LABORATORY DATA CONSULTANTS, INC.
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Technical Memorandum

Date: April, 28 2005

To: John J. Shao
The Boeing Company
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Canoga Park, CA 91309-7922
(Via: E-mail)
john.j.shao@boeing.com

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Subject: **Data Validation Implementation Plan for the Groundwater Sampling Activities at the Boeing Realty Corporation (BRC) Former C-6 Facility, Torrance, California.**

This technical memorandum describes the procedure and steps to perform data validation for the laboratory data collected as a result of sampling at the BRC Former C-6 Facility, Torrance, California. The purpose of this plan is to provide a standardized guidance document for all groundwater sampling data validation requirements.

1.0 DATA VALIDATION AND USABILITY

This section describes the procedures used to review, verify, and validate field and laboratory data collected.

1.1 Data Review, Verification, and Validation

Data generated during this project will be evaluated for usability and compliance with the data quality objectives outline in this document. Data will be reviewed, verified, and validated as specified in this section.

1.1.1 Data Review and Verification

Upon receipt, all field data will be reviewed by the contractor project manager to determine consistency with project data quality objectives (DQOs) and completeness. Laboratory data will be subjected to two levels of review within the laboratory, the chemist and the supervisor. A chemistry supervisory level review will be completed to verify analyte identification, quantitation, and QC data. Evidence of that review will be maintained in the form of a checklist outlining method and project requirements.

1.1.2 Data Validation

Following data verification, data validation will be performed. Ten percent of the total data will be subjected to validation. Of the data selected for validation, 55 percent will be subjected to tier 1 validation, 40 percent to tier 2 validations, and 5 percent to tier 3 validations. The 10 percent of the data to be validated will be randomly selected by Tait Environmental Management, Inc. (TAIT). Laboratory Data Consultants, Inc (LDC) will randomly select the data for validation for the three tiers. Data validation will be performed in accordance with USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (October 1999), the CLP National Functional Guidelines for Inorganic Data Review (February 1994), USEPA Region 9 Superfund Data Evaluation/Validation Guidance (December 1991).

For tier 1 data validation, the data values for routine and QC samples are generally assumed to be correctly reported by the laboratory, excluding calibration information. Data quality will be assessed by comparing the QC parameters to the appropriate criteria (or limits) as specified in the method requirements (e.g., CLP, SW-846). If calculations for quantitation are verified, it is done on a limited basis and may require raw data in addition to the standard data summary forms.

Tier 1 review includes:

- Review of chain of custody
- Check for sample holding time violations
- Review of laboratory summary forms for method blank, spike recoveries, surrogate recoveries, detection limits, and case narrative.

For tier 2 data validation, the data values for routine and QC samples are generally assumed to be correctly reported by the laboratory. Data quality will be assessed by comparing the QC parameters to the appropriate criteria (or limits) as specified in the method requirements (e.g., CLP, SW-846). If calculations for quantitation are verified, it is done on a limited basis and may require raw data in addition to the standard data summary forms.

Tier 2 review includes:

- All tier 1 checks
- Check for transcription errors between bench summary and hard copy report
- Check method QA/QC criteria

Tier 3 or full data validation follows the EPA protocols and CLP criteria as set forth in the functional guidelines for evaluating organic and inorganic analyses. These guidelines apply to full validation data packages that include the raw data (e.g., spectrum and chromatograms) and backup documentation for calibration standards, preparation logs, analysis run logs, LCS, dilution factors, and other types of information. This additional information is utilized in the full data validation process for checking calculations for quantified analytical data. Calculations are checked for QC samples (e.g., MS/MSD and LCS data) and routine field samples (including field duplicates, field and equipment rinsate blanks, VOC trip blanks). To assure that detection limit and data values are appropriate, and evaluation is made of instrument performance, method of calibration, and the original data for calibration standards.

Tier 3 review includes:

- All tier 1 and tier 2 checks
- Check for transcription errors between raw data, bench summary, and hard copy report
- Review of raw data

Based on the data validation criteria, data may be assigned the following qualifiers:

- U - Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

- J - Indicates an estimated value.
- R - Quality control indicates the data is not usable.
- N – Presumptive evidence of presence of the constituent.
- UJ - The sample detection limit is an estimated value.

1.1.3 Validation Procedures

1. TAIT randomly selects 10% of the total data to be validated.
2. The laboratory submits the selected data to LDC immediately upon completion of the analyses.
3. LDC randomly determines which data is to undergo tier 1, 2, 3 validations in accordance with USEPA guidelines.
4. LDC then provides a data validation report to Tait Environmental Management.
5. If the data validation identifies any corrective action requiring immediate resolution/corrective action by the laboratory, the LDC will immediately contact the laboratory and Tait Environmental management.

