 30 |
| Chloromethane | ND | 31.7 | 51.3 | 62 | * 37 | .8 59.3 | 64 | * 70 - 130 | 18 | 30 |
| Dibromochloromethane | ND | 41.1 | 51.3 | 80 | 50 | 5 59.3 | 85 | 70 - 130 | 20 | 30 |
| Dibromomethane | ND | 40.9 | 51.3 | 80 | 47 | 8 59.3 | 81 | 70 - 130 | 16 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 24.4 | 51.3 | 48 | * 25 | 2 59.3 | 43 | * 70 - 130 | 3 | 30 |
| Dichloromethane | ND | 41.8 | 51.3 | 82 | 47 | 0 59.3 | 79 | 70 - 130 | 12 | 30 |
| Diisopropyl Ether | ND | 45.0 | 51.3 | 88 | 51 | 4 59.3 | 87 | 70 - 130 | 13 | 30 |
| Ethyl tert-Butyl Ether | ND | 46.7 | 51.3 | 91 | 54 | 1 59.3 | 91 | 70 - 130 | 15 | 30 |
| Ethylbenzene | ND | 41.1 | 51.3 | 80 | 49 | 3 59.3 | 83 | 70 - 130 | 18 | 30 |
| Hexachlorobutadiene | ND | 26.6 | 51.3 | 52 | * 39 | 6 59.3 | 67 | * 70 - 130 | 40 3 | ¥ 30 |
| Isopropylbenzene (Cumene) | ND | 41.6 | 51.3 | 81 | 50 | 6 59.3 | 85 | 70 - 130 | 20 | 30 |
| Methyl tert-Butyl Ether | ND | 42.2 | 51.3 | 82 | 49 | 6 59.3 | 84 | 70 - 130 | 16 | 30 |
| Naphthalene | ND | 34.3 | 51.3 | 67 | 49 | 0 59.3 | 83 | 50 - 150 | 35 1 | * 30 |
| Styrene | ND | 42.6 | 51.3 | 83 | 50 | 6 59.3 | 85 | 70 - 130 | 17 | 30 |
| Tetrachloroethene (PCE) | ND | 39.5 | 51.3 | 77 | 47 | 3 59.3 | 80 | 70 - 130 | 18 | 30 |
| Toluene | 0.38 | 39.6 | 51.3 | 76 | 47 | 0 59.3 | 79 | 70 - 130 | 17 | 30 |
| Trichloroethene (TCE) | ND | 42.5 | 51.3 | 83 | 49 | 8 59.3 | 84 | 70 - 130 | 16 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 41.5 | 51.3 | 81 | 48 | | 81 | 70 - 130 | 15 | 30 |
| Vinyl Chloride | ND | 39.1 | 51.3 | 76 | 39. | 0 59.3 | 66 | * 70 - 130 | 0 | 30 |
| cis-1,2-Dichloroethene | ND | 43.1 | 51.3 | 84 | 50. | 4 59.3 | 85 | 70 - 130 | 15 | 30 |
| cis-1,3-Dichloropropene | ND | 41.9 | 51.3 | 82 | 49. | 2 59.3 | 83 | 70 - 130 | 16 | 30 |
| m,p-Xylenes | ND | 79.2 | 103 | 77 | 94. | 5 119 | 80 | 70 - 130 | 18 | 30 |
| n-Butylbenzene | ND | 32.2 | 51.3 | 63 | * 44. | 2 59.3 | 74 | 70 - 130 | 31 * | * 30 |
| n-Propylbenzene | ND | 37.6 | 51.3 | 73 | 48. | 7 59.3 | 82 | 70 - 130 | 26 | 30 |
| o-Xylene | ND | 40.1 | 51.3 | 78 | 47. | 1 59.3 | 79 | 70 - 130 | 16 | 30 |
| sec-Butylbenzene | ND | 37.5 | 51.3 | 73 | 47. | 5 59.3 | 80 | 70 - 130 | 24 | 30 |
| tert-Amyl Methyl Ether | ND | 44.7 | 51.3 | 87 | 52. | 7 59.3 | 89 | 70 - 130 | 16 | 30 |
| tert-Butylbenzene | ND | 35.7 | 51.3 | 70 | 48. | 2 59.3 | 81 | 70 - 130 | 30 | 30 |
| trans-1,2-Dichloroethene | ND | 41.1 | 51.3 | 80 | 45. | 7 59.3 | 77 | 70 - 130 | 11 | 30 |

Comments:

DC#: 21991J

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page:

2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? Was a LCS required?

| | \mathcal{A} | \ | | \mathcal{Z} | \ | | | | | | | | | | | | | | | | | | وببس | 71 |
|---------------------|-----------------------|------------------|-----|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|----------------|
| Qualifications | 1B J-/MJ/P (| - | | J-/MJ/P (| | | | | | | | | | | • | | | | | | | | | |
| Associated Samples | 1.2 4-9 12 17220st-MB | | | 10 11 172392- MB | | | | | | | | | | | | | | | | | | | | |
| RPD (Limits) | () | () | () | () | () | () | () | , | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () |) |
| LCSD %R (Limits) |]() | () | () | () | () | () | () | | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () | |
| LCS %R (Limits) | 63 (75-126) | () | () | 74 (1/) | () | () | (| () | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () | |
| Compound | 711 | | | コフィ | | | | | | | | | | | | | | | | | | | | |
| TCS/LCSD ID | 537-500241 | | | 172342-45 | | | | | | | | | | | | | | | | | | | | |
| Derte | L | | | | | | | | | | • | | | | | | | | | | | | | |
| ** | ı | 1 | | 1 | • | 1 | 1 | 1 | | | | 1 | | | 1 | | | | 1 | | 1 | 1 | | |

| LDC #:_ | 2199 | 15) |
|---------|------|-------|
| SDG #: | Su | Comer |

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | <u></u> of_ | <u>)</u> |
|---------------|-------------|----------|
| Reviewer: | | NY |
| 2nd reviewer. | | |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| Y/NN | <u>/A</u> |
|------|-----------|
| NKK | <u>/A</u> |

Were field duplicate pairs identified in this SDG?
Were target compounds detected in the field duplicate pairs?

| 0 0.90 | 8 | RPD | parend |
|--------|---------|-----------|---------------------------------------|
| 0 0 0 | | | |
| 0,90 | 9 1.01 | (£14D) | _ |
| 23 | U 13 | (£23D) | _ |
| 5 90 | 83,5 | (46.9B) | Jdets |
| 9 U O. | 38 6,5 | × V | |
| | 5 90 | 5 90 83,5 | 23 N 13 (£23 D) 5 90 83,5 (£6.9 B) |

| | | Concentrati | on ug Ag | | Para |
|----------|----|-------------|----------|-------------|------|
| Compound | | 9 | 10 | RPD | nhy |
| | M | 1,4 | 11 11 | 9,6 (=11 D) | |
| | F | 1,5 | 21 4 | 19.5 (4210) | 1 |
| | k | 4.3 | 6,0 | 1.7 (45,30) | , |
| | E | 0,61 | 5,34 | 4.69 | , |
| | CC | 0,77 | 5,34 | 4.53 |) |

| | Concentration (| | |
|----------|-----------------|-----|--|
| Compound | | RPD | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | Concentration (| |
|----------|-----------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | - |
| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 18, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905348

Sample Identification

EB091809-SO1

SA117-0.5B

SA117-9B

SA117-25B

SA117-41B

SA161-0.5B

SA161-10B

SA161-25B

SA161-25BDL

SA161009-25B

SA161-37B

TB091809-SO1

TB091809-SO3

SA117-9BMS

SA117-9BMSD

Introduction

This data review covers 12 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---|--------------------------------------|---|--|--------|
| 9/29/09 | Acetone | 27.5 | SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B 12392-MB | J+ (all detects) | A |
| 9/29/09 | Hexachlorobutadiene | 28.4 | SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B 12392-MB | J- (all detects) UJ (all non-detects) | Α |
| 9/30/09 | Hexachlorobutadiene | 29.7 | SA117-9BMS SA117-9BMSD | J- (all detects) UJ (all non-detects) | А |
| 10/1/09 | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | 28.1 25.2 25.5 25.6 45.9 | SA161-25B 172787-MB | J- (all detects) UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--|
| 172495-MB | 9/29/09 | 2-Butanone | 110 ug/Kg | SA161-25BDL SA161009-25B SA161-37B |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound TIC (RT in minutes) | Reported Concentration | Modified Final Concentration |
|-----------------------|---------------------------------|---------------------------|---------------------------------|
| SA161-25BDL (135.5X) | 2-Butanone | 230 ug/Kg | 230U ug/Kg |
| SA161009-25B (119.5X) | 2-Butanone | 220 ug/Kg | 220U ug/Kg |

| Sample | Compound | Reported | Modified Final |
|--------------------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA161-37B (105.5X) | 2-Butanone | 240 ug/Kg | 240U ug/Kg |

Samples TB091809-SO1 and TB091809-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample EB091809-SO1 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|----------------------------|-----------------------|-------------------------------------|
| EB091809-SO1 | 9/18/09 | Acetone Dichloromethane | 6.6 ug/L 0.27 ug/L | All soil samples in SDG R0905348 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|----------|---------------------------|---------------------------------|
| SA117-0.5B | Acetone | 4.5 ug/Kg | 4.5U ug/Kg |
| SA117-25B | Acetone | 1.9 ug/Kg | 1.9U ug/Kg |
| SA117-41B | Acetone | 13 ug/Kg | 13U ug/Kg |
| SA161-0.5B | Acetone | 7.8 ug/Kg | 7.8U ug/Kg |
| SA161-10B | Acetone | 11 ug/Kg | 11U ug/Kg |
| SA161-25B | Acetone | 10 ug/Kg | 10U ug/Kg |

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|-------------------------------------|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | All soil samples in SDG R0905348 |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|----------|---------------------------|---------------------------------|
| SA117-0.5B | Acetone | 4.5 ug/Kg | 4.5U ug/Kg |
| SA117-25B | Acetone | 1.9 ug/Kg | 1.9U ug/Kg |
| SA117-41B | Toluene | 0.33 ug/Kg | 0.33U ug/Kg |
| SA161-0.5B | Toluene | 0.71 ug/Kg | 0.71U ug/Kg |
| SA161-10B | Toluene | 0.78 ug/Kg | 0.78U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS percent recoveries (%R) and MS/MSD relative percent differences (RPD) were not within QC limits for several compounds, the MSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|--------------|-------------|---|--|--------|
| 172495-LCS | Bromomethane | 70 (75-125) | SA161-25BDL SA161009-25B SA161-37B 172495-MB | J- (all detects) UJ (all non-detects) | P |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|-----------|------------|---|---|-----------------|--------|
| SA161-25B | Chloroform | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects) | А |

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905348 | All compounds reported below the PQL. | J (all detects) | А |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P | |
|-----------|------------|------|--------|--|
| SA161-25B | Chloroform | х | А | |

| Sample | Compound | Flag | A or P | |
|-------------|--|------|--------|--|
| SA161-25BDL | All TCL compounds except Chloroform | x | A | |

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

XVI. Field Duplicates

Samples SA161-25B and SA161009-25B and samples SA161-25BDL and SA161009-25B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | 200 | 5 | | |
|----------------------|-----------------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA161-25B | SA161009-25B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 2.8 | 220 | - | 217.2 (≤1600) | - | - |
| Acetone | 10 | 3200U | - | 3190 (≤3200) | - | - |
| Bromoform | 5.8 | 790U | - | 784.2 (≤790) | - | - |
| Chloroform | 470 | 830 | - | 360 (≤790) | - | - |
| Dibromochloromethane | 2.0 | 790U | - | 788 (≤790) | - | - |

| | Concentration (ug/Kg) | | DDD | D:# | | |
|------------|-----------------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA161-25BDL | SA161009-25B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 230 | 220 | - | 10 (≤1800) | - | - |
| Chloroform | 630 | 830 | - | 200 (≤900) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905348

| SDG | 0 | 0 | Flore | A D | Bassas (Cada) |
|----------|---|---|--|--------|--|
| R0905348 | Sample SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B | Acetone | Flag J+ (all detects) | A or P | Reason (Code) Continuing calibration (%D) (c) |
| R0905348 | SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905348 | SA161-25B | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905348 | SA161-25BDL SA161009-25B SA161-37B | Bromomethane | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905348 | SA161-25B | Chloroform | J (all detects) | Α | Project Quantitation Limit (e) |
| R0905348 | EB091809-SO1 SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161-25B SA161-25BDL SA161009-25B SA161-37B TB091809-SO1 TB091809-SO3 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |
| R0905348 | SA161-25B | Chloroform | х | А | Overall assessment of data (o) |
| R0905348 | SA161-25BDL | All TCL compounds except Chloroform | х | A | Overall assessment of data (o) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905348

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|-----------------------|---------------------------------|---------------------------------|--------|------|
| R0905348 | SA161-25BDL (135.5X) | 2-Butanone | 230U ug/Kg | А | bl |
| R0905348 | SA161009-25B (119.5X) | 2-Butanone | 220U ug/Kg | А | bl |
| R0905348 | SA161-37B (105.5X) | 2-Butanone | 240U ug/Kg | A | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905348

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905348

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|----------|---------------------------------|--------|------|
| R0905348 | SA117-0.5B | Acetone | 4.5U ug/Kg | А | be |
| R0905348 | SA117-25B | Acetone | 1.9U ug/Kg | А | be |
| R0905348 | SA117-41B | Acetone | 13U ug/Kg | А | be |
| R0905348 | SA161-0.5B | Acetone | 7.8U ug/Kg | А | be |
| R0905348 | SA161-10B | Acetone | 11U ug/Kg | А | be |
| R0905348 | SA161-25B | Acetone | 10U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905348

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|----------|---------------------------------|--------|------|
| R0905348 | SA117-0.5B | Acetone | 4.5U ug/Kg | А | bf |
| R0905348 | SA117-25B | Acetone | 1.9U ug/Kg | А | bf |

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|----------|---------------------------------|--------|------|
| R0905348 | SA117-41B | Toluene | 0.33U ug/Kg | А | bf |
| R0905348 | SA161-0.5B | Toluene | 0.71U ug/Kg | А | bf |
| R0905348 | SA161-10B | Toluene | 0.78U ug/Kg | Α | bf |