1.1.4 Corrective Action Criteria

The criteria for QA/QC deficiencies that require immediate resolution/corrective action will be determined by LDC and may include the following:

1. Required procedures are not followed and /or reported by the laboratory.
2. Quality control procedures are not followed by the laboratory.
3. Data appears to be reported incorrectly, i.e. discrepancies between the raw data and reported results are observed.
4. Quality control results are consistently outside control limits.

1.2 Reconciliation with User Requirements

The objective of this section is to evaluate the results of the task against the DQOs and requirements of the data users or decision makers. The data quality process can be used to assess whether a decision can be made using the existing data or if additional data must be collected.

Analytical results for this project will be evaluated through the verification and validation steps discussed above and through the use of precision, accuracy, comparability, and completeness (PARCC) parameters. Limitations on the use of the data will be reported to decision makers through validation qualifiers and narratives received from the data validation process.

1.3 Validation Reporting

A report presenting the results of the data validation and verification will be prepared and submitted to BRC as an attachment for the groundwater monitoring report. Two example validation reports are attached for reference.

Attachments
Data validation report examples

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Tait Environmental Management, Inc.
701 N. Park Center Drive
Santa Ana, CA 92705
ATTN: Mr. Matt Hillman

April 19, 2005

SUBJECT: Boeing Realty Corp., Former C-6 Facility, Torrance, CA, Data Validation

Dear Mr. Hillman,

Enclosed are the revised data validation reports for the fraction listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 13309:

SDG #	Fraction
E5C020391, E5C040421, E5C070232	Volatiles

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

Sincerely,

Steven A. Zilliak
Senior Chemist

13309REV.wpd

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Tait Environmental Management, Inc.
701 N. Park Center Drive
Santa Ana, CA 92705
ATTN: Mr. Matt Hillman

April 14, 2005

SUBJECT: Boeing, Bldg. C-6, Data Validation

Dear Mr. Hillman,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on March 24, 2005. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 13309:

SDG #	Fraction
E5C020391, E5C040421, E5C070232	Volatiles

The data validation was performed under Tier 1, Tier 2 and Tier 3 guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998

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

Sincerely,

Steven A. Ziliak
Senior Chemist

13309COV.wpd

Attachment 1

LDC #13309 (Tait Environmenal Management, Inc. / Boeing, Bldg C-6)

LDC	SDG#	DATE REC'D	DATE DUE	VOA (8260B)																															
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	E5C020391	03/24/05	04/14/05	1	0	Tier I																													
B	E5C040421	03/24/05	04/14/05	1	0																														
C	E5C070232	03/24/05	04/14/05	1	0																														
Total	B			3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3

Shaded cells indicate Tier III validation (all other cells are Tier II validation). Sample counts do not include MS, MSD, or DUP's.

13309ST.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Boeing Realty Corp, Former C-6 Facility, Torrance CA

Collection Date: March 2, 2005

LDC Report Date: April 19, 2005

Matrix: Water

Parameters: Volatiles

Validation Level: Tier 1

Laboratory: Severn Trent Laboratories

Sample Delivery Group (SDG): E5C020391

Sample Identification

MWBO19_WG030205_0001

Introduction

This data review covers one water sample 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 a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. 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:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

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 check data were not reviewed for Level II.

III. Initial Calibration

Initial calibration data were not reviewed for Level II.

IV. Continuing Calibration

Continuing calibration data were not reviewed for Level II.

V. Blanks

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

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.

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

Internal standards data were not reviewed for Level II.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

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 have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

XVII. Field Blanks

No field blanks were identified in this SDG.

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Data Qualification Summary - SDG E5C020391

No Sample Data Qualified in this SDG

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Laboratory Blank Data Qualification Summary - SDG E5C020391

No Sample Data Qualified in this SDG

Tait Environmental

Client Sample ID: MWBO19_WG030205_0001

GC/MS Volatiles

Lot-Sample #....: E5C020391-007 **Work Order #...:** G5FDV1AA **Matrix.....:** WG
Date Sampled...: 03/02/05 12:05 **Date Received..:** 03/02/05 17:35
Prep Date.....: 03/04/05 **Analysis Date..:** 03/04/05
Prep Batch #...: 5066534 **Method.....:** SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	ND	50	ug/L
Chloromethane	ND	100	ug/L
Chloroethane	ND	100	ug/L
Bromomethane	ND	100	ug/L
Trichlorofluoromethane	ND	100	ug/L
1,1,2-Trichlorotrifluoro-ethane	ND	50	ug/L
1,1-Dichloroethene	ND	50	ug/L
Methylene chloride	ND	50	ug/L
Methyl tert-butyl ether	ND	50	ug/L
Carbon disulfide	ND	50	ug/L
Acetone	ND	500	ug/L
trans-1,2-Dichloroethene	ND	50	ug/L
1,1-Dichloroethane	ND	50	ug/L
2,2-Dichloropropane	ND	50	ug/L
cis-1,2-Dichloroethene	ND	50	ug/L
Chloroform	**2400**	**50**	**ug/L**
Bromochloromethane	ND	50	ug/L
1,1,1-Trichloroethane	ND	50	ug/L
2-Butanone	ND	250	ug/L
1,1-Dichloropropene	ND	50	ug/L
Carbon tetrachloride	ND	25	ug/L
1,2-Dibromoethane	ND	50	ug/L
Benzene	ND	50	ug/L
Trichloroethene	**110**	**50**	**ug/L**
Bromodichloromethane	ND	50	ug/L
4-Methyl-2-pentanone	ND	250	ug/L
Toluene	ND	50	ug/L
1,1,2-Trichloroethane	ND	50	ug/L
1,2-Dichloroethane	ND	25	ug/L
Tetrachloroethene	**160**	**50**	**ug/L**
2-Hexanone	ND	250	ug/L
Dibromochloromethane	ND	50	ug/L
Chlorobenzene	ND	50	ug/L
1,1,1,2-Tetrachloroethane	ND	50	ug/L
Ethylbenzene	ND	50	ug/L
Vinyl chloride	ND	25	ug/L
Xylenes (total)	ND	50	ug/L
Styrene	ND	50	ug/L
Bromoform	ND	50	ug/L

(Continued on next page)

A 41305

Tait Environmental

Client Sample ID: MWBO19_WG030205_0001

GC/MS Volatiles

Lot-Sample #...: E5C020391-007 **Work Order #...:** G5FDV1AA **Matrix.....:** WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Isopropylbenzene	ND	50	ug/L
1,1,2,2-Tetrachloroethane	ND	50	ug/L
1,2,3-Trichloropropane	ND	50	ug/L
n-Propylbenzene	ND	50	ug/L
Bromobenzene	ND	50	ug/L
1,3,5-Trimethylbenzene	ND	50	ug/L
2-Chlorotoluene	ND	50	ug/L
4-Chlorotoluene	ND	50	ug/L
tert-Butylbenzene	ND	50	ug/L
1,2,4-Trimethylbenzene	ND	50	ug/L
sec-Butylbenzene	ND	50	ug/L
p-Isopropyltoluene	ND	50	ug/L
1,3-Dichlorobenzene	ND	50	ug/L
1,4-Dichlorobenzene	ND	50	ug/L
n-Butylbenzene	ND	50	ug/L
1,2-Dichlorobenzene	ND	50	ug/L
1,2-Dibromo-3-chloro-propane	ND	100	ug/L
1,2,4-Trichloro-benzene	ND	50	ug/L
Hexachlorobutadiene	ND	50	ug/L
1,2,3-Trichlorobenzene	ND	50	ug/L
Acrolein	ND	1000	ug/L
Acrylonitrile	ND	1000	ug/L
Iodomethane	ND	100	ug/L
2-Chloroethyl vinyl ether	ND	250	ug/L
Tetrahydrofuran	ND	500	ug/L
Vinyl acetate	ND	250	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	92	(75 - 130)
1,2-Dichloroethane-d4	83	(65 - 135)
Toluene-d8	105	(80 - 130)

A
41305

LDC #: 13309A1

SDG #: E5C020391

Laboratory: Severn Trent Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Tier 1 (Level II)

Date: 3/30/05

Page: 1 of 1

Reviewer: JG

2nd Reviewer: [illegible]

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 /COC	N	Sampling dates: 3/02/05
II.	GC/MS Instrument performance check	N	
III.	Initial calibration	N	
IV.	Continuing calibration	N	
V.	Blanks	✓	
VI.	Surrogate spikes	✓	
VII.	Matrix spike/Matrix spike duplicates	✓	
VIII.	Laboratory control samples	✓	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	N	
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	✓	
XVI.	Field duplicates	N	
XVII.	Field blanks	✓	

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: Water

1	MWBO19_WG030205_0001	11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Boeing Realty Corp, Former C-6 Facility, Torrance CA