Tronox Northgate Henderson

| | | rionox rioralgato rionacicon |
|----------|--------------|-----------------------------------|
| LDC #: | 21991K1 | VALIDATION COMPLETENESS WORKSHEET |
| SDG #:_ | R0905348 | Stage 2B |
| Laborato | ry: Columbia | nalytical Services |

| Date: <u>12</u> | 102/00 |
|-----------------|--------|
| Page: <u> </u> | of |
| Reviewer: | 27/6 |
| 2nd Reviewer: | Υ |

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|-----|--|
| 1. | Technical holding times | A | Sampling dates: 9/18/09 |
| II. | GC/MS Instrument performance check | A | , |
| 111. | Initial calibration | À | 7. RSD rY |
| IV. | Continuing calibration/ICV | SM | CCN ≤ 25 } |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | SW | |
| VIII. | Laboratory control samples | Z W | us |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | SIM | |
| XIII. | Tentatively identified compounds (TICs) | Ν | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | SW | |
| XVI. | Field duplicates | SW | $p_1 = 8_{10}$ $p_2 = 9_{10}$ |
| XVII. | Field blanks | SW | $p_1 = 8 \cdot 10$ $p_2 = 9 \cdot 10$ $EB = 1 + TB = 12 \cdot 13$ $FB = FB \cdot 0729 \cdot 09 - 50$ Solution of the second of the |

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

YND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples: Water + Soil

| | 0101 | , | -0// | | | |
|------------|----------------------|---------|--------------|------|---------------------------------------|--------------|
| 7 1 | EB091809-SO1 W | 114 | SA161-37B S | 21 | 1720f3-111B | 31 (9 155) |
| 2 7 | SA117-0.5B | - 12 | TB091809-SO1 | 22 Y | 17 2392- | (1246) |
| 3 7 | SA117-9B | 131 | TB091809-SO3 | 23 3 | 172787- | 33 (4) 54) |
| 4 > | SA117-25B | 14 7 | SA117-9BMS 5 | 24 4 | 172495-+ | (9248) 34 |
| 5 7 | SA117-41B | 15 7 | SA117-9BMSD | 25 | , , , , , , , , , , , , , , , , , , , | 35 |
| 6 Y | SA161-0.5B | 16 | | 26 | | 36 |
| 7 7 | SA161-10B | 17 | | 27 | | 37 |
| 8 3 | SA161-25B 01 | 18 | | 28 | | 38 |
| 9 4 | SA161-25BDL Dy | 19 | | 29 | | 39 |
| 10 4 | SA161009-25B D, DY V | 20 | | 30 | | 40 |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A Chlomethane* | U. 1.1.2-Trichlomethane | OO. 2.2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------|
| B, Bromomethane | V. Benzene | | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF, Acrolein |
| E. Methylane Chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disuffide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dkchloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| 1. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m.p-Xylenes | LLLL. Ethyl ether |
| K. Chloraform** | EE. Ethylbenzane** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chiorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanel |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000 |
| N. 1,1,1-Trichloroethane | HH. Vinyt acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyttoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethytvinyl ether | CCC. tert-Buty/benzene | www. Ethanol | 0000 |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Buty/benzene | YYY. tert-Butanol | SSSS. |
| R. cts-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-lsopropyftoluene | AAAA. Ethyl tert-butyl ether | טטטט. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |
| | | | | |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

SDG #: Bu Cm LDC#: 21 901 K/

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 2nd Reviewer: Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

N N/A N/A N/A

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ? Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| r: | | | T | 7 | _ | | | | | · | | | | Π | Ī | Γ | Γ | | | | T | |
|-------------------------------|-----------|---------|---|---|----------|-----|--|-----------|-------|---------|--------|---------|---|---|---|---|---|--|--|--|---|--|
| Qualifications | 13/A (C- | T * | | | 1 4 | | | I /A | | | | -> | | | | | | | | | | |
| Qualif | J+ 10t5/A | J- /NJ | | | J-/nJ | | | 8 J-/NJ | | | | | • | | | | | | | | | |
| Associated Samples | 172392-MB | | | | ار اح | | | 172787-MB | | | | | | | | | | | | | | |
| Associat | 2-7 | | | | 4 | | | 8 | , | | | | | | | | | | | | | |
| Finding RRF (Limit: >0.05) | | | | | | | | | | | | | | | | | | | | | | |
| Finding %D (Limit: <25.0%) | 27,5 | 78.4 | | | 29.7 | | | 28./ | 25,2 | 52,5 | 25.6 | 45,9 | | | | | | | | | | |
| Compound | (+) ± | (-) 717 | | | (-) 177 | | | (-) 222 | FEE C | (-) 599 | (-) WW | (-) 717 | | | | | | | | | | |
| Standard ID | H1190 | | | - | #1211 | | | 41236 | | | | | | | | | | | | | | |
| Date | 9/29/09 | 1. | | | 9/06/6 | , , | | 10/01/01 | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | | | | |

| 991KI | Come |
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| 5 | 3 |
| LDC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET

of

Page:___ Reviewer:_ 2nd Reviewer._

| Blanks | |
|--------|--|
| | |
| | |
| | |
| | |

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was a method blank associated with every sample in this SDG?

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank analyzed at least once every 12 hours for each matrix and concentration? $\frac{\sqrt{N N/A}}{\sqrt{N}}$ Was there contamination in the method blanks? If yes, please see the qualifications below.

(79) = 16 Sample Identification Associated Samples: KS:SOL) 220 (x5.261) 230 Blank ID 172495-MB 120 Σ Compound Conc. units:

Blank analysis date: Conc. units:

| Compound Blank ID Sample Identification |
|---|
| |

SDG # Jee Cony LDC # 21991 KI

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: lof / 2nd Reviewer:_ Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were field blanks identified in this SDG? V N /N/A

Were target compounds detected in the field blanks?

*Blank units: Work Associated sample units: Work Associated Sample Units:

| | | | | | | | | |
|---|-----------------------|--------------------------|-------|------|-----------------------|------|--|--|
| (p e) | | | | | | | | |
| A11 501/5 | | | | | | | | |
| | ıntification | 8 | 10/4 | | EA) | | | |
| Associated Samples:_ | Sample Identification | 7 | n/ = | | others either ND or > | | | |
| Assoc | | 9 | 7.8/4 | | ther N | | | |
| ther. EB | | 7 | 13/4 | | Thers e | | | |
| rip Blank / O | | 4 | 1.9/4 | | (A1) 0 | | | |
| ple units: ' | BlankTD | 2 | 4.5/4 | | | | | |
| ociated sam e) Field Blanl | Blank ID | 9/8/69 | 6.5 | 6.27 | | | | |
| Blank units: でクノー Associated sample units: パラノバタ Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EA | Compound | Sampling Date 9 1/8/69 | 4 | E | | | | |

Blank units: 45/L Associated sample units: 45/kg Field blank type: (circle one), Field Blank / Rinsate / Trip Blank / Other:

| | | | | | | | (2) | | | |
|-------------------------|--|---|--|--|-------------------------------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| ntification | 7 | | | 0.78/4 | <u> </u> | | 7 7 | | | |
| Sample Ide |) | | | 0,71/4 | | | ND | | | |
| | S | | | 0.33/4 | | | either | | | |
| | 4 | 1.9/4 | | | | | thers | | | |
| | 2 | 4.5/4 | | | | | (m) | | | |
| SO Blank ID | | | | | | | | | | |
| F & 572509- Blank ID | | 3'8 | 06,30 | 0.44 | | | | | | |
| Compound | Sampling Date | # | E | 2) | | | | | | |
| | F D 372967- So Sample Identification Sample Identification | F-5,725,01-50 Blank ID Blank ID S 4 5 | Fb 573507-50 Blank ID Blank ID 2 4 5 5 5 5 5 5 5 5 5 5 | Fb 573907-50 Blank ID Blank ID 2 4 5 5 Filter Date 7/29/64 2 4 5/4 1.9/4 5 5 5 5 5 5 5 5 5 | Fb 573501-50 Blank ID 2 4 | Fb 573707-50 Blank ID 2 4 5 5 Elling Date 7/29/69 2 4 5 5 Elling Date 7/29/69 4.5/4 1.9/4 5 E | Fb 572501-50 Blank ID 2 4 | Fb 572501-50 Blank ID 2 4 | Fb 572501-50 Blank ID 2 4 | F6 572501-50 Blank ID 2 4 |

SDG#: 21991 K1

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1 Reviewer: 5VC 2nd Reviewer: 0

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated Riease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" N/N N/A

MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # Date | MS/MSD ID | Compound | MS %R (Limits) | MSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|--------|--------------------|----------|-------------------|--------------------|--------------|--------------------|----------------|
| ⊩ | 14/15 | Sewerd | compounds) | have (2 R)it | £ | ٤ | No mul (MSD |
| | | entride | de (hmits) | and (2 RPD | | • | |
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| | | | () | () | () | | |
| | | | () | () | () | | |
| | | | () | () | () | | |
| | Comp | Compound | QC Lim | Limits (Soil) | RPD (Soil) | QC Limits (Water) | RPD (Water) |
| H | 1,1-Dichloroethene | | 59-1 | 59-172% | < 22% | 61-145% | < 14% |
| S. | Trichloroethene | | 62-1 | 62-137% | < 24% | 71-120% | < 14% |
| ٧. | Benzene | | -99 | 66-142% | < 21% | 76-127% | < 11% |
| CC. | Toluene | | 59-1 | 59-139% | < 21% | 76-125% | < 13% |
| .00 | Chlorobenzene | | -09 | 60-133% | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905348

Date Collected: 9/18/09

Date Received: 9/19/09

Date Analyzed: 9/30/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA117-9B

Lab Code:

R0905348-003

Units: μg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Latrix Spike Q0909236-0: | | | | ate Matrix Q0909236-0 | | % Rec | | RPD |
|----------------------------------|--------|--------|-----------------------------|-------|---|--------|--------------------------|-------|----------|------|-------|
| Analyte Name | Result | Result | Amount | % Rec | : | Result | Amount | % Rec | Limits | RPD | Limit |
| 1,1,1,2-Tetrachloroethane | ND | 35.7 | 52.9 | 68 | * | 47.5 | 58.3 | 81 | 70 - 130 | 28 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 44.6 | 52.9 | 84 | | 57.0 | 58.3 | 98 | 70 - 130 | 24 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 37.4 | 52.9 | 71 | | 51.7 | 58.3 | 89 | 70 - 130 | 32 * | |
| 1,1,2-Trichloroethane | ND | 35.9 | 52.9 | 68 | * | 47.7 | 58.3 | 82 | 70 - 130 | 28 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 42.6 | 52.9 | 80 | | 53.1 | 58.3 | 91 | 70 - 130 | 22 | 30 |
| 1,1-Dichloroethene (1,1-DCE) | ND | 42.2 | 52.9 | 80 | | 55.7 | 58.3 | 96 | 70 - 130 | 28 | 30 |
| 1,1-Dichloropropene | ND | 43.3 | 52.9 | 82 | | 52.7 | 58.3 | 90 | 70 - 130 | 19 | 30 |
| 1,2,3-Trichlorobenzene | ND | 33.6 | 52.9 | 63 | * | 49.9 | 58.3 | 86 | 70 - 130 | 39 * | |
| 1,2,3-Trichloropropane | ND | 35.0 | 52.9 | 66 | * | 47.3 | 58,3 | 81 | 70 - 130 | 30 | 30 |
| 1,2,4-Trichlorobenzene | ND | 37.3 | 52.9 | 71 | | 53.2 | 58.3 | 91 | 70 - 130 | 35 * | 30 |
| 1,2,4-Trimethylbenzene | ND | 40.2 | 52.9 | 76 | | 53.0 | 58.3 | 91 | 70 - 130 | 28 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 34.3 | 52.9 | 65 | | 48.9 | 58.3 | 84 | 50 - 150 | 35 * | |
| 1,2-Dibromoethane | ND | 36.9 | 52.9 | 70 | | 47.7 | 58.3 | 82 | 70 - 130 | 26 | 30 |
| 1,2-Dichlorobenzene | ND | 37.0 | 52.9 | 70 | | 50.4 | 58.3 | 86 | 70 - 130 | 31 * | |
| 1,2-Dichloroethane | ND | 39.1 | 52.9 | 74 | | 50.0 | 58.3 | 86 | 70 - 130 | 25 | 30 |
| 1,2-Dichloropropane | ND | 39.1 | 52.9 | 74 | | 49.8 | 58.3 | 85 | 70 - 130 | 24 | 30 |
| 1,3,5-Trimethylbenzene | ND | 40.8 | 52.9 | 77 | | 53.9 | 58.3 | 92 | 70 - 130 | 28 | 30 |
| 1,3-Dichlorobenzene | ND | 39.9 | 52.9 | 75 | | 52.8 | 58.3 | 90 | 70 - 130 | 28 | 30 |
| 1,3-Dichloropropane | ND | 36.1 | 52.9 | 68 | * | 47.8 | 58.3 | 82 | 70 - 130 | 28 | 30 |
| 1,4-Dichlorobenzene | ND | 40.6 | 52.9 | 77 | | 53.5 | 58.3 | 92 | 70 - 130 | 27 | 30 |
| 2,2-Dichloropropane | ND | 45.0 | 52.9 | 85 | | 56.9 | 58.3 | 98 | 70 - 130 | 23 | 30 |
| 2-Butanone (MEK) | 0.79 | 40.3 | 52.9 | 75 | | 55,5 | 58.3 | 94 | 50 - 150 | 32 * | 30 |
| 2-Chlorotoluene | ND | 39.6 | 52.9 | 75 | | 57.7 | 58.3 | 99 | 70 - 130 | 37 * | 30 |
| 2-Hexanone | ND | 36.3 | 52.9 | 69 | * | 48.3 | 58.3 | 83 | 70 - 130 | 28 | 30 |
| 2-Methyl-2-propanol | ND | 809 | 1060 | 76 | | 1050 | 1170 | 90 | 50 - 150 | 26 | 30 |
| 4-Chlorotoluene | ND | 42.2 | 52.9 | 80 | | 54.9 | 58.3 | 94 | 70 - 130 | 26 | 30 |
| 4-Isopropyltoluene | ND | 41.8 | 52.9 | 79 | | 55.5 | 58.3 | 95 | 70 - 130 | 28 | 30 |
| 4-Methyl-2-pentanone | ND | 36.7 | 52.9 | 69 | * | 48.6 | 58.3 | 83 | 70 - 130 | 28 | 30 |
| Acetone | ND | 54.1 | 52.9 | 102 | | 81.3 | 58.3 | 139 | 50 - 150 | 40 * | 30 |
| Benzene | ND | 38.7 | 52.9 | 73 | | 49.6 | 58.3 | 85 | 70 - 130 | 25 | 30 |
| Bromobenzene | ND | 37.3 | 52.9 | 70 | | 50.3 | 58.3 | 86 | 70 - 130 | 30 | 30 |
| Bromochloromethane | ND | 38.1 | 52.9 | 72 | | 49.1 | 58.3 | 84 | 70 - 130 | 25 | 30 |
| Bromodichloromethane | ND | 39.4 | 52.9 | 75 | | 49.3 | 58.3 | 85 | 70 - 130 | 22 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Project:

Northgate Environmental

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905348
Date Collected: 9/18/09
Date Received: 9/19/09

Date Analyzed: 9/30/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name: Lab Code: SA117-9B R0905348-003

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

| | Sample | | latrix Spike Q0909236-0 | | | ate Matrix Q0909236-0 | | % Rec | | RPD |
|----------------------------------|--------|--------|----------------------------|-------|--------|--------------------------|-------|----------|------|-------|
| Analyte Name | Result | Result | Amount | % Rec | Result | Amount | % Rec | Limits | RPD | Limit |
| Bromoform | ND | 36.8 | 52.9 | 70 | 49.1 | 5 8.3 | 84 | 70 - 130 | 29 | 30 |
| Bromomethane | ND | 37.1 | 52.9 | 70 | 45.9 | 58.3 | 79 | 50 - 150 | 21 | 30 |
| Carbon Tetrachloride | ND | 46.8 | 52.9 | 89 | 57.9 | 58.3 | 99 | 70 - 130 | 21 | 30 |
| Chlorobenzene | ND | 37.8 | 52.9 | 71 | 49.4 | 58.3 | 85 | 70 - 130 | 27 | 30 |
| Chloroethane | ND | 40.0 | 52.9 | 76 | 48.8 | 58.3 | 84 | 70 - 130 | 20 | 30 |
| Chloroform | ND | 41.6 | 52.9 | 79 | 55.1 | 58.3 | 94 | 70 - 130 | 28 | 30 |
| Chloromethane | ND | 39.2 | 52.9 | 74 | 49.1 | 58.3 | 84 | 70 - 130 | 22 | 30 |
| Dibromochloromethane | ND | 37.5 | 52.9 | 71 | 48.8 | 58.3 | 84 | 70 - 130 | 26 | 30 |
| Dibromomethane | ND | 38.4 | 52.9 | 73 | 48.7 | 58.3 | 84 | 70 - 130 | 24 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 33.9 | 52.9 | 64 * | 42.7 | 58.3 | 73 | 70 - 130 | 23 | 30 |
| Dichloromethane | ND | 39.3 | 52.9 | 74 | 51.3 | 58.3 | 88 | 70 - 130 | 26 | 30 |
| Diisopropyl Ether | ND | 43.6 | 52.9 | 82 | 56.1 | 58.3 | 96 | 70 - 130 | 25 | 30 |
| Ethyl tert-Butyl Ether | ND | 44.4 | 52.9 | 84 | 58.2 | 58.3 | 100 | 70 - 130 | 27 | 30 |
| Ethylbenzene | ND | 41.1 | 52.9 | 78 | 53.0 | 58.3 | 91 | 70 - 130 | 25 | 30 |
| Hexachlorobutadiene | ND | 36.0 | 52.9 | 68 * | 49.3 | 58.3 | 85 | 70 - 130 | 31 * | |
| Isopropylbenzene (Cumene) | ND | 43.1 | 52.9 | 81 | 54.4 | 58.3 | 93 | 70 - 130 | 23 | 30 |
| Methyl tert-Butyl Ether | ND | 38.7 | 52.9 | 73 | 51.9 | 58.3 | 89 | 70 - 130 | 29 | 30 |
| Naphthalene | ND | 35.6 | 52.9 | 67 | 51.0 | 58.3 | 87 | 50 - 150 | 36 * | 30 |
| Styrene | ND | 40.4 | 52.9 | 76 | 53.2 | 58.3 | 91 | 70 - 130 | 27 | 30 |
| Tetrachloroethene (PCE) | ND | 43.1 | 52.9 | 81 | 55.2 | 58.3 | 95 | 70 - 130 | 25 | 30 |
| Toluene | ND | 39.3 | 52.9 | 74 | 50.8 | 58.3 | 87 | 70 - 130 | 26 | 30 |
| Trichloroethene (TCE) | ND | 42.7 | 52.9 | 81 | 52.5 | 58.3 | 90 | 70 - 130 | 20 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 45.2 | 52.9 | 85 | 56,7 | 58.3 | 97 | 70 - 130 | 23 | 30 |
| Vinyl Chloride | ND | 41.2 | 52.9 | 78 | 50.6 | 58.3 | 87 | 70 - 130 | 20 | 30 |
| cis-1,2-Dichloroethene | ND | 38.9 | 52.9 | 74 | 54.2 | 58.3 | 93 | 70 - 130 | 33 * | 30 |
| cis-1,3-Dichloropropene | ND | 40.0 | 52.9 | 76 | 51.8 | 58.3 | 89 | 70 - 130 | 26 | 30 |
| m,p-Xylenes | ND | 81.8 | 106 | 77 | 105 | 117 | 90 | 70 - 130 | 25 | 30 |
| n-Butylbenzene | ND | 43.2 | 52.9 | 82 | 58.2 | 58.3 | 100 | 70 - 130 | 30 | 30 |
| n-Propylbenzene | ND | 42.3 | 52.9 | 80 | 54.5 | 58.3 | 93 | 70 - 130 | 25 | 30 |
| o-Xylene | ND | 39.8 | 52.9 | 75 | 49.3 | 58.3 | 84 | 70 - 130 | 21 | 30 |
| sec-Butylbenzene | ND | 42.6 | 52.9 | 81 | 56.4 | 58.3 | 97 | 70 - 130 | 28 | 30 |
| tert-Amyl Methyl Ether | ND | 41.1 | 52.9 | 78 | 56.7 | 58.3 | 97 | 70 - 130 | 32 * | |
| tert-Butylbenzene | ND | 40.9 | 52.9 | 77 | 52.3 | 58.3 | 90 | 70 - 130 | 25 | 30 |
| trans-1,2-Dichloroethene | ND | 41.7 | 52.9 | 79 | 53.0 | 58.3 | 91 | 70 - 130 | 24 | 30 |

Comments:

Printed 10/29/09 9:48
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Matrix Spike Summary

SuperSet Reference:

09-0000121394 rev 00

3C#: 21991 K)

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: Reviewer 2nd Reviewer:

IETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| CSD ID | Compound | %R _ | LCS %R (LImits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|-----------|----------|------|--------------------|---------------------|--------------|--------------------|----------------|
| 172495-45 | g | 22 | (361-56) |) | J | 1 9-11, 172495-MB | J-/MM (K) |
| | - | | () | (|) |) | |
| | | | () | (|) [(|) [| |
| 72392-165 | 777 | 74 | (52/-52) | (|) (| 1 2-7 172312-MB | 3 No rud (MCD |
| | | | () | (|) |) (| 0 |
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| | | | () |) |) (|) | |
| | | | , | , |) | 1 | |

LDC #: 21691 K/ SDG #: 54

VALIDATION FINDINGS WORKSHEET Compound Quantitation and CRQLs

Reviewer: 2nd Reviewer: _

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| Qualifications | Jdor/4 (e) | | | | | | | | | | |
|--------------------|--------------|--|--|--|--|--|--|--|--|---------|--|
| Associated Samples | | | | | | | | | | | |
| Finding | k > cd range | | | | | | | | | | |
| Sample ID | 8 | | | | | | | | | | |
| Date | | | | | | | | | | | |
| * | | | | | | | | | | <u></u> | |

Comments: See sample calculation verification worksheet for recalculations

SDG# 54 (m)

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

| ot | 3/6 | 7 |
|-----------|-----------|---------------|
| _ Page: _ | Reviewer: | 2nd Reviewer: |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Was the overall quality and usability of the data acceptable?

| us | (0) | \ | - | | | | | | | |
|--------------------|--------------|---|--------------|--|--|--|--|--|------|-----------|
| Qualifications | × | | 1 | | | | | | | |
| Associated Samples | 1 | 8 | 4.) | | | | | | | |
| Finding | K > cu rayed | | All except K | | | | | | | |
| Sample ID | 8 | | 6 | | | | | | | |
| Date | | | | | | | | | | ents: |
| * | | | | | | | | | | Comments: |

| _DC #:_ | 2 99 | <u>_</u> |
|---------|------|----------|
| 3DG #:_ | Su | Cm/ |

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | | of |
|---------------|---|-----|
| Reviewer: | | SVC |
| 2nd reviewer: | Ø | |

WETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Y N N/A

Were field duplicate pairs identified in this SDG? Were target compounds detected in the field duplicate pairs?

| | | Concentrat | tion (US/Ly) | | Prima |
|----------|----|------------|--------------|----------------|-------|
| Compound | | 8 | 10 | RPD | ny |
| | М | ع, 8 | 220 | 217.2 (=1600) | _ |
| | F_ | 10 | 3200 U | 3190 (= 3200D) | - |
| | X | 5,8 | 790 y | 784,2 (= 790D) | _ |
| | K | 470 | 830 | 360 | _ |
| | + | ٥. ٥ | 790 U | 788 | - |

| | | Concentration | on (US/kg) | | Pares |
|----------|---|---------------------------------------|------------|---------------|---------------------------------------|
| Compound | | 9 | 10 | RPD | my |
| | M | 230 | 220 | 10 (£1800 D) | |
| | K | 630 | 8 30 | 200 (£ 900 b) | |
| | | · · · · · · · · · · · · · · · · · · · | | | , |
| | | | | | · · · · · · · · · · · · · · · · · · · |
| | | | | | |

| | Concentration () | | |
|----------|-------------------|--|-----|
| Compound | | | RPD |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
| | | |
| | | |
| | | |
| | | |
| | | |

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 21, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905387

Sample Identification

SA32-0.5B TB092109-SO2

SA32-9B

SA32-25B

SA32009-25B

SA32-37B

SA66-0.5B

SA66-0.5BDL

SA66009-0.5B

SA66009-0.5BDL

SA66-10B

SA66-10BRE

SA66-28B

SA129-10B

SA129-29B

RSAT4-0.5B

RSAT4-10B

RSAT4-25B

RSAT4-10B

RSAT4-53B

TB092109-SO1

Introduction

This data review covers 19 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2 172107-WMB 172107-SMB 173080-MB | J (all detects) UJ (all non-detects) | A |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---------|---|--------------------------------------|---|--|--------|
| 9/30/09 | Hexachlorobutadiene | 29.7 | SA32-0.5B SA32-9B SA32-25B SA32-37B 172602-MB | J- (all detects) UJ (all non-detects) | А |
| 10/1/09 | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | 28.1 25.2 25.5 25.6 45.9 | SA32009-25B SA66-0.5B SA66009-0.5B SA66-10B 172787-MB | J- (all detects) UJ (all non-detects) | А |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--|---|--------|
| 9/28/09 | 2-Methyl-2-propanol | 0.029 (≥0.05) | SA66-10BRE TB092109-SO1 TB092109-SO2 172107-WMB 172107-SMB | J (all detects) UJ (all non-detects) | А |
| 10/2/09 | 2-Methyl-2-propanol | 0.027 (≥0.05) | SA66-0.5BDL SA66009-0.5BDL 173080-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--------------------|
| 172107-SMB | 9/28/09 | 2-Butanone | 53 ug/Kg | SA66-28B |
| 173080-MB | 10/2/09 | 2-Butanone | 79 ug/Kg | SA66009-0.5BDL |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|----------------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA66009-0.5BDL | 2-Butanone | 590 ug/Kg | 590U ug/Kg |

Samples TB092109-SO1 and TB092109-SO2 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|----------|---------------|---|
| TB092109-SO1 | 9/21/09 | Acetone | 5.3 ug/L | SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified.

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|---|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66-0.5BDL SA66009-0.5B SA66009-0.5BDL SA66-10B SA66-10B SA66-10BRE SA66-28B SA129-10B SA129-29B |
| FB080309-SO | 8/3/09 | Acetone Toluene | 2.1 ug/L 0.30 ug/L | RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-53B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|--------------|----------|---------------------------|---------------------------------|
| SA32-0.5B | Toluene | 0.50 ug/Kg | 0.50U ug/Kg |
| SA32-9B | Toluene | 0.69 ug/Kg | 0.69U ug/Kg |
| SA66009-0.5B | Acetone | 6.7 ug/Kg | 6.7U ug/Kg |
| SA129-29B | Acetone | 3.7 ug/Kg | 3.7U ug/Kg |
| RSAT4-0.5B | Toluene | 0.57 ug/Kg | 0.57U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

| Sample | Surrogate | %R (Limits) | Compound | Flag | A or P |
|------------|----------------------|-------------|-------------------|--|--------|
| SA66-10BRE | Dibromofluoromethane | 67 (70-130) | All TCL compounds | J- (all detects) UJ (all non-detects) | А |

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCSD percent recoveries (%R) were not within QC limits for some compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---------------------------|--|---|---|------------------------------------|--------|
| SA66-0.5B SA66009-0.5B | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects) J (all detects) | A |

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905387 | All compounds reported below the PQL. | J (all detects) | А |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|-------------------------------|--|------|--------|
| SA66-0.5B SA66009-0.5B | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | × | А |
| SA66-0.5BDL SA66009-0.5BDL | All TCL compounds except 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | х | А |

| Sample | Compound | Flag | A or P |
|------------|-------------------|------|--------|
| SA66-10BRE | All TCL compounds | Х | Α |