Collection Date: March 4, 2005

LDC Report Date: April 19, 2005

Matrix: Water

Parameters: Volatiles

Validation Level: Tier 2

Laboratory: Severn Trent Laboratories

Sample Delivery Group (SDG): E5C040421

Sample Identification

CMW002_WG030405_0001
CMW002_WG030405_0001MS
CMW002_WG030405_0001MSD

Introduction

This data review covers 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 a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. 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:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

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
3/9/05	Acrolein Acetone Acrylonitrile Tetrahydrofuran 2-Chloroethylvinyl ether	0.02877 (≥0.05) 0.03685 (≥0.05) 0.04065 (≥0.05) 0.04326 (≥0.05) 0.00138 (≥0.05)	All samples in SDG E5C040421	J (all detects) R (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.

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
3/9/05	Acrolein Acetone Acrylonitrile Tetrahydrofuran 2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane	0.02579 (≥0.05) 0.03235 (≥0.05) 0.03814 (≥0.05) 0.03968 (≥0.05) 0.00142 (≥0.05) 0.04930 (≥0.05)	All samples in SDG E5C040421	J (all detects) R (all non-detects)	A

V. Blanks

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

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
CMW002_WG030405_0001MS/MSD (CMW002_WG030405_0001)	Trichloroethene	71 (75-135)	69 (75-135)	-	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
G5XVH1AC	Bromomethane	163 (60-140)	All samples in SDG E5C040421	J (all 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. Compound Quantitation and CRQLs

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 have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

XVII. Field Blanks

No field blanks were identified in this SDG.

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Data Qualification Summary - SDG E5C040421

SDG	Sample	Compound	Flag	A or P	Reason
E5C040421	CMW002_WG030405_0001	Acrolein Acetone Acrylonitrile Tetrahydrofuran 2-Chloroethylvinyl ether	J (all detects) R (all non-detects)	A	Initial calibration (RRF)
E5C040421	CMW002_WG030405_0001	Acrolein Acetone Acrylonitrile Tetrahydrofuran 2-Chloroethylvinyl ether 1,2-Dibromo-3-chloropropane	J (all detects) R (all non-detects)	A	Continuing calibration (RRF)
E5C040421	CMW002_WG030405_0001	Trichloroethene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
E5C040421	CMW002_WG030405_0001	Bromomethane	J (all detects)	P	Laboratory control samples (%R)

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Laboratory Blank Data Qualification Summary - SDG E5C040421

No Sample Data Qualified in this SDG

Tait Environmental

Client Sample ID: CMW002_WG030405_0001

GC/MS Volatiles

Lot-Sample #...: E5C040421-004 **Work Order #...:** G5L0W1AA **Matrix.....:** WG
Date Sampled...: 03/04/05 12:30 **Date Received..:** 03/04/05 15:40
Prep Date.....: 03/09/05 **Analysis Date..:** 03/09/05
Prep Batch #...: 5069291 **Method.....:** SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	ND	200	ug/L
Chloromethane	ND	400	ug/L
Chloroethane	ND	400	ug/L
Bromomethane	ND	400	ug/L
Trichlorofluoromethane	ND	400	ug/L
1,1,2-Trichlorotrifluoro-ethane	ND	200	ug/L
1,1-Dichloroethene	ND	200	ug/L
Methylene chloride	ND	200	ug/L
Methyl tert-butyl ether	ND	200	ug/L
Carbon disulfide	ND	200	ug/L
Acetone	**900 J** J	**2000**	**ug/L**
trans-1,2-Dichloroethene	ND	200	ug/L
1,1-Dichloroethane	ND	200	ug/L
2,2-Dichloropropane	ND	200	ug/L
cis-1,2-Dichloroethene	ND	200	ug/L
Chloroform	ND	200	ug/L
Bromochloromethane	ND	200	ug/L
1,1,1-Trichloroethane	ND	200	ug/L
2-Butanone	ND	1000	ug/L
1,1-Dichloropropene	ND	200	ug/L
Carbon tetrachloride	ND	100	ug/L
1,2-Dibromoethane	ND	200	ug/L
Benzene	ND	200	ug/L
Trichloroethene	**690** J	**200**	**ug/L**
Bromodichloromethane	ND	200	ug/L
4-Methyl-2-pentanone	ND	1000	ug/L
Toluene	ND	200	ug/L
1,1,2-Trichloroethane	ND	200	ug/L
1,2-Dichloroethane	ND	100	ug/L
Tetrachloroethene	ND	200	ug/L
2-Hexanone	ND	1000	ug/L
Dibromochloromethane	ND	200	ug/L
Chlorobenzene	**9700**	**200**	**ug/L**
1,1,1,2-Tetrachloroethane	ND	200	ug/L
Ethylbenzene	ND	200	ug/L
Vinyl chloride	ND	100	ug/L
Xylenes (total)	ND	200	ug/L
Styrene	ND	200	ug/L
Bromoform	ND	200	ug/L

(Continued on next page)

8
4135

Tait Environmental

Client Sample ID: CMW002_WG030405 0001

GC/MS Volatiles

Lot-Sample #...: E5C040421-004 Work Order #...: G5L0W1AA Matrix.....: WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Isopropylbenzene	ND	200	ug/L
1,1,2,2-Tetrachloroethane	ND	200	ug/L
1,2,3-Trichloropropane	ND	200	ug/L
n-Propylbenzene	ND	200	ug/L
Bromobenzene	ND	200	ug/L
1,3,5-Trimethylbenzene	ND	200	ug/L
2-Chlorotoluene	ND	200	ug/L
4-Chlorotoluene	ND	200	ug/L
tert-Butylbenzene	ND	200	ug/L
1,2,4-Trimethylbenzene	ND	200	ug/L
sec-Butylbenzene	ND	200	ug/L
p-Isopropyltoluene	ND	200	ug/L
1,3-Dichlorobenzene	ND	200	ug/L
1,4-Dichlorobenzene	ND	200	ug/L
n-Butylbenzene	ND	200	ug/L
1,2-Dichlorobenzene	ND	200	ug/L
1,2-Dibromo-3-chloro-propane	ND R	400	ug/L
1,2,4-Trichloro-benzene	ND	200	ug/L
Hexachlorobutadiene	ND	200	ug/L
1,2,3-Trichlorobenzene	ND	200	ug/L
Acrolein	ND R	4000	ug/L
Acrylonitrile	ND R	4000	ug/L
Iodomethane	**240 J**	**400**	**ug/L**
2-Chloroethyl vinyl ether	ND R	1000	ug/L
Tetrahydrofuran	ND R	2000	ug/L
Vinyl acetate	ND	1000	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	88	(75 - 130)
1,2-Dichloroethane-d4	100	(65 - 135)
Toluene-d8	101	(80 - 130)

NOTE(S):

J Estimated result. Result is less than RL.

A 41305

LDC #: 13309B1

SDG #: E5C040421

Laboratory: Severn Trent Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Tier 2

Date: 3/30/05

Page: 1 of 1

Reviewer: NG

2nd Reviewer: [illegible]

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: 3/04/05
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	
IV.	Continuing calibration	SW	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	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	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

Validated Samples:

Water

1	CMW002_WG030405_0001	11		21		31	
2	CMW002_WG030405_0001MS	12		22		32	
3	CMW002_WG030405_0001MSD	13		23		33	
4	MB	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		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. 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. Tetrahydrofuran
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM.
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
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-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

BOE-C6-0050034

LDC #: 13309B1
SDG #: ESC04021

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: R

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 Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/09/05	ICAL	FFFF		0.02877	All + blk	J/R/A
			F		0.03685		
			GGGG		0.04064		
			LLLL		0.04326		
			II		0.00138		

INICAL 1SB

LDC #: 13309 B1
SDG #: E5C040421

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260)
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?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A 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
	3/09/05	QS1874	FFFF		0.02579	All + Blk	J/R/A
			F		0.03235		
			GGGG		0.03814		
			LLLL		0.03968		
			II		0.00142		
			MM		0.04930		

BOE-C6-0050036

LDC #: 13309 B1
SDG #: E5C040421

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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.

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

Y N N/A 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
		2/3	S	71 (75-125)	69 (75-125)	( )	#1	J/UJ/A
			DD	0 (75-125)	0 (75-125)	( )	↓	No qual (parent conc >2x spike amount)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

MSD.1SB

LDC #: 13309 B1
SDG #: E5C040421

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JYG
2nd Reviewer: AC

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 LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		G5XV11AC	B	163 (60-140)	( )	( )	All + Blk	J dets /P
			~~H~~	~~112~~ (~~65-135~~)	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LCSLCSD.1SB

BOE-C6-0050038

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Boeing Realty Corp, Former C-6 Facility, Torrance CA

Collection Date: March 7, 2005

LDC Report Date: April 19, 2005

Matrix: Water

Parameters: Volatiles

Validation Level: Tier 3

Laboratory: Severn Trent Laboratories

Sample Delivery Group (SDG): E5C070232

Sample Identification

WCC_4S_WG030705_0001

Introduction

This data review covers one water sample 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 a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. 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:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