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

XVI. Field Duplicates

Samples SA32-25B and SA32009-25B, samples SA66-0.5B and SA66009-0.5B, and samples SA66-0.5BDL and SA66009-0.5BDL were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentrat | Concentration (ug/Kg) | | DDD D'#* | | |
|------------|------------|-----------------------|-----------------|------------------------|-----------------|--------|
| Compound | SA32-25B | SA32009-25B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 3.5 | 2.4 | - | 1.1 (≤14) | - | - |
| Chloroform | 38 | 18 | - | 20 (≤7.2) | J (all detects) | А |
| Toluene | 1.2 | 1 | - | 0.2 (≤7.2) | - | - |

| | Concentrati | on (ug/Kg) | 555 | D!# | | |
|------------------------|-------------|--------------|-----------------|------------------------|-----------------|--------|
| Compound | SA66-0.5B | SA66009-0.5B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 1,2,3-Trichlorobenzene | 490 | 650 | 28 (≤50) | - | - | - |
| 1,2,4-Trichlorobenzene | 920 | 1500 | 48 (≤50) | - | - | - |
| 1,2-Dichlorobenzene | 10 | 33 | - | 23 (≤6.2) | J (all detects) | А |
| 1,3-Dichlorobenzene | 4.9 | 17 | - | 12.1 (≤6.2) | J (all detects) | А |
| 1,4-Dichlorobenzene | 12 | 38 | - | 26 (≤6.2) | J (all detects) | А |
| 2-Butanone | 11U | 1.7 | - | 9.3 (≤11) | - | - |
| 2-Chlorotoluene | 5.3U | 1.9 | - | 3.4 (≤5.3) | - | - |
| 2-Hexanone | 1.8 | 12U | - | 10.2 (≤12) | - | - |
| Acetone | 21U | 6.7 | - | 14.3 (≤21) | - | - |

| | Concentration (ug/Kg) | | 222 | D''' | | |
|---------------------|-----------------------|--------------|-----------------|------------------------|-----------------|--------|
| Compound | SA66-0.5B | SA66009-0.5B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| Chlorobenzene | 5.6 | 10 | - | 4.4 (≤6.2) | - | - |
| Chloroform | 4.8 | 3.7 | - | 1.1 (≤6.2) | - | |
| Hexachlorobutadiene | 30 | 90 | 100 (≤50) | - | J (all detects) | А |
| Toluene | 5.3U | 5.6 | - | 0.3 (≤5.3) | - | - |
| Trichloroethene | 0.44 | 6.2U | - | 5.76 (≤6.2) | - | - |

| | Concentrat | ion (ug/Kg) | 500 | D'' | | |
|------------------------|-------------|----------------|-----------------|------------------------|-----------------|--------|
| Compound | SA66-0.5BDL | SA66009-0.5BDL | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 1,2,3-Trichlorobenzene | 6900 | 22000 | 104 (≤50) | - | J (all detects) | А |
| 1,2,4-Trichlorobenzene | 12000 | 39000 | 106 (≤50) | - | J (all detects) | А |
| 1,2-Dichlorobenzene | 88 | 260 | - | 172 (≤6.2) | J (all detects) | А |
| 1,4-Dichlorobenzene | 130 | 400 | - | 270 (≤1300) | - | |
| 2-Butanone | 200 | 590 | - | 390 (≤2600) | - | - |
| Chloroform | 290 | 2000 | - | 1710 (≤1300) | J (all detects) | Α |
| Hexachlorobutadiene | 930 | 3000 | - | 2070 (≤1300) | J (all detects) | Α |
| Tetrachloroethene | 550U | 220 | - | 330 (≤550) | - | - |
| Toluene | 550U | 150 | - | 400 (≤550) | - | - |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Data Qualification Summary - SDG R0905387

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|---|---|--|--------|-------------------------------------|
| R0905387 | SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) (c) |
| R0905387 | SA32-0.5B SA32-9B SA32-25B SA32-37B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905387 | SA32009-25B SA66-0.5B SA66009-0.5B SA66-10B | tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905387 | SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Continuing calibration (RRF) (c) |
| R0905387 | SA66-10BRE | All TCL compounds | J- (all detects) UJ (all non-detects) | А | Surrogate spikes (%R) (s) |
| R0905387 | SA66-0.5B SA66009-0.5B | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | J (all detects) J (all detects) | А | Project Quantitation Limi (e) |
| R0905387 | SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66-0.5BDL SA66009-0.5B SA66009-0.5BDL SA66-10B SA66-10BRE SA66-10BRE SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-53B TB092109-SO1 TB092109-SO2 | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limi (sp) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|-------------------------------|--|---|--------|---------------------------------------|
| R0905387 | SA66-0.5B SA66009-0.5B | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | X X | А | Overall assessment of data (o) |
| R0905387 | SA66-0.5BDL SA66009-0.5BDL | All TCL compounds except 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | × | A | Overall assessment of data (o) |
| R0905387 | SA66-10BRE | All TCL compounds | × | А | Overall assessment of data (o) |
| R0905387 | SA32-25B SA32009-25B | Chloroform | J (all detects) | Α | Field duplicates (Difference) (fd) |
| R0905387 | SA66-0.5B SA66009-0.5B | 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene | J (all detects) | А | Field duplicates (Difference) (fd) |
| R0905387 | SA66-0.5B SA66009-0.5B | Hexachlorobutadiene | J (all detects) | A | Field duplicates (RPD) (fd) |
| R0905387 | SA66-0.5BDL SA66009-0.5BDL | 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene | J (all detects) J (all detects) | Α | Field duplicates (RPD) (fd) |
| R0905387 | SA66-0.5BDL SA66009-0.5BDL | 1,2-Dichlorobenzene Chloroform Hexachlorobutadiene | J (all detects) J (all detects) J (all detects) | A | Field duplicates (Difference) (fd) |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905387

| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|----------------|---------------------------------|---------------------------------|--------|------|
| R0905387 | SA66009-0.5BDL | 2-Butanone | 590U ug/Kg | А | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905387

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|--------------|----------|---------------------------------|--------|------|
| R0905387 | SA32-0.5B | Toluene | 0.50U ug/Kg | А | bf |
| R0905387 | SA32-9B | Toluene | 0.69U ug/Kg | А | bf |
| R0905387 | SA66009-0.5B | Acetone | 6.7U ug/Kg | А | bf |
| R0905387 | SA129-29B | Acetone | 3.7U ug/Kg | Α | bf |
| R0905387 | RSAT4-0.5B | Toluene | 0.57U ug/Kg | А | bf |

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Reviewer: 2nd Reviewer:

Laboratory: Columbia Analytical Services

LDC #: 21991L1 SDG #:___R0905387

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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 |
|-------|--|-----|--|
| l. | Technical holding times | Å | Sampling dates: 9/21/69 |
| II. | GC/MS Instrument performance check | A | |
| Ш. | Initial calibration | SW | 2 RSD rr |
| IV. | Continuing calibration/IQV | ٦M | COV & 25 ? |
| V | Blanks | SW | |
| VI. | Surrogate spikes | SN) | |
| VII. | Matrix spike/Matrix spike duplicates | N | client spec |
| VIII. | Laboratory control samples | ZW | Client Spec US 10 |
| IX. | Regional Quality Assurance and Quality Control | N | |
| Χ. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | SW | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | SW | |
| XVI. | Field duplicates | SM | $D_1 = 3.4$ $D_2 = 6.8$ $D_3 = 7.9$ |
| XVII. | Field blanks | SN | TB-20, 21 FB = FB 672969-50 Arm = FB080309-50 Arm Rog |

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: | Soil | + | Water |
|--------------------|------|---|-------|
| | انعد | | |

| | ۷ | . 01 | | ··wrey | | |
|----------------|--------------------------|---------------|-------------|----------------|-------------------------------------|---|
| † 1 | SA32-0.5B | S | 114 | SA66-10BDERE S | 21 5 TB092109-SO2 W 31 1 172602_ MB | |
| † 2 | SA32-9B | | 12 | SA66-28B | 22 32 × 172 787 - MB | |
| + 3 | SA32-25B D ₁ | | 13 4 | SA129-10B | 23 33 3 17 30 80 - MB | |
| + 4 | SA32009-25B D | | 14 4 | SA129-29B | 24 34 172989- | |
| † 5 | SA32-37B | | 15 4 | RSAT4-0.5B | 25 35 172107 - WM | В |
| <i>ک</i> | SA66-0.5B P _y | | 16 4 | RSAT4-10B | 26 366 172107-SMB | _ |
| ₇ | SA66-0.5BDL |) , | 17 4 | RSAT4-25B | 27 37 | |
| 8 7 | SA66009-0.5B ₺/ | | 18 × | RSAT4-10B | 28 38 | |
| 9 > | SA66009-0.5BDL | 03 | 19 🖠 | RSAT4-53B | 29 39 | |
| 10 3 | SA66-10B | \mathcal{V} | 20 5 | TB092109-SO1 W | 30 40 | |

TARGET COMPOUND WORKSHEET

WETHOD: VOA (EPA SW 846 Method 8260B)

| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|----------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyf-2-pentanone | SS. 1,3-Dichloropropane | MMM, Naphthalene | GGGG. Acrytonitrile |
| F. Acetone | Z. 2-Hexanone | TT, 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disutfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. teobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachioroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m.p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzane** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl. 2-propanel |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichlonoethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethyfvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | 0000. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Buty/benzene | YYY, tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Buty/ alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-isopropyltoluene | AAAA. Ethyl tert-butyl ether | ບນບບ. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | ww. |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

r aye. ____ Reviewer:_ 2nd Reviewer:

AETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

SDG# So Corey .DC #: -1 -1 LI

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

Note that N/A were percent relative standard deviations (%RSD) and relative response factors (RRF) within mass a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation.

Note that initial calibration meet the acceptance criteria?

Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? $\frac{\Gamma^2 \geq 0}{2}$ $\frac{4}{9}$

| | Qualifications | (7) A th/[|
|---|-------------------------------|------------|
| | Associated Samples | 120211 97 |
| criteria or ≤30 %RSD and ≥0.05 KRF ? | Finding RRF (Limit: >0.05) | 0000 |
| اہ | Finding %RSD (Limit: <30.0%) | |
| KFs within the valida | Compound | NAN |
| Were all %RSDs and RRFs within the validation | Standard ID | 16.41 |
| M/A | Date | 17 176 |
| Z > | # | |

| # | Date | Standard ID | Compound | Finding %RSD (Limit: <30.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|---|---------|-------------|----------|---------------------------------|-------------------------------|--------------------|----------------|
| | 69/81/6 | ICAL | MNNN | | 0.028 | 12,02,11 9,7 | J/45 A (C) |
| | | | | | | 172107-WMB | |
| | | | | | | 172/07-5MB | |
| | | | | | | 173080-MB | |
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TDC #: 21 441 [

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: Of 2nd Reviewer: Reviewer:_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

N N N X X

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

| | (3) | 1 | 1 | | \Box | | | | 1 | 4 | | | | Z | | | | | | | |
|-------------------------------|------------------|----------|---|---------------------|--------|---|--------|---------|---|---|----------------------|------------|---|-------------------|--|--|---|--|--|--|--|
| Qualifications | J-/43/A | | | | | | | | > | | J/MJ/A | | | | | | | | | | |
| Associated Samples | 1-3 5, 172602-NB | | | 4 6, 8 10 172787-MB | | | | | | | 11 20 21 172107- WAR | 172107-SMB | | 7, 9, 173080-1115 | | | , | | | | |
| Finding RRF (Limit: >0.05) | | | | | | | | | | | 0,029 | | | 0,027 | | | | | | | |
| Finding %D (Limit: <25.0%) | 29.7 | / , | | 28,1 | 25,2 | Ŋ | 25,6 | 45.9 | | | | | | | | | | | | | |
| Compound | (C-) 111 | | | (-) 222 | EFE C | ı | C-) MW | (-) 111 | | | NNN | | | 2222 | | | | | | | |
| Standard ID | H 1211 | | | H1236 | | | | | | | C1047 | | | 06117 | | | | | | | |
| Date | 9/20/69 | \ | | 10/01/04 | | | , | | | | 64/85/6 | | • | 10/00/91 | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | | | |

LDC #: 2 [191 L] SDG #:

VALIDATION FINDINGS WORKSHEET <u>Blanks</u>

Page:

2nd Reviewer: Reviewer:_

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Was a method blank associated with every sample in this SDG? X/N N/A

Was a method blank analyzed at least once every 12 hours for each matrix and concentration?

Was there contamination in the method blanks? If yes, please see the qualifications below. Blank analysis date: 9/28/6? N/N N/A

(aN)

4

Associated Samples:

Conc. units:

7 9 Sample Identification Sample Identification 9 Associated Samples (x++t) 2 500 172107-5 MB 173080-MB Blank ID Blank ID 23 Blank analysis date: 10 /02/04 Conc. units: NG /KM \mathbf{z} Z Compound Compound

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VALIDATION FINDINGS WORKSHEET Field Blanks

2nd Reviewer:_ Page:_ Reviewer:

(m)

1-5

Associated Samples:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SUG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: "9 / kg

Associated sample units: "9 / kg

Field blank type: (circle one) Field Blank / Rinsate / (rip Blank) Other:

Sample Identification Associated Samples: Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other. ng Acq Associated sample units:_ Blank ID 9/21/69 Blank ID20 5,3 Sampling Date. Blank units: 149 12 Compound

| | Compound | F 8 0 7 2 9 0 4 | Blank-fo | | | | Sample Identification | | |
|----------|---------------|-----------------|----------|---|---------|-------|-----------------------|--|--|
| | Samuling Date | 7/29/69 | | 7 | 8 | 4/ | | | |
| <u> </u> | u_ | 5'8 | | | 1.7 7.3 | 3,7/4 | | | |
| <u> </u> | 11. | 0,30 | | | | , | | | |

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| Sample Identification | | | | | \warphi | | | | |
| | | | | | JN | | | | |
| | 14 | 3.7/4 | | | es ther | | | | |
| | 8 | h/ L'8 h/ L'3 | | | thers | | | | |
| | 7 | | | 1/63.0 | C A11 0 | | | | |
| Blapk-to | | | | 0.50/W | | | | | - |
| Blank ID ' | 7/24 69 | 3,5 | 0,30 | 0,44 | | | | | |
| Compound | Sampling Date | 4 | רת | 3 | | | | | |
| | establish | • | | <u> </u> | | | -i | 1 | |
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| .DC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET Field Blanks

Page of Y 2nd Reviewer: Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?

Were target compounds detected in the field blanks?

Blank units: Mg /kg

Field blank Rinsate / Trip Blank / Other: Blank units:

Associated Samples:

15- 19

TB Sample Identification 5 S - Der others 0.57 /U /₩ F BO80304 SO Blank ID Blank ID 40/40/8 30 0 Sampling Date 9 Compound

Associated sample units: Blank units:

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:

| | | 1 | T | $\overline{\Gamma}$ | - | T | T | | |
|--|-----------------------|---------------|---|---------------------|--------------|---|---|--|-------------|
| ı | | | | | | | | | |
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| Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: | | | | | | | | | |
| | | | | | | | | | |
| es: | ntification | | | | | | | | |
| ited Samples | Sample Identification | | | | | | | | |
| Associa | | | | | | | | | |
| | | | | | | | | | |
| Slank / Other | | | | | | | | | |
| Trip E | | | | | | | | | |
| / Rinsate / | Blank ID | | | | | | | | |
| Field Blank | Blank ID | | | | | | | | |
| ircle one) | | Sampling Date | - | | | | | | |
| lank type: (ci | Compound | Sampl | | | | | | | |
| Field b | | | | | | | | | · |

SDG #: Sec Gran LDC #: 21411

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

(Jo Page: Reviewer: 2nd Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

| X | N/A | Were all surrogate %R within QC limits?
| Y | N/A | Were all surrogate %R within QC limits?
| Y | N/A | Were all surrogate %R within QC limits?
| Y | N/A | Were all surrogate %R within QC limits?

| | T / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / | | | | | | | | | | | | | |
|--------------------|---|--|---|-----|--|--|--|--|---|-----|-----|---|-----|--|
| %Bacovery (Limits) | 67 (70-130) | | | () | | | | | (| () | () |) | () | |
| Surrogata | DFM | | | | | | | | | | | | | |
| Data Sample ID | 1/ | | | | | | | | | | | | | |
| * | | | 1 | | | | | | | | | | | |

QC Limits (Soil) 81-117 74-121 80-120 80-120 SMC1 (TOL) = Toluene-48
SMC2 (BFB) = Bromofluorobenzene
SMC3 (DCE) = 1,2-Dichloroethane-44
SMC4 (DFM) = Dibromofluoromethane

QC Limits (Water) 88-110 86-115 80-120 86-118

LDC# 2/99/ LJ SDG #:

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

of Page: Reviewer: 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| | 7 | | — | | | | | > | r | — | | | | ,,,,,,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | | | | | | | | |
|---------------------|--------------|-----------|--------|--------|--------|--------|--------|---------|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|
| Qualifications | | | | | | | | \ | | | | | | | | | | | | | | | | |
| Associated Samples | 9 172989-1MB | | | | | | | 7 | | | | | | | | | | | | | | | | |
| Associate | 11. 13-19 | (|) [|) [|) (|) [| (| |) [|) [|) [| (|) | | | | | | | | | | | |
| RPD (Limits) |) |) |) |) |) |) |) |) |) |) |) |) |) | |) | () | (| (| () | (| () | (| () |) |
| LCSD %R (Limits) | 74 (75-125) | 7) () // | 72 () | () 89 | 74 () | () 57 | () 72 | 10 1 10 | () |) | () | () | () | () | () | () | () | () | () | () | () | () | () | |
| LCS %R (Limits) | () | () | () | () | () | () | () | | () | () | () | () | () | () | () | () | () | () | () | () | () | () | () | |
| Compound | nn | I | XX | mm | 22 | 71 | himy | 222 | | | | | | | | | | | | | | | | |
| TCS/FCSD ID | 9/5M-68peL1 | | | | | | | | | | | | | | | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | | | | | | | | | |
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VALIDATION FINDINGS WORKSHEE! Compound Quantitation and CRQLs

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2nd Reviewer:

IETHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Yere the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? N N N N N N

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

| ** | Date | Sample ID | Finding | Associated Samples | Qualifications |
|------|------------|---|--------------------------|--------------------|----------------|
| | | \ \forall \ \gamma \ \gamma \ \gamma \ \ \ \ \ \ \ \ \ \ \ \ \qqq \qqq \qqq \qqq \qqq \qqq \qqq \qqq \qqq \q | NNN KKK > CA | ra | J Mets (A) (E) |
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| Somm | nents: See | Somments: See sample calculation verification worksheet for recalculations | sheet for recalculations | | |

LDC #: 24 (49) L)
SDG #: 54 (4~)

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: of Deviewer: DVC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y) N. N.A. Was the overall quality and usability of the data acceptable?

| | | ć | <u> </u> | | - | ! | |
|----------|-----|-----------|----------|-----------------|--------------------|---------------|-----|
| | # | Date | | Finaing | Associated Samples | - 11 | |
| | | | 8 9 | NNN KKK > CA | rongo | ∀ × | (%) |
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| | | | 6 4 | All except BNN, | KKK dij | | |
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LDC#: 21991L1a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page: | \ of <u> </u> |
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| Reviewer: | JV6 |
| 2nd Reviewer: | |

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

YN NA
Were field duplicate pairs identified in this SDG?
Were target analytes detected in the field duplicate pairs?

| Compound Name | Conc (| ug/Kg) | RPD | Diff | Diff Limits | Quals |
|---------------|--------|--------|---------------|------|-------------|---------------|
| Compound Name | 3 | 4 | RPD (≤50%) | Dill | | (Parent Only) |
| 2-Butanone | 3.5 | 2.4 | | 1.1 | ≤ 14 | - |
| Chloroform | 38 | 18 | | 20 | ≤7.2 | Jdets/A (fd) |
| Toluene | 1.2 | 1.0 | | 0.2 | ≤7.2 | - |

| Compound Name | Conc (| ug/Kg) | RPD | Diff | Diff Limits | Quals |
|------------------------|--------|--------|---------|------|-------------|---------------|
| Compound Name | 6 | 8 | (≤ 50%) | Dill | DITEIRES | (Parent Only) |
| 1,2,3-Trichlorobenzene | 490 | 650 | 28 | | | - |
| 1,2,4-Trichlorobenzene | 920 | 1500 | 48 | | | - |
| 1,2-Dichlorobenzene | 10 | 33 | | 23 | ≤6.2 | Jdets/A (fd) |
| 1,3-Dichlorobenzene | 4.9 | 17 | | 12.1 | ≤6.2 | Jdets/A (fd) |
| 1,4-Dichlorobenzene | 12 | 38 | | 26 | ≤6.2 | Jdets/A (fd) |
| 2-Butanone | 11U | 1.7 | | 9.3 | ≤11 | - |
| 2-Chlorotoluene | 5.3U | 1.9 | | 3.4 | ≤ 5.3 | - |
| 2-Hexanone | 1.8 | 12U | | 10.2 | ≤12 | - |
| Acetone | 21U | 6.7 | | 14.3 | ≤21 | - |
| Chlorobenzene | 5.6 | 10 | | 4.4 | 6.2 | - |
| Chloroform | 4.8 | 3.7 | | 1.1 | 5 6.2 | - |
| Hexachlorobutadiene | 30 | 90 | 100 | | | Jdets/A (fd) |
| Toluene | 5.3U | 5.6 | | 0.3 | ≤ 5.3 | - |
| Trichloroethene | 0.44 | 6.2U | | 5.76 | ≤6.2 | |

| Compound Name | Conc (| ıg/Kg) | RPD Diff | | Diff Limits | Quals |
|------------------------|--------|--------|----------|------|-------------|---------------|
| Compound Name | 7 | 9 | (≤ 50%) | Dill | Dill Emilis | (Parent Only) |
| 1,2,3-Trichlorobenzene | 6900 | 22000 | 104 | | | Jdets/A (fd) |
| 1,2,4-Trichlorobenzene | 12000 | 39000 | 106 | | | Jdets/A (fd) |
| 1,2-Dichlorobenzene | 88 | 260 | | 172 | < 6.2 | Jdets/A (fd) |

LDC#: 21991L1a SDG#:See cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | γ _{of} γ |
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| Reviewer: | 579 |
| 2nd Reviewer: | |

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Y N NA Were field duplicate pairs identified in this SDG?

Y N NA Were target analytes detected in the field duplicate pairs?

| Compound Name | Conc (| ug/Kg) | RPD | Diff | Diff Limits | Quals |
|---------------------|--------|--------|--------|------|--------------|---------------|
| Compound Name | 7 | 9 | (≤50%) | Diii | Dill Lilling | (Parent Only) |
| 1,4-Dichlorobenzene | 130 | 400 | | 270 | ≤ 1300 | <u>-</u> |
| 2-Butanone | 200 | 590 | | 390 | ≤ 2600 | - , |
| Chloroform | 290 | 2000 | | 1710 | ≤ 1300 | Jdets/A (fd) |
| Hexachlorobutadiene | 930 | 3000 | | 2070 | ≤1300 | Jdets/A (fd) |
| Tetrachloroethene | 550U | 220 | | 330 | ≤ 550 | - |
| Toluene | 550U | 150 | | 400 | ≤ 550 | - |

V:\FIELD DUPLICATES\21991L1a.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date: September 24 through September 25, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905464

Sample Identification

SA121-25BRE SA205-0.5B SA121-44B SA205-10B SA208-0.5B SA205-25B SA205-41B SA208-7B TB092509-SO1 SA84-0.5B TB092509-SO2 SA84-10B SA84009-10B TB092509-SO3 SA101-0.5BMS SA84-25B SA101-0.5BMSD SA84-43B

TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4

SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B

Introduction

This data review covers 23 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 as 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 V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was 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.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- 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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990.

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|---------|---------------------|---------------|--------------------------------------|---|--------|
| 9/18/09 | 2-Methyl-2-propanol | 0.028 (≤0.05) | All water samples in SDG R0905464 | J (all detects) UJ (all non-detects) | А |

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|--------------------|--|--------------------------------------|--|---|--------|
| 10/5/09 (C1217) | Acetone 2-Butanone | 25.3 26.9 | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | А |
| 10/4/09 | Acetone | 28.7 | SA205-0.5B SA205-10B SA205-25B 173191-MB | J- (all detects) UJ (all non-detects) | А |
| 10/5/09 (H1369) | Acetone | 35.5 | SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA101-0.5BMS SA101-0.5BMSD 173307-MB | J+ (all detects) | A |
| 10/5/09 (H1369) | 1,2,3-Trichloropropane tert-Butylbenzene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene Naphthalene | 25.6 27.3 28.7 33.8 27.1 | SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA101-0.5BMS SA101-0.5BMS | J- (all detects) UJ (all non-detects) | A |
| 10/6/09 | Hexachlorobutadiene | 35.2 | SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B 173430-MB | J- (all detects) UJ (all non-detects) | A |
| 10/9/09 | Hexachlorobutadiene | 31.6 | SA121-25BRE 174051-MB | J- (all detects) UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

| Date | Compound | RRF (Limits) | Associated Samples | Flag | A or P |
|--------------------|---------------------|---------------|---|---|--------|
| 10/2/09 | 2-Methyl-2-propanol | 0.027 (≥0.05) | TB092509-SO2 TB092509-SO3 173080-MB | J (all detects) UJ (all non-detects) | А |
| 10/5/09 (C1217) | 2-Methyl-2-propanol | 0.024 (≥0.05) | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB | J (all detects) UJ (all non-detects) | А |

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Analysis Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|-----------------|------------------|---------------------------------|---------------|--------------------|
| 174051-MB | 10/9/09 | Dichloromethane | 1.6 ug/Kg | SA121-25BRE |

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported | Modified Final |
|-------------|---------------------|---------------|----------------|
| | TIC (RT in minutes) | Concentration | Concentration |
| SA121-25BRE | Dichloromethane | 1.8 ug/Kg | 1.8U ug/Kg |

Samples TB092409-SO1, TB092509-SO1, TB092509-SO2, and TB092509-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|----------|---------------|---|
| TB092409-SO1 | 9/24/09 | Acetone | 1.7 ug/L | SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B |

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---------------|------------------|-----------------------------------|----------------------|--|
| TB092509-SO1 | 9/25/09 | Bromoform Dibromochloromethane | 3.4 ug/L 1.6 ug/L | EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121-0.5B SA121-0.5B SA121-10B SA121-25B SA121-25B SA121-25B SA121-25B SA121-44B |
| TB092509-SO3 | 9/25/09 | Bromoform | 0.32 ug/L | EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121-0.5B SA121-10B SA121-10B SA121-25B SA121-25B SA121-25B SA121-44B |

Sample concentrations were compared to concentrations detected in the trip blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|-----------|----------|---------------------------|---------------------------------|
| SA205-25B | Acetone | 3.2 ug/Kg | 3.2U ug/Kg |

Samples EB092509-SO1A2 and EB092509-SO2A4 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|-----------------------|-----------------------|------------------------|
| EB092509-SO1A2 | 9/25/09 | Acetone Chloroform | 3.7 ug/L 0.26 ug/L | SA208-0.5B SA208-7B |

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|--------------------|------------------|-----------------------|-----------------------|---|
| EB092509-SO2A4 | 9/25/09 | Acetone Chloroform | 4.3 ug/L 0.23 ug/L | SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-0.5B SA84-10B SA84-25B SA84-25B SA84-25B SA101-0.5B SA101-0.5B SA101-25B SA101-25B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B |

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---------------|----------|---------------------------|---------------------------------|
| SA208-7B | Acetone | 6.6 ug/Kg | 6.6U ug/Kg |
| SA205-0.5B | Acetone | 5.1 ug/Kg | 5.1U ug/Kg |
| SA205-25B | Acetone | 3.2 ug/Kg | 3.2U ug/Kg |
| SA205-41B | Acetone | 7.3 ug/Kg | 7.3U ug/Kg |
| SA84-0.5B | Acetone | 6.8 ug/Kg | 6.8U ug/Kg |
| SA84-25B | Acetone | 4.4 ug/Kg | 4.4U ug/Kg |
| SA101-0.5B | Acetone | 4.7 ug/Kg | 4.7U ug/Kg |
| SA101-42B | Acetone | 3.3 ug/Kg | 3.3U ug/Kg |
| SA121009-0.5B | Acetone | 8.3 ug/Kg | 8.3U ug/Kg |

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

| Field Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|----------------|------------------|---------------------------------------|------------------------------------|--|
| FB072909-SO | 7/29/09 | Acetone Dichloromethane Toluene | 3.5 ug/L 0.30 ug/L 0.44 ug/L | SA208-0.5B SA208-7B |
| FB080309-SO | 8/3/09 | Acetone Toluene | 2.1 ug/L 0.30 ug/L | SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84-09-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-25B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B |

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|------------|--------------------|---------------------------|---------------------------------|
| SA208-7B | Acetone Toluene | 6.6 ug/Kg 0.40 ug/Kg | 6.6U ug/Kg 0.40U ug/Kg |
| SA205-0.5B | Toluene | 0.38 ug/Kg | 0.38U ug/Kg |
| SA205-25B | Acetone | 3.2 ug/Kg | 3.2U ug/Kg |
| SA84-25B | Acetone | 4.4 ug/Kg | 4.4U ug/Kg |
| SA101-0.5B | Acetone | 4.7 ug/Kg | 4.7U ug/Kg |
| SA101-42B | Acetone | 3.3 ug/Kg | 3.3U ug/Kg |
| SA121-0.5B | Toluene | 0.57 ug/Kg | 0.57U ug/Kg |
| SA121-44B | Toluene | 0.56 ug/Kg | 0.56U ug/Kg |

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

| Sample | Surrogate | %R (Limits) | Compound | Flag | A or P |
|-------------|--------------------|-------------|-------------------|--|--------|
| SA121-25B | Bromofluorobenzene | 63 (70-130) | All TCL compounds | J- (all detects) UJ (all non-detects) | A |
| SA121-25BRE | Bromofluorobenzene | 65 (70-130) | All TCL compounds | J- (all detects) UJ (all non-detects) | Α |

VII. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

| Spike ID (Associated Samples) | Compound | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|-------------------------------------|---------------------|---------------------|----------------------|-----------------|--|--------|
| SA101-0.5BMS/MSD (SA101-0.5B) | Hexachlorobutadiene | 38 (70-130) | 40 (70-130) | - | J- (all detects) UJ (all non-detects) | А |

VIII. Laboratory Control Samples (LCS)

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

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|---|--|---|--|--------|
| 173191-LCS | 1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene | 70 (75-125) 62 (75-125) 65 (75-125) 74 (75-125) | SA205-0.5B SA205-10B SA205-25B 173191-MB | J- (all detects) UJ (all non-detects) | Р |
| 173360-LCS | Isopropylbenzene | 126 (75-125) | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB | J+ (all detects) | Р |

| LCS ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|------------|---------------------|--------------|---|--|--------|
| 173307-LCS | Hexachlorobutadiene | 62 (75-125) | SA205-41B SA84-0.5B SA84-0.5B SA84-009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B 173307-MB | J- (all detects) UJ (all non-detects) | Р |
| 174051-LCS | Acetone | 139 (75-125) | SA121-25BRE 174051-MB | J+ (all detects) | Р |

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|-----------|--------------------|-------------------------|--|-------------------------------------|--------|
| SA121-25B | Pentafluorobenzene | 103752 (258285-1033140) | Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol | J (all detects) R (all non-detects) | A |

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|-----------|------------------------|------------------------|--|--------------------------------------|--------|
| SA121-25B | 1,4-Dichlorobenzene-d4 | 125113 (205219-820874) | 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene | J (all detects) UJ (all non-detects) | A |

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|-------------|---|--|---|--------------------------------------|--------|
| SA121-25BRE | Pentafluorobenzene 1,4-Dichlorobenzene-d4 | 147116 (236617-946466) 144505 (188329-753316) | Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane 1,2,3-Trichloropropane 1,2,4-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene 1,2-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene 1,2-Tichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene | J (all detects) UJ (all non-detects) | A |

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

| Sample | Finding | Flag | A or P |
|-----------------------------|---------------------------------------|-----------------|--------|
| All samples in SDG R0905464 | All compounds reported below the PQL. | J (all detects) | Α |

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|-----------|-------------------|------|--------|
| SA121-25B | All TCL compounds | × | Α |

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

XVI. Field Duplicates

Samples SA84-10B and SA84009-10B and samples SA121-0.5B and SA121009-0.5B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

| | Concentration (ug/Kg) | | DDD | D:# | | |
|------------|-----------------------|-------------|-----------------|------------------------|-------|--------|
| Compound | SA84-10B | SA84009-10B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 12U | 1.5 | - | 10.5 (≤12) | - | - |

| | Concentral | tion (ug/Kg) | 555 | D.W | | |
|-----------------|------------|--------------|-----------------|------------------------|-------|--------|
| Compound | SA101-42B | SA121-0.5B | RPD (Limits) | Difference (Limits) | Flags | A or P |
| 2-Butanone | 0.91 | 1.6 | - | 0.69 (≤11) | - | - |
| Dichloromethane | 0.34 | 5.6U | - | 5.26 (≤5.6) | - | - |
| Toluene | 0.57 | 0.66 | - | 0.09 (≤5.6) | - | |
| Acetone | 18U | 8.3 | - | 9.7 (≤18) | • | - |

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| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|--|---|--------|------------------------------------|
| R0905464 | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 TB092509-SO2 TB092509-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | А | Initial calibration (RRF) |
| R0905464 | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 | Acetone 2-Butanone | J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905464 | SA205-0.5B SA205-10B SA205-25B | Acetone | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905464 | SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B | Acetone | J+ (all detects) | А | Continuing calibration (%D) (c) |
| R0905464 | SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B | 1,2,3-Trichloropropane tert-Butylbenzene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene Naphthalene | J- (all detects) UJ (all non-detects) | А | Continuing calibration (%D) (c) |
| R0905464 | SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B SA121-25BRE | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | A | Continuing calibration (%D) (c) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---|--|--------|---|
| R0905464 | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 TB092509-SO2 TB092509-SO3 | 2-Methyl-2-propanol | J (all detects) UJ (all non-detects) | A | Continuing calibration (RRF) (c) |
| R0905464 | SA121-25B SA121-25BRE | All TCL compounds | J- (all detects) UJ (all non-detects) | А | Surrogate spikes (%R) (s) |
| R0905464 | SA101-0.5B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | Α | Matrix spike/Matrix spike duplicates (%R) (m) |
| R0905464 | SA205-0.5B SA205-10B SA205-25B | 1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905464 | TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 | Isopropylbenzene | J+ (all detects) | Р | Laboratory control samples (%R) (I) |
| R0905464 | SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B | Hexachlorobutadiene | J- (all detects) UJ (all non-detects) | Р | Laboratory control samples (%R) (I) |
| R0905464 | SA121-25BRE | Acetone | J+ (all detects) | Р | Laboratory control samples (%R) (l) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|-----------|--|---|--------|-------------------------------|
| R0905464 | SA121-25B | Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Trichlorofluoromethane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol | J (all detects) R (all non-detects) | A | Internal standards (area) (i) |
| R0905464 | SA121-25B | 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene | J (all detects) UJ (all non-detects) | Α | Internal standards (area) (i) |

| | Compound | Flag | A or P | Reason (Code) |
|----------------------|--|--------------------------------------|--------|---|
| R0905464 SA121-25BRE | Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene 1,2,4-Trimethylbenzene 1,2-Dichlorobenzene 1,2-Dichlorobenzene 1,2-Dichlorobenzene 1,2-Tethorobenzene 1,2-Tethorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene 1,2-Trichlorobenzene | J (all detects) UJ (all non-detects) | A or P | Reason (Code) Internal standards (area) (i) |

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|----------|--|---------------------------------------|-----------------|--------|---------------------------------|
| R0905464 | SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84-09-10B SA84-25B SA84-25B SA84-43B TB092409-SO1 EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-25B SA121-0.5B SA121-0.5B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-25B SA121-30B S | All compounds reported below the PQL. | J (all detects) | A | Project Quantitation Limit (sp) |
| R0905464 | SA121-25B | All TCL compounds | х | A | Overall assessment of data (o) |

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| SDG | Sample | Compound TIC (RT in minutes) | Modified Final Concentration | A or P | Code |
|----------|-------------|---------------------------------|---------------------------------|--------|------|
| R0905464 | SA121-25BRE | Dichloromethane | 1.8U ug/Kg | А | bl |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Trip Blank Data Qualification Summary - SDG R0905464

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-----------|----------|---------------------------------|--------|------|
| R0905464 | SA205-25B | Acetone | 3.2U ug/Kg | Α | bt |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Equipment Blank Data Qualification Summary - SDG R0905464

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|---------------|----------|---------------------------------|--------|------|
| R0905464 | SA208-7B | Acetone | 6.6U ug/Kg | Α | be |
| R0905464 | SA205-0.5B | Acetone | 5.1U ug/Kg | Α | be |
| R0905464 | SA205-25B | Acetone | 3.2U ug/Kg | Α | be |
| R0905464 | SA205-41B | Acetone | 7.3U ug/Kg | А | be |
| R0905464 | SA84-0.5B | Acetone | 6.8U ug/Kg | А | be |
| R0905464 | SA84-25B | Acetone | 4.4U ug/Kg | Α | be |
| R0905464 | SA101-0.5B | Acetone | 4.7U ug/Kg | А | be |
| R0905464 | SA101-42B | Acetone | 3.3U ug/Kg | Α | be |
| R0905464 | SA121009-0.5B | Acetone | 8.3U ug/Kg | А | be |

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Volatiles - Field Blank Data Qualification Summary - SDG R0905464

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|------------|--------------------|---------------------------------|--------|------|
| R0905464 | SA208-7B | Acetone Toluene | 6.6U ug/Kg 0.40U ug/Kg | А | bf |
| R0905464 | SA205-0.5B | Toluene | 0.38U ug/Kg | А | bf |
| R0905464 | SA205-25B | Acetone | 3.2U ug/Kg | А | bf |
| R0905464 | SA84-25B | Acetone | 4.4U ug/Kg | А | bf |
| R0905464 | SA101-0.5B | Acetone | 4.7U ug/Kg | А | bf |
| R0905464 | SA101-42B | Acetone | 3.3U ug/Kg | А | bf |
| R0905464 | SA121-0.5B | Toluene | 0.57U ug/Kg | Α | bf |

| SDG | Sample | Compound | Modified Final Concentration | A or P | Code |
|----------|-----------|----------|---------------------------------|--------|------|
| R0905464 | SA121-44B | Toluene | 0.56U ug/Kg | Α | bf |

Tronox Northgate Henderson

| LDC #: | 21991N1 | VALIDATION COMPLETENESS WORKSHEET |
|----------|------------------------|--|
| SDG#:_ | R0905464 | Stage 2B |
| Laborato | ry: Columbia Analytica | al Services |

| Date: 13/62/0 | 9 |
|---------------|---|
| Page: _of | |
| Reviewer: | / |
| 2nd Reviewer: | |

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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

| | Validation Area | | Commen | ts |
|-------|--|-----|--|--------------------------|
| l. | Technical holding times | A | Sampling dates: 9/24 - 25 /09 | |
| II. | GC/MS Instrument performance check | . A | | |
| 111. | Initial calibration | ZW | 2 KSD m | |
| IV. | Continuing calibration/ICV | ZW. | COV = 25 b | |
| V. | Blanks | SM | | |
| VI. | Surrogate spikes | SW | | |
| VII. | Matrix spike/Matrix spike duplicates | SW | | |
| VIII. | Laboratory control samples | SW | LCS | |
| IX. | Regional Quality Assurance and Quality Control | N | | |
| Χ. | Internal standards | WZ | | |
| XI. | Target compound identification | N | | |
| XII. | Compound quantitation/CRQLs | 2 | | |
| XIII. | Tentatively identified compounds (TICs) | N | | |
| XIV. | System performance | N | | |
| XV. | Overall assessment of data | SM | | |
| XVI. | Field duplicates | SW | $D_1 = 6.7$ $D_2 :$ | = 17,18 |
| XVII. | Field blanks | SW) | $V_1 = 6.7$ $V_2 = 10.25,26.27$ $EB = 11.25$ | ,12 FB = FB072909-50 (M. |

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

| Validat | ted Samples: | soil | + l | Vater | | | | | | | |
|------------|---------------------|------|-------------|------------------------------|---|-----------|----------------|---|------------------|-----------|---------|
| 1 2 | SA205-0.5B | 2 | 11 3 | EB092509-SO1A2 | W | 21 | SA121-25BDL RF | S | 31 | 173080-MB | (1910) |
| 2 | SA205-10B | | 12 | EB092509-SO2A4 | | 22 22 | SA121-44B | | 32 Y | [7319]- | 9453) |
| 3 2 | SA205-25B | | 13 | SA101-0.5B | S | 23 \$ | SA208-0.5B | | - 33 3 | 173360- | (14 60) |
| 4 | SA205-41B | | 14 | SA101-10B | | 24 24 | SA208-7B | | 34 4 | 173307- | 9500) |
| 5 f | SA84-0.5B | | 15 4 | SA101-25B | | + 3 25 | TB092509-SO1 | W | - 35 5 | 173430- | 15397 |
| 6 | SA84-10B <i>D</i> , | | 16 | SA101-42B | | 26 | TB092509-SO2 | 1 | 366 | 174051- | (827) |
| 7 7 | SA84009-10B D | , | 17 | SA121-0.5B | | 57 1 | TB092509-SO3 | | 37 | | |
| 8 4 | SA84-25B | | 18 18 | SA121009-0.5B D _Y | | 28 4 | SA101-0.5BMS | ς | 38 | | |
| 9 * | SA84-43B | | 19 | SA121-10B | | 29 | SA101-0.5BMSD | | 39 | | |
| 10 3 | TB092409-SO1 | W | 20 20 | SA121-25B | V | 30 | | | 40 | · · · | |

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

| A Chlomethane* | U. 1.1.2-Trichloroethane | OO. 2.2-Dichloropropane | W. n.Butubonzene | CCCC.1-Chlorohexane |
|------------------------------|---------------------------------|-------------------------------|--|---------------------------|
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | J.J. 1,2-Denomberizor® | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachiorbutedoan | FFFF, Acrolein |
| E. Methylene Chonde | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MAMA. Nephistolong | GGGG. Acrycontrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlendennage | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | 000. 1,3,5-Trichlorobenzene | IIII. 1sobutyl alcohol |
| H. 1,1-Dichloroethene** | 86: 1,1,2,2 Tetralchioroethane | W. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluena** | WW: Bransbergere | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX 1.2.3-Trichlaropropage | RRR. m.p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzane** | Yis wentyberzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. Schlantokenę | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. 2-Methyl-2-propanol |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5.Fismelly/benzene | UUU. 1,2-Dichlorotetrafluoroethane | 0000. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. Adhterotatione | VVV. 4-Ethyltoluene | рррр. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | GEST COMPLYABORISONS | WWW. Ethanol | 0000 . |
| P. Bromodichioromethane | JJ. Dichlorodifluoromethane | DBB: 4,8,4-Trimethylbenzese | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE weethyberzens » | YYY. tert-Butanol | SSSS. |
| R. da-1,3-Dichloropropene | LL. Methy-tert-butyf ether | FPP. sparacherocenzent | ZZZ. tert-Butyl alcohol | TITT. |
| S. Trichloroethene | MM. 1,2-Dibremo-Gefforoproperfe | GGO:sprincepytokana. | AAAA. Ethyl tert-butyl ether | ບບບບ. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHM: 1,4-Statemate nzene | BBBB. tert-Amyl methyl ether | ww. |
| | | | | |

^{* =} System performance check compounds (SPCC) for RRF; ** = Calibration check compounds (CCC) for %RSD.

PFB

4 DCB

| N / 86 / 2 | なるぞ |
|------------|------|
| DC #: " | DG#: |

;DG #:

VALIDATION FINDINGS WORNSHEET **Initial Calibration**



METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Did the laboratory perform a 5 point calibration prior to sample analysis? Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? Was a curve fit used for evaluation? $\frac{\Gamma^2 - 20}{10}$.

Did the initial calibration meet the acceptance criteria?

| ſ | | U | VI | Ī | T | | | | | | | | | 1 | | | | T | \Box | _ |
|---|-------------------------------|-----------------------|---------------|---|---|---|-----|---------|----|----------|---|--|---|-------------|----------|---|--------------|---|----------|---|
| | | 5/45/A | | | | | | | | | | | | | | | | | | |
| | Associated Samples | All water + 172080-MB | 173360-MB | | | | | | | | | | | | | | | | | |
| \SD and ≥0.05 RRF? | Finding RRF (Limit: >0.05) | 0.028 | | | | | | | | | | | | | | | | | | |
| on criteria of ≤30 %F | Finding %RSD (Limit: <30.0%) | | | | | | | | | | | | | | | | | | | |
| Res within the validati | Compound | 77 72 | | | | | | | | | | | | | | | | | | |
| Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? | Standard ID | ICA1 | | | | | | | | | | | | | | | | | | |
| Y N'NA V | <u>و</u> | 9/18/6 | 1 / 2 / 2 / 2 | | | | | | | | | | | | | | | | | |
| × | * | : | | 1 | | _ | . 1 | \perp | 1_ | <u> </u> | _ | | _ | <u></u> | <u> </u> | _ | <u> </u> | | <u>L</u> | 1 |

LDC #: 21491 N) SDG #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: __of_ Reviewer:_ 2nd Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of <25 %D and >0.05 RRF?

N N N X/N N/A

| * | Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications | |
|----------|----------|-------------|----------|-------------------------------|-------------------------------|---------------------|----------------|--------|
| | 10/5/06 | 1 190 | N N N | | 0.027 | PM-080671 72 35 | 3/NJ A (C. | |
| | 1 2/2/2 | | | | | l | | |
| | | | | | | | | |
| | 10/65/69 | C 1217 | (S) 4 | 25.3 | | 10-12,25 173360-118 | 18 J-145A | |
| | ,,,,,, | | Z (Z) | 6.92 | | | ſ | |
| | | | マススこ | | 0,024 | _ | J/113 A | |
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| | | | | 7 | | | | |
| | 10/04/09 | H1330 | F (-) | 28,2 | | 1-3 173191-M& | J-/45 A | 1 |
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| | 10/05/01 | 41369 | (+) ¥ | 5'58 | | 4-9 13-17 28 29. | 3+ 10ts A | \Box |
| | | | (-) XX | 9:52 | | 172307 - MB | J-145A | |
| | | | (3000 | 27,3 | | | | \Box |
| | , | | (-) WW | 28.7 | | | | I |
| <u> </u> | | | (-) 111 | 33.X | | | | |
| | | | C-J MWW | 1.7. | | | | |
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| | 10/06/09 | H 1403 | (-) 717 | 35,2 | | 18-20 22-24 | コーカコイ | 7 |
| | | | | | | 173420-MB | | 耳 |
| | | | | | | | | 7 |
| | · | | | Ī | | ı | | Ţ |
| | 10/09/01 | H 1504 | (5) 777 | 21.0 | | 21 174051-MB | J-/12/7 | 7 |
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LDC #: 2141 N)

SDG #:

VALIDATION FINDINGS WORKSHEET

Blanks

Reviewer:_ 2nd Reviewer.

| _ |
|--------|
| 8260B |
| Method |
| 846 |
| S |
| (EPA |
| VOA |
| GC/MS |
| ETHOD: |

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was a method blank associated with every sample in this SDG? Y N/A

Was a method blank analyzed at least once every 12 hours for each matrix and concentration? Was there contamination in the method blanks? If yes, please see the qualifications below. Y/N N/A

Blank analysis date:_ V N N/A

Conc. units:

7 Associated Samples:

| | = | | , | _ | _ | , : - | | - |
|-----------------------|----------------|-----------|-------|---|---|------------------|------|---------------|
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| ration | cation | | | | | | | |
| Sample Identification | ample Identili | | | | | | | |
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| | | | | | | | | |
| | | /د | 1.8/y | | | | | |
| Blank ID | | 174051-MB | 1.6 | | | | : | |
| punc | | | m | | | | | |
| Compound | | | | | | | | |

Blank analysis date: Conc. units:

Associated Samples:

| | | 1 | T - | 1 | T- | T | - | 1 | _ |
|---------------------|-----------------------|---|----------------|-------|----|---|--------------|---|---|
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| | n. | | | | | | | | |
| | Sample Identification | | | | | | | | |
| | San | | | | | | | | |
| Associated Samples. | | | | | | | | | |
| Asso | | | | | | | | | |
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| | Blank ID | | | | | | | | |
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| | Compound | | | | | | | | |
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LDC #: 2/991 N)

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 1 of 3 Reviewer: 176 2nd Reviewer:__

-19

Associated Samples:

| Sample Identification | | | s either No 17 2 TB) | | | | "9 /kg $^{\prime\prime}$ Associated Samples: $(2-32)$ | | | | | | |
|-----------------------|---------------|-------|----------------------|--|--|--|--|-------------|---------------|------|----------|--|--|
| | | h/ | 7 | | | | ; "3/kg pk/ Other: | | 4 | | | | |
| Blank ID | 3 | M/2,8 | (All others | | | | ug / L ole units: / Rinsate (Trip Bla | Blank ID 27 | | 0.92 | | | |
| Blank ID 10 | 9/24/69 | 1.7 | | | | | Associated sample units: e one) Field Blank / Rinsate | Blank ID 25 | 4/25/64- | 3.4 | - 6 | | |
| Compound | Sampling Date | 4 | | | | | Blank units: 4 Associated sample units: Field blank type: (circle one) Field Blank / Rinsate (Trip Blank) Other: | Compound | Sampling Date | × | \ | | |

LDC # 21 591 N) SDG #:__

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: Yof 3 Reviewer: W 2nd Reviewer:_

> Associated Samples: t B More target compounds detected in the field blanks?
>
> Associated sample units: 45 / kg
>
> Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other. METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
>
> Y N /N/A Were field blanks identified in this SDG? Y N /N/A

44

23

| | Compound | Blank ID 11 | Blank ID | | | | Sample Id | Sample Identification | | | |
|---|--|-------------------------------|----------------|---------------------------|---------|----------------|---------------------------|-----------------------|-----------|----|------|
| | Sampling Date | 9/25/09 | | 24 | | | | | | | |
| + | 4 | 3,7 | | 6.6 /4 | | | | | | | |
| 7 | ¥ | 0.26 | | , | | | | | | | |
| | | | | | | | | | | | |
| | | | 3 | CAIl others | either | either No nr > | FB) | | | | |
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| | | | | | | | | | | | |
| | Blank units: $40/L$ Associated sample units: $45/E_S$ Field Blank / Rinsate / Trip Blank / Other: EB | ociated samp) Field Blank | ole units: M./ | 5 /كـخ rip Blank / Oth | ier. EB | Assoc | Associated Samples:_ | 1 1 | 1-9 13-22 | 9) | (be) |
| | Compound | Riant ID 12 | \ | | | | is a filter of a few of o | 9 | | | |

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| | | 1.8 | 8.3/4 | | | | | | |
| | | 16 | 3,3/4 | | | | | | |
| | entification | (3 | 47/4 | | | | | | |
| | Sample Identification | 8 | 4,2/4 4,2/4 3,3/4 8,3/4 | | | | | | |
| | | S | h/8.9 | | 7 53 | | | | |
| | | 4 | 4/8.9 WET W | | with No m > EB) | | | | |
| | | 3 | 3,2/4 | | | | | | |
| | Blankto |) | 5,1/4 | - | (All others | | | | - |
| | Blank ID 12 | 9/25/09 | 4.3 | 0,23 | | | | | |
| | Compound | Sampling Date 9/25/69 | 1 | K | | | | | |
| _ | | | 19 | | | | | | |

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|---------|--------|
| FDC #: | SDG #: |

VALIDATION FINDINGS WORKSHEET Field Blanks

Reviewer: T/C Page: 2nd Reviewer._

METHOD: GC/MS VOA (EPA SW. 846 Method 8260B)

Y N /N/A

Were field blanks identified in this SDG?

Y N N/A

Were target compounds detected in the field blanks?

Blank units:

Associated sample units:

Associated sample units:

Field blank type: (circle one) field Blank | Other:

23,24

| щ | Field blank type: (circle one) Field Blank/ Rinsate / Trip Blank | Field Blank | y Rinsate / Tr | ip Blank / Other: | ner: | Assoc | Associated Samples: | | , , | - | |
|----------|--|---|----------------|-----------------------------|--------|-------|---------------------|-----------------------|---------|---------------|--|
| | Compound | FS072909-10 Blank ID Blank ID | o Blank ID | | | | Sample Id | Sample Identification | | | |
| لتنسب | Sampling Date | 7/29/69 | | 24 | | | | | | | |
| <u> </u> | 4 | 3,5 | | 6.6 /y | | | | | | | |
| | tt. | 0.30 | | | | | | | | | |
| ~ | 22 | 0,44 | | W.40/V | | | | | | | |
| | | | | | | | | | | | |
| | | | CAII | e there | either | ND or | > FB) | | | | |
| | | | | | | | | | | | |
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| | | | | | | : | | | | | |
| | | | | | | | | | | | |
| | Blank units: Mg/L Assone Field blank type: (circle one | Associated sample units: e one)(Field Blank) Rinsate | ple units: "V | سم الحج Trip Blank / Otl | ner: | Assoc | Associated Samples: | 1-9, | 13-22 | (<i>t</i> 9) | |
| <u> </u> | Compound FA 08 03 04 - SO Blank ID Blank ID | FA 08 03 04-5 Blank ID | 0 Blapk-to | | | | Sample Id | Sample Identification | | | |
| | Sampling Date | 6/63/8 | | 3 | 8 | 13 | 91 | 17 | 22 | | |
| ٦. | 11_ | 2.1 | | 3.2/4 | 4.4 /4 | 4.7/4 | 3.3/4 | | | | |
| ی | . 35 | 0,30 | h/ 8¢'a | | | | | 0,57 /y | P. 52/4 | | |
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SDG #: CA CAN LDC #: 31 491 N

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: of Reviewer: 2nd Reviewer.

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". XANANA. Were all surrogate %R within QC limits?

N/A

If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of

| # Data Sample ID | Surrogate | | | |
|------------------|-----------|------------|----------|----------------|
| 30 | 019 | SIGN TO SE | 1 | Qualifications |
| | ATB | 63 (70 | (70-130) | 1-121 A12-1 |
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SMC1 (TOL) = Toluene-d8 SMC2 (BFB) = Bromofluorobenzene SMC3 (DCE) = 1,2-Dichloroethane-d4 SMC4 (DFM) = Dibromofluoromethane

QC Limits (Water)

81-117 74-121 80-120 80-120

QC Limits (Soil)

88-110 86-115 80-120 86-118

SIID 1CB

See Cont 21991 NJ LDC #:_ SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates



METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

You may be a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated

MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix? N N/A

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| F | - | | | | L | 10-00 | _ | | | |
|---|------|--------------------|----------|-------------------|------------------|--------------------|----------|--------------|--------------------|----------------|
| # | Date | MS/MSD ID | Compound | MS %R (Limits) | | MSD %R (Limits) | | RPD (Limits) | Associated Samples | Qualifications |
| | | 28/29 | li l | compounds | name | ľ | | RPD () | 3 | No gual |
| | | | \sim | ontride limits b | but e | | dsW/ | or LCS in | | <i>5</i> |
| | | | | | attaghed | d sammary | (m | () | | |
| | | | 717 | 38 (70-130 | (01 | 40 (20-130) | (a. | () | _ | 5-Ms A (m) |
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| | | | | |) [|) | | () | | |
| | | Compound | puno | Ö | QC Limits (Soil) | (Soil) | | RPD (Soil) | QC Limits (Water) | RPD (Water) |
| | I | 1,1-Dichloroethene | | | 59-172% | % | | < 22% | 61-145% | < 14% |
| Ç | S. | Trichloroethene | | | 62-137% | % | | < 24% | 71-120% | < 14% |
| 1 | V. | Benzene | | | 66-142% | % | | < 21% | 76-127% | < 11% |
| Ö | CC. | Toluene | | | 59-139% | % | | < 21% | 76-125% | < 13% |
| ٥ | DD. | Chlorobenzene | į | | 60-133% | % | | < 21% | 75-130% | < 13% |

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905464
Date Collected: 9/25/09
Date Received: 9/26/09

Date Analyzed: 10/5/09 - 10/6/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA101-0.5B

Lab Code:

R0905464-013

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Aatrix Spike Q0909500-0: | | | | ate Matrix Q0909500-0 | | | % Rec | | RPD |
|----------------------------------|--------|--------|------------------------------------|------------|---|--------|--------------------------|------|---|----------|-----------|-------|
| Analyte Name | Result | Result | Amount | % Rec | : | Result | Amount | % Re | С | Limits | RPD | Limit |
| 1,1,2-Tetrachloroethane | ND | 39.3 | 55.9 | 70 | | 38.7 | 55.9 | 69 | 4 | 70 - 130 | 1 | 30 |
| 1,1,1-Trichloroethane (TCA) | ND | 52.2 | 55.9 | 94 | | 50.6 | 55.9 | 91 | | 70 - 130 | 3 | 30 |
| 1,1,2,2-Tetrachloroethane | ND | 40.2 | 5 5 .9 | 72 | | 39.6 | 55.9 | 71 | | 70 - 130 | 1 | 30 |
| 1,1,2-Trichloroethane | ND | 43.4 | 55.9 | 78 | | 44.0 | 55.9 | 79 | | 70 - 130 | 1 | 30 |
| 1,1-Dichloroethane (1,1-DCA) | ND | 49.4 | 55.9 | 88 | | 48.9 | 55.9 ' | 88 | | 70 - 130 | ì | 30 |
| 1,1-Dichloroethene (1,1-DCE) | ND | 47.0 | 55.9 | 84 | | 44.6 | 55.9 | 80 | | 70 - 130 | 5 | 30 |
| 1,1-Dichloropropene | ND | 46.0 | 55.9 | 82 | | 47.1 | 55.9 | 84 | | 70 - 130 | 2 | 30 |
| 1,2,3-Trichlorobenzene | ND | 28.5 | 55.9 | 51 | * | 30.4 | 55.9 | 54 | * | 70 - 130 | 7 | 30 |
| 1,2,3-Trichloropropane | ND | 38.5 | 55.9 | 69 | * | 40.4 | 55.9 | 72 | | 70 - 130 | 5 | 30 |
| 1,2,4-Trichlorobenzene | ND | 27.9 | 55.9 | 50 | * | 30.0 | 55.9 | 54 | * | 70 - 130 | 7 | 30 |
| 1,2,4-Trimethylbenzene | ND | 30.2 | 55.9 | 54 | * | 31.1 | 55,9 | 56 | | 70 - 130 | 3 | 30 |
| 1,2-Dibromo-3-chloropropane (DBC | ND | 38.2 | 55.9 | 68 | | 38.9 | 55.9 | 70 | | 50 - 150 | 2 | 30 |
| 1,2-Dibromoethane | ND | 43.6 | 55.9 | 78 | | 43.0 | 55.9 | 77 | | 70 - 130 | 1 | 30 |
| 1,2-Dichlorobenzene | ND | 32.1 | 55.9 | 58 | * | 34,4 | 55.9 | 62 | * | 70 - 130 | $\hat{7}$ | 30 |
| 1,2-Dichloroethane | ND | 47.7 | 55.9 | 85 | | 48.0 | 55.9 | 86 | | 70 - 130 | i | 30 |
| 1,2-Dichloropropane | ND | 46.9 | 55.9 | 84 | | 48.1 | 55.9 | 86 | | 70 - 130 | 2 | 30 |
| 1,3,5-Trimethylbenzene | ND | 30.3 | 55.9 | 54 | * | 31.3 | 55.9 | 56 | * | 70 - 130 | 3 | 30 |
| 1,3-Dichlorobenzene | ND | 30.5 | 55.9 | 55 | * | 31.8 | 55.9 | 57 | | 70 - 130 | 4 | 30 |
| 1,3-Dichloropropane | ND | 42.9 | 55.9 | 77 | | 43.9 | 55.9 | 79 | | 70 - 130 | 2 | 30 |
| 1,4-Dichlorobenzene | ND | 31.4 | 55.9 | 56 | * | 32.3 | 55.9 | 58 | * | 70 - 130 | 3 | 30 |
| 2,2-Dichloropropane | ND | 51.6 | 55.9 | 92 | | 46.5 | 55.9 | 83 | | 70 - 130 | 10 | 30 |
| 2-Butanone (MEK) | 1.0 | 57.5 | 55.9 | 101 | | 51.7 | 55.9 | 91 | | 50 - 150 | 11 | 30 |
| 2-Chlorotoluene | ND | 31.8 | 55.9 | 57 | * | 35,4 | 55.9 | 63 | * | 70 - 130 | 11 | 30 |
| 2-Hexanone | ND | 42.9 | 55,9 | 7 7 | | 44.8 | 55.9 | 80 | | 70 - 130 | 4 | 30 |
| 2-Methyl-2-propanol | ND | 1110 | 1120 | 99 | | 988 | 1120 | 88 | | 50 - 150 | 11 | 30 |
| 4-Chlorotoluene | ND | 31.9 | 55.9 | 57 | * | 33.4 | 55.9 | 60 | * | 70 - 130 | 5 | 30 |
| 4-Isopropyltoluene | ND | 28.3 | 55.9 | 51 | * | 29.2 | 55.9 | 52 | | 70 - 130 | 3 | 30 |
| 4-Methyl-2-pentanone | ND | 44.4 | 55.9 | 80 | | 46.4 | 55.9 | 83 | | 70 - 130 | 4 | 30 |
| Acetone | 4.7 | 74.6 | 55.9 | 125 | | 88.3 | 55.9 | 150 | | 50 - 150 | 17 | 30 |
| Benzene | ND | 42.4 | 55.9 | 76 | | 44.0 | 55,9 | 79 | | 70 - 130 | 4 | 30 |
| Bromobenzene | ND | 34.0 | 55.9 | 61 | * | 35.6 | 55.9 | 64 | * | 70 - 130 | 5 | 30 |
| Bromochloromethane | ND | 42.5 | 55.9 | 76 | | 45.0 | 55.9 | 81 | | 70 - 130 | 6 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0905464 Date Collected: 9/25/09 Date Received: 9/26/09 Date Analyzed: 10/5/09 -

10/6/09

Matrix Spike Summary Volatile Organic Compounds by GC/MS

Sample Name:

SA101-0.5B

Lab Code:

R0905464-013

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | Iatrix Spike Q0909500-0: | | | | ate Matrix (| | % Rec | | RPD |
|----------------------------------|--------|--------|-----------------------------|-------|---|--------|--------------|-------|--------------------------|-------|----------|
| Analyte Name | Result | Result | Amount | % Rec | | Result | Amount | % Rec | Limits | RPD | Limit |
| Bromodichloromethane | ND | 45.8 | 55.9 | 82 | | 47.2 | 55.9 | 84 | 70 - 130 | 3 | 30 |
| Bromoform | ND | 43.0 | 55.9 | 77 | | 44.6 | 55.9 | 80 | 70 - 130 | 4 | 30 |
| Bromomethane | ND | 8.75 | 55.9 | 16 | * | 36.3 | 55,9 | 65 | 50 - 150 | 122 3 | |
| Carbon Tetrachloride | ND | 51,4 | 55.9 | 92 | | 50.6 | 55.9 | 91 | 70 - 130 | 2 | 30 |
| Chlorobenzene | ND | 37.0 | 55.9 | 66 | * | 38.6 | 55.9 | | * 70 - 130 | 4 | 30 |
| Chloroethane | ND | 40.5 | 55.9 | 73 | | 40.5 | 55.9 | 72 | 70 - 130 | 0 | 30 |
| Chloroform | ND | 50.5 | 55.9 | 90 | | 50.4 | 55.9 | 90 | 70 - 130 | Ö | 30 |
| Chloromethane | ND | 56.8 | 55.9 | 102 | | 44.9 | 55.9 | 80 | 70 - 130 | 23 | 30 |
| Dibromochloromethane | ND | 42.1 | 55.9 | 75 | | 44.5 | 55.9 | 80 | 70 - 130 | 6 | 30 |
| Dibromomethane | ND | 43.6 | 55.9 | 78 | | 45.2 | 55.9 | 81 | 70 - 130 | 3 | 30 |
| Dichlorodifluoromethane (CFC 12) | ND | 37.3 | 55.9 | 67 | * | 35.3 | 55.9 | | * 70 - 130 | 5 | 30 |
| Dichloromethane | 0.48 | 46.6 | 55.9 | 83 | | 45.4 | 55.9 | 80 | 70 - 130 | 3 | 30 |
| Diisopropyl Ether | ND | 55.3 | 55.9 | 99 | | 53.7 | 55.9 | 96 | 70 - 130 | 3 | 30 |
| Ethyl tert-Butyl Ether | ND | 56.3 | 55.9 | 101 | | 56.5 | 55.9 | 101 | 70 - 130 | 0 | 30 |
| Ethylbenzene | ND | 38.5 | 55.9 | 69 | * | 37.1 | 55.9 | | * 70 - 130 | 4 | 30 |
| Hexachlorobutadiene | ND | 21.3 | 55.9 | 38 | * | 22.3 | 55.9 | | * 70 - 130 | 5 | 30 |
| Isopropylbenzene (Cumene) | ND | 38.6 | 55.9 | 69 | * | 38,3 | 55.9 | | * 70 - 130 | 1 | 30 |
| Methyl tert-Butyl Ether | ND | 49.8 | 55.9 | 89 | | 47.6 | 55.9 | 85 | 70 - 130 | 5 | 30 |
| Naphthalene | ND | 33.9 | 55.9 | 61 | | 36.4 | 55.9 | 65 | 50 - 150 | 7 | 30 |
| Styrene | ND | 40.2 | 55.9 | 72 | | 40.1 | 55.9 | 72 | 70 - 130 | 0 | 30 |
| Tetrachloroethene (PCE) | ND | 40.4 | 55.9 | 72 | | 39.2 | 55.9 | 70 | 70 - 130 | 3 | 30 |
| Toluene | 0.51 | 40.1 | 55.9 | 71 | | 40.2 | 55.9 | 71 | 70 - 130 70 - 130 | 0 | 30 |
| Trichloroethene (TCE) | ND | 45.9 | 55.9 | 82 | | 46.7 | 55.9 | 84 | 70 - 130 | 2 | 30 |
| Trichlorofluoromethane (CFC 11) | ND | 49.4 | 55.9 | 88 | | 48.5 | 55.9 | 87 | 70 - 130 | 2 | 30 |
| Vinyl Chloride | ND | 46.8 | 55.9 | 84 | | 39.4 | 55.9 | 71 | 70 - 130 | 17 | 30 |
| cis-1,2-Dichloroethene | ND | 46.1 | 55.9 | 82 | | 45.4 | 55.9 | 81 | 70 - 130 70 - 130 | 17 | 30 |
| cis-1,3-Dichloropropene | ND | 46.4 | 55,9 | 83 | | 46.7 | 55.9 | 84 | 70 - 130 | 1 | 30 |
| m,p-Xylenes | ND | 73.5 | 112 | | * | 71.5 | 112 | | * 70 - 130 * 70 - 130 | 3 | 30 |
| n-Butylbenzene | ND | 25.6 | 55.9 | | * | 26.7 | 55.9 | | * 70 - 130 * 70 - 130 | 4 | 30 |
| n-Propylbenzene | ND | 31.1 | 55.9 | | * | 32.3 | 55.9 | | * 70 - 130 * 70 - 130 | 4 | 30 |
| o-Xylene | ND | 36.7 | 55.9 | | * | 38.1 | 55.9 | | * 70 - 130 * 70 - 130 | 4 | 30 |
| sec-Butylbenzene | ND | 30,6 | 55.9 | | * | 31.8 | 55.9 | | * 70 - 130 | 4 | 30 30 |
| tert-Amyl Methyl Ether | ND | 53.0 | 55.9 | 95 | | 50.1 | 55.9 | 90 | 70 - 130 | 6 | 30 |

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Project: Northgate Environmental

Sample Matrix:

Tronox LLC Henderson/2027.001

Soil

Service Request: R0905464
Date Collected: 9/25/09

Date Received: 9/26/09
Date Analyzed: 10/5/09 -

10/6/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: Lab Code: SA101-0.5B

R0905464-013

Units: µg/Kg Basis: Dry

Analytical Method: 8260B

| | Sample | | I <mark>atrix Spi</mark> ke Q0909500-0: | | - | ate Matrix Q0909500-0 | - | % Rec | | RPD |
|---------------------------|--------|--------|--|-------|--------|--------------------------|-------|-----------------|-----|-------|
| Analyte Name | Result | Result | Amount | % Rec | Result | Amount | % Rec | Limits | RPD | Limit |
| tert-Butylbenzene | ND | 30.1 | 55.9 | 54 * | 30.5 | 55.9 | 55 | * 70 - 130 | 1 | 30 |
| trans-1,2-Dichloroethene | ND | 45.0 | 55.9 | 81 | 42.6 | 55.9 | 76 | 70 - 130 | 6 | 30 |
| trans-1,3-Dichloropropene | ND | 41.9 | 55.9 | 75 | 43.4 | 55.9 | 78 | 70 - 130 | 3 | 30 |

| Comments: | |
|-----------|--|
| | |

LDC #: 21 441 N)

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of 1 2nd Reviewer: _ Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Was a LCS required? Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

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| • | Cl | , | | 7 | | | (\mathcal{I}) | | | | (MS/Ms. | (1) | \ | | (1) | | | | | | | | | |
| Qualifications | 5-145 | | | 7 | | | J+dets/F | | | | No sure (| _ ~ | | | J+ dcts/2 | - | | | | | | | | |
| slated Samples | 3 173191-MB | | | → | , | | 25. 17 3960-MB | | | | 13-17 170 307MB | , 1 | | | 174051-MB | | | | | | | | | |
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| res/resp ib | 173191-165 | | | | | | 827-0948 21 | | | | 173207- VCS | | | | 174051- LCS | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | | | | | | | | , | |
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VALIDATION FINDINGS WORKSHEET

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METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

SDG #:_

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

Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

| 75 | Date | Sample ID | Internal Standard | Area (Limits) | RT (I imits) | Oualifications |
|----|------|-----------|----------------------|-----------------|-----------------|---------------------------------------|
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(BCM) = Bromochloromethane (DFB) = 1,4-Difluorobenzene (CBZ) = Chlorobenzene-d5

(FBZ) = Fluorobenzene

V(PFB) = Pentafluorobenzene V(4DCB) = 1,4-Dichlorobenzene-d4 (₹DCB) = 17€-Dichlorobenzene-d4

LDC#: 21991 W) SDG#: See Gran

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: 1 of A Reviewer: N/6 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

V) N N/A Was the overall quality and usability of the data acceptable?

| # | Date | Sample ID | Finding | Associated Samples | Qualifications | |
|---|-----------|-----------|------------------|--------------------|----------------|-----|
| | | 26 | IS & Sur ontside | limits | | (s) |
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| LDC #: | 2/90/ | _N / |
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VALIDATION FINDINGS WORKSHEET Field Duplicates

| Page:_ | |
|---------------|------|
| Reviewer: | JV6_ |
| 2nd reviewer: | |

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

| Y | N | N/A |
|----------------|---|-----|
| \overline{Y} | Ŋ | N/A |
| | | |

Were field duplicate pairs identified in this SDG?

Were target compounds detected in the field duplicate pairs?

| | Concentration (45 /kg) | | Pare |
|----------|-------------------------|-----|---------------|
| Compound | 6 | 7 | RPD |
| M | 12 11 | 1.5 | 105 (E D) - |
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| | Concentration (45/5) | | | Paren |
|----------|-----------------------|-------|---------------|-------|
| Compound | 17 | 18 | RPD | ny |
| M | 0.91 | 1.6 | 0.69 (= 11 0) | |
| E | 0,34 | 5,6 U | 5.26(45,60) | |
| CC | 0,57 | 0.66 | 0.09 | _ |
| F | 18 V | 8.3 | 9.7 (= 18D) | _ |
| | ' | | | |

| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
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| | Concentration () | |
|----------|-------------------|-----|
| Compound | | RPD |
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