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 with the following exceptions:

Date	Compound	%RSD	Associated Samples	Flag	A or P
3/15/05	Dichlorodifluoromethane	30.109	All samples in SDG E5C070232	J (all detects) UJ (all non-detects)	A

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
3/15/05	Acrolein Acetone Acrylonitrile 2-Butanone Tetrahydrofuran 2-Chloroethylvinyl ether	0.01887 (≥0.05) 0.01899 (≥0.05) 0.02611 (≥0.05) 0.03186 (≥0.05) 0.02484 (≥0.05) 0.00069 (≥0.05)	All samples in SDG E5C070232	J (all detects) R (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
3/15/05	Dichlorodifluoromethane Vinyl acetate Tetrahydrofuran 2-Chloroethylvinyl ether 4-Methyl-2-pentanone	29.02384 65.02501 29.90033 26.36261 27.63732	All samples in SDG E5C070232	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
3/15/05	Acrolein Acetone Acrylonitrile 2-Butanone Tetrahydrofuran 2-Chloroethylvinyl ether	0.01630 (≥0.05) 0.01460 (≥0.05) 0.02082 (≥0.05) 0.02436 (≥0.05) 0.01741 (≥0.05) 0.00051 (≥0.05)	All samples in SDG E5C070232	J (all detects) R (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
G6D6L1AA	3/15/05	1,2,4-Trichlorobenzene	0.30 ug/L	All samples in SDG E5C070232

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

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
G6D6L1AC	Bromomethane	156 (60-140)	All samples in SDG E5C070232	J (all 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

All target compound identifications were within validation criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was within validation criteria.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

XVII. Field Blanks

No field blanks were identified in this SDG.

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Data Qualification Summary - SDG E5C070232

SDG	Sample	Compound	Flag	A or P	Reason
E5C070232	WCC_4S_WG030705_0001	Dichlorodifluoromethane	J (all detects) UJ (all non-detects)	A	Initial calibration (%RSD)
E5C070232	WCC_4S_WG030705_0001	Acrolein Acetone Acrylonitrile 2-Butanone Tetrahydrofuran 2-Chloroethylvinyl ether	J (all detects) R (all non-detects)	A	Initial calibration (RRF)
E5C070232	WCC_4S_WG030705_0001	Dichlorodifluoromethane Vinyl acetate Tetrahydrofuran 2-Chloroethylvinyl ether 4-Methyl-2-pentanone	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
E5C070232	WCC_4S_WG030705_0001	Acrolein Acetone Acrylonitrile 2-Butanone Tetrahydrofuran 2-Chloroethylvinyl ether	J (all detects) R (all non-detects)	A	Continuing calibration (RRF)
E5C070232	WCC_4S_WG030705_0001	Bromomethane	J (all detects)	P	Laboratory control samples (%R)

Boeing Realty Corp, Former C-6 Facility, Torrance CA
Volatiles - Laboratory Blank Data Qualification Summary - SDG E5C070232

No Sample Data Qualified in this SDG

Tait Environmental

Client Sample ID: WCC_4S_WG030705_0001

GC/MS Volatiles

Lot-Sample #...: E5C070232-005 **Work Order #...:** G5PJ11AA **Matrix.....:** WG
Date Sampled...: 03/07/05 11:07 **Date Received..:** 03/07/05 17:50
Prep Date.....: 03/15/05 **Analysis Date..:** 03/16/05
Prep Batch #...: 5075667 **Method.....:** SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Dichlorodifluoromethane	ND UJ	25	ug/L
Chloromethane	ND	50	ug/L
Chloroethane	ND	50	ug/L
Bromomethane	ND	50	ug/L
Trichlorofluoromethane	ND	50	ug/L
1,1,2-Trichlorotrifluoro-ethane	ND	25	ug/L
1,1-Dichloroethene	**1800**	**25**	**ug/L**
Methylene chloride	ND	25	ug/L
Methyl tert-butyl ether	ND	25	ug/L
Carbon disulfide	ND	25	ug/L
Acetone	ND R	250	ug/L
trans-1,2-Dichloroethene	**12 J**	**25**	**ug/L**
1,1-Dichloroethane	ND	25	ug/L
2,2-Dichloropropane	ND	25	ug/L
cis-1,2-Dichloroethene	**47**	**25**	**ug/L**
Chloroform	ND	25	ug/L
Bromochloromethane	ND	25	ug/L
1,1,1-Trichloroethane	ND	25	ug/L
2-Butanone	ND R	120	ug/L
1,1-Dichloropropene	ND	25	ug/L
Carbon tetrachloride	ND	12	ug/L
1,2-Dibromoethane	ND	25	ug/L
Benzene	ND	25	ug/L
Trichloroethene	**770**	**25**	**ug/L**
Bromodichloromethane	ND	25	ug/L
4-Methyl-2-pentanone	ND UJ	120	ug/L
Toluene	ND	25	ug/L
1,1,2-Trichloroethane	ND	25	ug/L
1,2-Dichloroethane	ND	12	ug/L
Tetrachloroethene	ND	25	ug/L
2-Hexanone	ND	120	ug/L
Dibromochloromethane	ND	25	ug/L
Chlorobenzene	ND	25	ug/L
1,1,1,2-Tetrachloroethane	ND	25	ug/L
Ethylbenzene	ND	25	ug/L
Vinyl chloride	ND	12	ug/L
Xylenes (total)	ND	25	ug/L
Styrene	ND	25	ug/L
Bromoform	ND	25	ug/L

(Continued on next page)

41305

Tait Environmental

Client Sample ID: WCC_4S_WG030705_0001

GC/MS Volatiles

Lot-Sample #...: E5C070232-005 **Work Order #...:** G5PJ11AA **Matrix.....:** WG

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Isopropylbenzene	ND	25	ug/L
1,1,2,2-Tetrachloroethane	ND	25	ug/L
1,2,3-Trichloropropane	ND	25	ug/L
n-Propylbenzene	ND	25	ug/L
Bromobenzene	ND	25	ug/L
1,3,5-Trimethylbenzene	ND	25	ug/L
2-Chlorotoluene	ND	25	ug/L
4-Chlorotoluene	ND	25	ug/L
tert-Butylbenzene	ND	25	ug/L
1,2,4-Trimethylbenzene	ND	25	ug/L
sec-Butylbenzene	ND	25	ug/L
p-Isopropyltoluene	ND	25	ug/L
1,3-Dichlorobenzene	ND	25	ug/L
1,4-Dichlorobenzene	ND	25	ug/L
n-Butylbenzene	ND	25	ug/L
1,2-Dichlorobenzene	ND	25	ug/L
1,2-Dibromo-3-chloro-propane	ND	50	ug/L
1,2,4-Trichloro-benzene	ND	25	ug/L
Hexachlorobutadiene	ND	25	ug/L
1,2,3-Trichlorobenzene	ND	25	ug/L
Acrolein	ND R	500	ug/L
Acrylonitrile	ND R	500	ug/L
Iodomethane	ND	50	ug/L
2-Chloroethyl vinyl ether	ND R	120	ug/L
Tetrahydrofuran	ND R	250	ug/L
Vinyl acetate	ND UJ	120	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	88	(75 - 130)
1,2-Dichloroethane-d4	86	(65 - 135)
Toluene-d8	97	(80 - 130)

NOTE(S):

J Estimated result. Result is less than RL.

LDC #: 13309C1

SDG #: E5C070232

Laboratory: Severn Trent Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Tier 3

Date: 3/20/05

Page: 1 of 1

Reviewer: JVG

2nd Reviewer: [illegible]

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: 3/07/05
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	
IV.	Continuing calibration	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	~~MB~~ MWB005-WG030705-0001 (from this SDG)
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
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	N	

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

Validated Samples: Water

1	WCC_4S_WG030705_0001	11		21		31	
2	~~MB~~ G6DGL1AA	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS CHECKLIST

LDC #: 13309C1
SDG #: E5C070232

Reviewer: JVC
2nd Reviewer: [illegible]

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. 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? If Yes, what was the acceptance criteria used?				
Did the initial calibration meet the curve fit acceptance criteria?				
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?		✓		

VALIDATION FINDINGS CHECKLIST

LDC #: 13309C1
SDG #: ES C070232

Reviewer: JVC
2nd Reviewer: R

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
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. 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?	✓			
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 ± 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.			✓	

VALIDATION FINDINGS CHECKLIST

LDC #: 13309C1
SDG #: E5C070232

Reviewer: JVG
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Field blanks				
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. 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-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. Tetra hydro furan
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM.
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
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-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl mathyl ether	VVVV.

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

BOE-C6-0050052

LDC #: 133091C
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

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 Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/15/05	ICAL	FFFF		0.01887	All + BLK	J/R/A
			F		0.01899		
			GGGG		0.02611		
			M		0.03186		
			LLLL		0.02484		
			II		0.00069		
			JJ	30.109			J/UJ/A

INICAL 1SB

LDC #: 13309C1
SDG #: ES C070232

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: <

METHOD: GC/MS VOA (EPA SW 846 Method 8260)
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?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A 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
	3/15/05	RS 0863	FFFF		0.01630	All + Blk	J/R/A
			F		0.01460		
			GGGG		0.02082		
			M		0.02436		
			LLLL		0.01741		
			II		0.00051		
			JJ	29.02384			J/UJ/A
			HH	65.02501			
			LLLL	29.90033			
			II	26.36261			
			Y	27.63732			

BOE-C6-0050054

LDC #: 13309C1
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: AL

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 method blank associated with every sample in this SDG?
Y N N/A 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: 3/15/05
Conc. units: ug/L
Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	G6DGL1AA									
Methylene chloride										
Acetone										
KKK	0.30									
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

BLANKS2.1SB

BOE-C6-0050055

LDC #: 13309C1
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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.

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

Y N N/A 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
		MWB005-WG030705-0001	H	0 (65-135)	0 (65-135)	( )	None	No qual
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

MSD.1SB

BOE-C6-0050056

LDC #: 13309 C1
SDG #: E5C070237

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

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 LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		GGD6L1AC	B	156 (60-140)	( )	( )	All + Blk	J dets / P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

BOE-C6-0050057

LDC #: 13309C1
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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 = $(A_x)(C_{is})/(A_{is})(C_x)$
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_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/15/05	Methylene chloride (1st internal standard)	0.18392	0.18392	0.18575	0.18575	6.682	6.682
			~~Trichlorethene~~ EE (2nd internal standard)	1.81786	1.81786	1.85452	1.85493	6.164	6.164
			~~Toluene~~ BB (3rd internal standard)	0.38566	0.38566	0.39155	0.39155	8.011	8.012
2			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (3rd internal standard)						
3			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (3rd internal standard)						
4			Methylene chloride (1st internal standard)						
			Trichlorethene (2nd internal standard)						
			Toluene (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.

INICLC1SB

BOE-C6-0050058

DC #: 133091
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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 = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RS083	3/15/05	Methylene chloride (1st internal standard)	0.18575	0.17196	0.17196	7.42235	7.42198
			~~Trichlorethene~~ EE (2nd internal standard)	1.85492	1.70080	1.70080	8.30889	8.30867
			~~Toluene~~ DB (3rd internal standard)	0.39155	0.32531	0.32531	16.91768	16.9178
2			Methylene chloride (1st internal standard)					
			Trichlorethene (2nd internal standard)					
			Toluene (3rd internal standard)					
3			Methylene chloride (1st internal standard)					
			Trichlorethene (2nd internal standard)					
			Toluene (3rd internal standard)					
4			Methylene chloride (1st internal standard)					
			Trichlorethene (2nd internal standard)					
			Toluene (3rd internal standard)					

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 #: 13309C1
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

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: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	10	9.6965	97	97	0
Bromofluorobenzene		8.8056	88	88	
1,2-Dichloroethane-d4		8.6520	86	86	
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					

Sample ID:

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

LDC #: 13309C1
SDG #: ES C070232

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

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

RPD = I MSC - MSDC I * 2/(MSC + MSDC) MSC = Matrix spike percent recovery MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: MW B005-WG030705-0001

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	—	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	625	625	4300	0	0	0	0	0	0	0	0
Trichloroethene	↓	↓	3100	3690	3880	94	94	124	125	4.9	5.0
Benzene	↓	↓	~~523~~ 0	523	535	84	84	86	86	3.0	3.0
Toluene	↓	↓	~~551~~ ↓	558	578	88	88	83	83	6.2	6.2
Chlorobenzene	↓	↓	↓	524	494	84	84	79	79	5.9	5.9

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.

MSDCLC.1SB

BOE-C6-0050061

LDC #: 13309C1
SDG #: ESC070232

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: K

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 = Spiked sample concentration; SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	10	NA	10.9	NA	109	109				
Trichloroethene			8.69		87	87				
Benzene			8.95		90	90				
Toluene			9.12		91	91				
Chlorobenzene			8.77		88	88				

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.

LCSCLC.1SB

BOE-C6-0050062

LDC #: 13309C1
SDG #: E5C070232

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

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

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #1, H:

Conc. = (1283401)(10)( )
(1053561)(0.17157)( )( )
= 71.02 (25 ml)
= 1775.5 ≈ 1800 ng/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification