APPENDIX D-3 ROUND 3 DATA VALIDATION REPORT

LABORATORY DATA CONSULTANTS, INC.
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LDC #15332/15405
September 26, 2006

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Marina Mitchell

SUBJECT: Lower Duwamish Waterway Group Sediment Sample Data Validation

Dear Ms. Mitchell,

Enclosed is our final EPA Level III and Level IV data validation of analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by Analytical Resources, Inc. and AXYS Analytical Services Ltd. Samples were analyzed for GC/MS Semivolatiles by EPA SW 846 Methods 8270D and 8270D-SIM, GC Polychlorinated Biphenyls by EPA SW 846 Method 8082, Butyltins by EPA SW 846 Methods 8270D-SIM/Krone Method, Metals by EPA SW 846 Methods 6010B/7471A, Total Organic Carbon by Plumb Method, Total Solids by EPA Method 160.3 and HRGC/HRMS Dioxins/Dibenzofurans by EPA Method 1613B. Samples are referenced under the following Sample Delivery Groups : JO76, JQ01 and DPWG19875/WG19595. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed.

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

Sincerely,

Stella Cuenco

Stella S. Cuenco
Project Manager/Senior Chemist

LDC #15332 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	SVOA (8270D)		SVOA (8270D -SIM)		PCBs (8082)		Metals & Hg (SW846)		Hg (7471A)		Butyl -tins (Krone)		TOC (Plumb)		Total Solids (160.3)																	
Matrix:	Water/Sediment			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	JO76/JQ01	08/07/06	08/28/06	0	3	0	3	0	15	0	2	0	3	0	1	0	15	0	15														
A	JO76/JQ01	08/07/06	08/28/06	0	1	0	1	0	4	0	1	0	0	0	1	0	4	0	4														
Total	B/SC			0	4	0	4	0	19	0	3	0	3	0	2	0	19	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	73

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, DUP, TRP and DLs

Attachment 1

LDC #15405 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Dioxins (1613B)																															
Matrix: Water/Sediment				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	DPWG19875/WG19595	08/23/06	09/14/06	0	1																														
Total	B/SC			0	1	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	1

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

CHEMICAL DATA QUALITY REVIEW FOR SUBSURFACE SEDIMENT SAMPLES (ROUND 3)

Lower Duwamish Waterway Group
LDC# 15332 & 15405

This report details the findings of an EPA Level III and EPA Level IV data validation of analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by Analytical Resources, Inc. and AXYS Analytical Services Ltd. Samples were analyzed for GC/MS Semivolatiles by EPA SW 846 Methods 8270D and 8270D-SIM, GC Polychlorinated Biphenyls by EPA SW 846 Method 8082, Butyltins by EPA SW 846 Methods 8270D-SIM/Krone Method, Metals by EPA SW 846 Methods 6010B/7471A, Total Organic Carbon by Plumb Method, Total Solids by EPA Method 160.3 and HRGC/HRMS Dioxins/Dibenzofurans by EPA Method 1613B. Samples are referenced under the following Sample Delivery Groups : JO76, JQ01 and DPWG19875/WG19595. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed and the Sample Validation Table (Attachment 2) for the sample identifications and analyses. Sample IDs ending in "**" underwent Level IV review.

The QC guidelines used for data qualification are those specified in the National Functional Guidelines for Organic Data Review (October 1999), National Functional Guidelines for Inorganic Data Review (July 2002) and the EPA Region 10 SOP for the Validation of Polychlorinated Dibenzodioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) Data (Revision 2.0 January 31, 1996). Specific QC criteria used follow the Lower Duwamish Waterway Group Final Subsurface Sediment Sampling for Chemical Analyses Quality Assurance Project Plan (February 3, 2006). Where specific guidance is not available, the data has been evaluated in a conservative manner using professional experience.

The following items were evaluated during the review:

- Holding Times
- Sample Preservation
- Cooler Temperatures
- Instrument Calibration
- Blanks
- Surrogates
- Matrix Spike/Matrix Spike Duplicates
- Internal Standards
- Laboratory Control Samples
- Target Compound Identifications*
- Compound Quantitation and CRQLs*
- System Performance
- Field Replicates

*Data were not reviewed for Level III.

Attachment 1

LDC #15332 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	SVOA (8270D)		SVOA (8270D -SIM)		PCBs (8082)		Metals & Hg (SW846)		Hg (7471A)		Butyl -tins (Krone)		TOC (Plumb)		Total Solids (160.3)																	
Matrix:	Water/Sediment			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	JO76/JQ01	08/07/06	08/28/06	0	3	0	3	0	15	0	2	0	3	0	1	0	15	0	15																
A	JO76/JQ01	08/07/06	08/28/06	0	1	0	1	0	4	0	1	0	0	0	1	0	4	0	4																
Total	B/SC			0	4	0	4	0	19	0	3	0	3	0	2	0	19	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, DUP, TRP and DLs

Attachment 1

LDC #15405 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Dioxins (1613B)																													
Matrix: Water/Sediment				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	DPWG19875/WG19595	08/23/06	09/14/06	0	1																												
Total	B/SC			0	1	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	1

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

Attachment 2

SDG#: JO76/JQ01 VALIDATION SAMPLE TABLE **LDC#:** 15332A

Project Name: Lower Duwamish Waterway Group Parameters/Analytical Method Project #04-08-06-24

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Hg (7174A)	Butyltins (Krone)	TOC (Plumb)	Total Solids (160.3)				
LDW-SC8-8-10	JO76A	sediment	02/10/06	X	X	X	X			X	X				
LDW-SC8-8-10DL	JO76ADL	sediment	02/10/06			X									
LDW-SC10-6-8	JO76B	sediment	02/10/06			X				X	X				
LDW-SC12-6.7-8.7	JO76C	sediment	02/16/06			X		X		X	X				
LDW-SC14-6-8.7	JO76D	sediment	02/13/06			X		X		X	X				
LDW-SC14-6-8.7DL	JO76DDL	sediment	02/13/06			X									
LDW-SC14-10-11	JO76E	sediment	02/13/06			X		X		X	X				
LDW-SC15-8-10	JO76F	sediment	02/17/06			X				X	X				
LDW-SC19-6-7	JO76G	sediment	02/24/06			X				X	X				
LDW-SC19-6-7DL	JO76GDL	sediment	02/24/06			X									
LDW-SC19-9-11.9	JO76H	sediment	02/24/06			X				X	X				
LDW-SC49-8-10	JO76I	sediment	02/06/06			X				X	X				
LDW-SC21-10-11.3	JO76J	sediment	02/15/06			X				X	X				
LDW-SC23-6-8	JO76K	sediment	02/17/06			X				X	X				
LDW-SC23-8-10.2	JO76L	sediment	02/17/06			X				X	X				
LDW-SC25-8-9.1	JO76M	sediment	02/18/06			X	X		X	X	X				
LDW-SC25-8-9.1DL	JO76MDL	sediment	02/18/06						X						
LDW-SC28-12-12.6	JO76N	sediment	02/25/06	X	X	X	X		X	X	X				
LDW-SC28-12-12.6DL	JO76NDL	sediment	02/25/06						X						
LDW-SC33-8-10	JO76O	sediment	02/11/06	X	X	X				X	X				
LDW-SC201-8-10	JO76P	sediment	02/11/06	X	X	X				X	X				
LDW-SC41-6-7.9	JO76Q	sediment	02/21/06			X				X	X				
LDW-SC49-5-8	JO76R	sediment	02/06/06			X				X	X				
LDW-SC20-8-10	JQ01A	sediment	02/15/06			X				X	X				
LDW-SC20-8-10DL	JQ01ADL	sediment	02/15/06			X									

Note: X = Validation was performed.

SDG#: JO76/JQ01 | VALIDATION SAMPLE TABLE | **LDC#:** 15332A

Project Name: Lower Duwamish Waterway Group | Parameters/Analytical Method | Project #04-08-06-24

Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Hg (7174A)	Butyltins (Krone)	TOC (Plumb)	Total Solids (160.3)				
LDW-SC8-8-10MS	JO76AMS	sediment	02/10/06				X			X					
LDW-SC8-8-10DUP	JO76ADUP	sediment	02/10/06				X			X	X				
LDW-SC8-8-10TRP	JO76ATRP	sediment	02/10/06							X	X				
LDW-SC19-9-11.9MS	JO76HMS	sediment	02/24/06			X									
LDW-SC19-9-11.9MSD	JO76HMSD	sediment	02/24/06			X									
LDW-SC25-8-9.1MS	JO76MMS	sediment	02/18/06						X						
LDW-SC25-8-9.1MSD	JO76MMSD	sediment	02/18/06						X						
LDW-SC33-8-10MS	JO76OMS	sediment	02/11/06	X	X										
LDW-SC33-8-10MSD	JO76OMSD	sediment	02/11/06	X	X										
LDW-SC20-8-10MS	JQ01AMS	sediment	02/15/06							X					
LDW-SC20-8-10DUP	JQ01ADUP	sediment	02/15/06							X	X				
LDW-SC20-8-10TRP	JQ01ATRP	sediment	02/15/06							X	X				

Note: X = Validation was performed.

Attachment 2

SDG#: DPWG19875/WG19595 VALIDATION SAMPLE TABLE **LDC#:** 15405A

Project Name: Lower Duwamish Waterway Group Parameters/Analytical Method Project #04-08-06-24

Client ID #	Lab ID #	Matrix	Date Collected	Dioxins (1613B)											
LDW-SC20-8-10	L9073-1	sediment	02/15/06	X											
LDW-SC20-8-10DUP	L9073-1DUP	sediment	02/15/06	X											

Note: X = Validation was performed.

Only issues which require comment or action are discussed in this report. Data deficiencies are arranged by method. Potential effects of data anomalies have been described where possible.

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.

The following qualifiers are for the dioxin/dibenzofuran analysis only:

J1 Blank Contamination: Indicates possible high bias and/or false positives.

J2 Calibration Range exceeded: Indicates possible low bias.

J3 Holding times not met: Indicates low bias for most analytes.

J4 Other QC parameters outside control limits: bias not readily determined.

J5 Other QC parameters outside control limits. The reported results appear to be biased high. The actual value of target compound in the sample may be lower than the value reported by the laboratory.

J6 Other QC parameters outside control limits. The reported results appear to be biased low. The actual value of target compound in the sample may be higher than the value reported by the laboratory.

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.

Overall Data Assessment

I. Usability

A. Instrument calibration, method blank contamination, compound quantitation and various QC exceedance problems warranted the qualification of a portion of the data set.

- Due to initial calibration %RSD and continuing calibration %D problems, results for several compounds were qualified as estimated (J/UJ) in the semivolatile and semivolatile-SIM analyses.

- Due to compound quantitation %RPD problems, one detected result was qualified as estimated (J) for Aroclor-1260 in the PCB analyses.

- Due to various QC accuracy and precision problems, results were qualified as estimated (J/UJ) in the semivolatile, semivolatile-SIM, PCB, butyltin and metal analyses.

B. No action was taken when the SRM results were outside the limit of Mean ± Standard Deviation for the organic analyses since the SRM standards were outdated and there were no certified QC limits established.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J/UJ) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

GC/MS Semivolatiles by EPA SW 846 Method 8270D

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.

All ion abundance requirements were met.

III. Initial Calibration

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 with the following exceptions:

SDG	Date	Compound	%RSD	Associated Samples	Flag	A or P
JO76	7/5/06	2,4-Dinitrophenol	73.4	LDW-SC8-8-10** LDW-SC28-12-12.6	J (all detects) UJ (all non-detects)	A
		4,6-Dinitro-2-methylphenol	34.6	LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects)	

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JO76	7/26/06	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	99.9 31.0	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JO76	7/5/06	Hexachlorocyclopentadiene	28.2	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects)	A

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

V. Blanks

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

SDG	Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
JO76	MB-072206	7/22/06	Phenol	42 ug/Kg	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10

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 within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
JO76	LDW-SC33-8-10MS/MSD (LDW-SC33-8-10)	Benzo(g,h,i)perylene	-	-	67.4 (≤50)	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.

Standard reference material was performed at the required frequencies.

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 for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

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

XVI. Field Replicates

Samples LDW-SC33-8-10 and LDW-SC201-8-10 were identified as field replicates. No semivolatiles were detected in any of the samples with the following exceptions:

SDG	Compound	Concentration (ug/Kg)		RPD (Limits)
		LDW-SC33-8-10	LDW-SC201-8-10	
JO76	Fluorene	38	61U	Not calculable
JO76	Phenanthrene	150	150	0 (≤50)
JO76	Anthracene	48	40	18 (≤50)
JO76	Fluoranthene	350	300	15 (≤50)
JO76	Pyrene	210	150	33 (≤50)
JO76	Benzo (a) anthracene	95	84	12 (≤50)
JO76	Chrysene	120	94	24 (≤50)
JO76	Benzo (b) fluoranthene	56	45	22 (≤50)
JO76	Benzo (k) fluoranthene	90	72	22 (≤50)
JO76	Benzo (a) pyrene	82	61	29 (≤50)
JO76	Indeno (1,2,3-cd) pyrene	48	34	34 (≤50)
JO76	Benzo (g,h,i)perylene	50	35	35 (≤50)

XVII. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Semivolatiles - Data Qualification Summary - SDG JO76

SDG	Sample	Compound	Flag	A or P	Reason
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Initial calibration (%RSD)
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	2,4-Dinitrophenol 4,6-Dinitro-2-methylphenol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	Hexachlorocyclopentadiene	J (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)
JO76	LDW-SC33-8-10	Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (RPD)

Lower Duwamish Waterway Group
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG JO76

No Sample Data Qualified in this SDG

GC/MS Semivolatiles by EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM).

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.

All ion abundance requirements were met.

III. Initial Calibration

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

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 .

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JO76	7/26/06	N-Nitroso-di-n-propylamine	29.9	LDW-SC8-8-10** LDW-SC28-12-12.6	J (all detects) UJ (all non-detects)	A
		1,2,4-Trichlorobenzene	37.6	LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects)	

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JO76	7/21/06	1,2,4-Trichlorobenzene N-Nitrosodiphenylamine	36.4 44.36	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

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

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile 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 with the following exceptions:

SDG	LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
JO76	LCS-072206	1,2,4-Trichlorobenzene	32.8 (40-130)	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	J (all detects) UJ (all non-detects)	P

Standard reference material was performed at the required frequencies.

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 for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

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

XVI. Field Replicates

Samples LDW-SC33-8-10 and LDW-SC201-8-10 were identified as field replicates. No semivolatiles were detected in any of the samples with the following exceptions:

SDG	Compound	Concentration (ug/Kg)		RPD (Limits)
		LDW-SC33-8-10	LDW-SC201-8-10	
JO76	Dibenz(a,h)anthracene	23	19	19 (≤50)
JO76	2,4-Dimethylphenol	5.5	3.7	39 (≤50)

XVII. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Semivolatiles(SIM) - Data Qualification Summary - SDG JO76

SDG	Sample	Compound	Flag	A or P	Reason
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	N-Nitroso-di-n-propylamine 1,2,4-Trichlorobenzene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	1,2,4-Trichlorobenzene N-Nitrosodiphenylamine	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)
JO76	LDW-SC8-8-10** LDW-SC28-12-12.6 LDW-SC33-8-10 LDW-SC201-8-10	1,2,4-Trichlorobenzene	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)

Lower Duwamish Waterway Group
Semivolatiles(SIM) - Laboratory Blank Data Qualification Summary - SDG JO76

No Sample Data Qualified in this SDG

Polychlorinated Biphenyls by EPA SW 846 Method 8082

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/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

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

VI. Surrogate Spikes and Internal Standards

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:

SDG	Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
JO76	LDW-SC33-8-10	Not specified	Tetrachloro-m-xylene	31.8 (50-150)	All TCL compounds	J (all detects) UJ (all non-detects)	P
JQ01	LDW-SC20-8-10	Not specified	Tetrachloro-m-xylene	36.4 (50-150)	All TCL compounds	J (all detects) UJ (all non-detects)	P

All internal standard areas and retention times 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 with the following exceptions:

SDG	LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
JQ01	LCS-072106	Aroclor-1016	49.1 (50-150)	LDW-SC20-8-10 LDW-SC20-8-10DL	J (all detects) UJ (all non-detects)	P

Standard reference material was performed at the required frequencies.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Although sulfur and acid cleanup was not required by the method, it was performed by the laboratory.

Florisil cleanup was not required and therefore not performed.

b. GPC Calibration

GPC cleanup was not required and therefore not performed.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

SDG	Sample	Compound	Finding	Criteria	Flag	A or P
JO76	LDW-SC8-8-10**	Aroclor-1254 Aroclor-1260	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A N/A	-
JO76 JQ01	LDW-SC14-6-8.7 LDW-SC20-8-10	Aroclor-1260	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A	-
JO76	LDW-SC19-6-7	Aroclor-1254 Aroclor-1260 Aroclor-1248	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A N/A N/A	-

N/A = Not applicable

For the results above flagged "Not applicable", the affected compound results in the associated samples were deemed unusable and did not warrant qualification of the data.

The sample results for detected compounds from the two columns were within 40.0% relative percent differences (RPD) with the following exceptions:

SDG	Sample	Compound	%RPD	Flag	A or P
JO76	LDW-SC8-8-10**	Aroclor-1260	49	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. 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:

SDG	Sample	Compound	Flag	A or P
JO76	LDW-SC8-8-10**	Aroclor-1254 Aroclor-1260	R R	A
JO76	LDW-SC8-8-10DL**	All TCL compounds except Aroclor-1254 Aroclor-1260	R	A
JO76 JQ01	LDW-SC14-6-8.7 LDW-SC20-8-10	Aroclor-1260	R	A
JO76 JQ01	LDW-SC14-6-8.7DL LDW-SC20-8-10DL	All TCL compounds except Aroclor-1260	R	A
JO76	LDW-SC19-6-7	Aroclor-1254 Aroclor-1260 Aroclor-1248	R R R	A
JO76	LDW-SC19-6-7DL	All TCL compounds except Aroclor-1254 Aroclor-1260 Aroclor-1248	R	A

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

XIV. Field Replicates

Samples LDW-SC33-8-10 and LDW-SC201-8-10 were identified as field replicates. No polychlorinated biphenyls were detected in any of the samples.

XV. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Polychlorinated Biphenyls - Data Qualification Summary - SDGs JO76 and JQ01

SDG	Sample	Compound	Flag	A or P	Reason
JO76 JQ01	LDW-SC33-8-10 LDW-SC20-8-10	All TCL compounds	J (all detects) UJ (all non-detects)	P	Surrogate recovery (%R)
JQ01	LDW-SC20-8-10 LDW-SC20-8-10DL	Aroclor-1016	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)
JO76	LDW-SC8-8-10**	Aroclor-1260	J (all detects)	A	Compound quantitation and CRQLs (RPD)
JO76	LDW-SC8-8-10**	Aroclor-1254 Aroclor-1260	R R	A	Overall assessment of data
JO76	LDW-SC8-8-10DL**	All TCL compounds except Aroclor-1254 Aroclor-1260	R	A	Overall assessment of data
JO76 JQ01	LDW-SC14-6-8.7 LDW-SC20-8-10	Aroclor-1260	R	A	Overall assessment of data
JO76 JQ01	LDW-SC14-6-8.7DL LDW-SC20-8-10DL	All TCL compounds except Aroclor-1260	R	A	Overall assessment of data
JO76	LDW-SC19-6-7	Aroclor-1254 Aroclor-1260 Aroclor-1248	R R R	A	Overall assessment of data
JO76	LDW-SC19-6-7DL	All TCL compounds except Aroclor-1254 Aroclor-1260 Aroclor-1248	R	A	Overall assessment of data

Lower Duwamish Waterway Group
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDGs JO76 and JQ01

No Sample Data Qualified in this SDG

Butyltins By EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) & Krone Method

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.

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 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% for all compounds.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No butyltin 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.

Standard reference material was performed at the required frequencies.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard percent recoveries (%R) were within QC limits for samples with the following exceptions:

SDG	Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
JO76	LDW-SC25-8-9.1**	p-Terphenyl-d14	395838 (91680-366722)	Dibutyl-tin ion Butyl-tin ion	J (all detects) J (all detects)	A
JO76	LDW-SC28-12-12.6	p-Terphenyl-d14	371428 (91680-366722)	Dibutyl-tin ion Butyl-tin ion	J (all detects) J (all detects)	A

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

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:

SDG	Sample	Compound	Flag	A or P
JO76	LDW-SC25-8-9.1DL** LDW-SC28-12-12.6DL	All TCL compounds	R R	A

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

XVI. Field Replicates

No field replicates were identified in this SDG.

XVII. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Butyltins - Data Qualification Summary - SDG JO76

SDG	Sample	Compound	Flag	A or P	Reason
JO76	LDW-SC25-8-9.1** LDW-SC28-12-12.6	Dibutyl-tin ion Butyl-tin ion	J (all detects) J (all detects)	A	Internal standards (area)
JO76	LDW-SC25-8-9.1DL** LDW-SC28-12-12.6DL	All TCL compounds	R	A	Overall assessment of data

Lower Duwamish Waterway Group
Butyltins - Laboratory Blank Data Qualification Summary - SDG JO76

No Sample Data Qualified in this SDG

Metals by EPA SW 846 Methods 6010B/7471A

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
JO76	LDW-SC8-8-10MS (LDW-SC8-8-10** LDW-SC25-8-9.1 LDW-SC28-12-12.6 LDW-SC8-8-10DUP)	Antimony	16.8 (70-130)	J (all detects) UJ (all non-detects)	A

Although the percent recovery of antimony was severely low (<30%) in the MS sample above, the results in all the associated ~~samples were qualified as estimated~~ (J/UJ) since the post spike recoveries for antimony ~~were greater then 75%.~~ 5 of 4 ~~were within the 70-130 QC limits.~~

VI. Duplicate Sample Analysis

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

VII. Laboratory Control Samples (LCS)

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

Standard reference material was performed at the required frequencies.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XI. Sample Result Verification

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

XII. Overall Assessment of Data

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

XIII. Field Replicates

No field replicates were identified in this SDG.

XIV. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Metals - Data Qualification Summary - SDG JO76

SDG	Sample	Analyte	Flag	A or P	Reason
JO76	LDW-SC8-8-10** LDW-SC25-8-9.1 LDW-SC28-12-12.6 LDW-SC8-8-10DUP	Antimony	J (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R)

Lower Duwamish Waterway Group
Metals - Laboratory Blank Data Qualification Summary - SDG JO76

No Sample Data Qualified in this SDG

Total Organic Carbon by Plumb Method and Total Solids by EPA Method 160.3

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Duplicates

Duplicate (DUP) and Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) and relative standard deviation (RSD) were within QC limits.

VI. Laboratory Control Samples

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

Standard reference material was performed at the required frequencies.

VII. Sample Result Verification

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

VIII. Overall Assessment of Data

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

IX. Field Replicates

Samples LDW-SC33-8-10 and LDW-SC201-8-10 were identified as field replicates. No concentrations were detected in any of the samples with the following exceptions:

SDG	Compound	Concentration (%)		RPD (Limits)
		LDW-SC33-8-10	LDW-SC201-8-10	
J076	Total solids	65.3	65.1	0 (≤20)
J076	Total organic carbon	1.53	1.55	1 (≤30)

X. Field Blanks

No field blanks were identified in this SDG.

Lower Duwamish Waterway Group
Wet Chemistry - Data Qualification Summary - SDGs JO76 and JQ01

No Sample Data Qualified in this SDG

Lower Duwamish Waterway Group
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDGs JO76 and JQ01

No Sample Data Qualified in this SDG

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Lower Duwamish Waterway Group

Collection Date: February 15, 2006

LDC Report Date: December 19, 2006

Matrix: Sediment

Parameters: Dioxins/Dibenzofurans

Validation Level: EPA Level IV

Laboratory: AXYS Analytical Services Ltd.

Sample Delivery Group (SDG): DPWG19875/WG19595

Sample Identification

LDW-SC20-8-10
LDW-SC20-8-10DUP

Introduction

This data review covers 2 sediment samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Lower Duwamish Waterway Group Final Subsurface Sediment Sampling for Chemical Analyses Quality Assurance Project Plan (February 3, 2006) and USEPA Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Dibenzofurans Data Review (August 2002).

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between ^{13}C-2,3,7,8-TCDD and ^{13}C-1,2,3,4-TCDD was less than or equal to 25%.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all native compounds and less than or equal to 30.0% for all labelled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was technically acceptable.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration concentrations were within the QC limits.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG19595-101	7/11/06	1,2,3,4,6,7,8-HpCDD OCDD 2,3,4,7,8-PeCDF OCDF Total HpCDD	0.089 ng/Kg 0.376 ng/Kg 0.052 ng/Kg 0.086 ng/Kg 0.052 ng/Kg	All samples in SDG DPWG19875/WG19595

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

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

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

VII. Laboratory Control Samples (LCS)

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

Standard reference material was performed at the required frequencies.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

*XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG19875/WG19595	All compounds reported by the lab as estimated (K) maximum possible concentration (EMPC)	U	A

XII. System Performance

The system performance was acceptable.

XIII. 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
All samples in SDG DPWG19875/WG19595	2,3,7,8-TCDF on DB-5	R	A

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

*Lower Duwamish Waterway Group
Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG19875/WG19595

SDG	Sample	Compound	Flag	A or P	Reason
*DPWG19875/ WG19595	LDW-SC20-8-10 LDW-SC20-8-10DUP	All compounds reported by the lab as estimated (K) maximum possible concentration (EMPC)	U	A	Compound quantitation and CRQLs (EMPC)
DPWG19875/ WG19595	LDW-SC20-8-10 LDW-SC20-8-10DUP	2,3,7,8-TCDF on DB-5	R	A	Overall assessment of data

*Added CRQL (EMPC) finding.

Lower Duwamish Waterway Group
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG DPWG19875/WG19595

No Sample Data Qualified in this SDG

LDC #: 15332A2a **VALIDATION COMPLETENESS WORKSHEET** Date: 8/9/06
SDG #: JØ076/JQ01 Level III/IV Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270D)

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: 2/10 → 2/27/06
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	
IV.	Continuing calibration	SW	ICV ± 25
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples /SRM	SWA	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation. not reported
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	GPC clean up performed
XVI.	Field duplicates	SW	D = 3+4
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: ** Indicates sample underwent Level IV validation

Sediment

+							
1	LDW-SC8-8-10**	11	MB-072206	21		31	
2	LDW-SC28-12-12.6	12		22		32	
3	LDW-SC33-8-10	13		23		33	
4	LDW-SC201-8-10	14		24		34	
5	LDW-SC33-8-10MS	15		25		35	
6	LDW-SC33-8-10MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 15332/A2a
SDG #: J6976/1961

VALIDATION FINDINGS CHECKLIST

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

Method: Semivolatiles (EPA SW 846 Method 8270C)

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 DFTPP 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 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 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicate				
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?	✓			

LDC #: 15332/A29
SDG #: J0676/J0801

VALIDATION FINDINGS CHECKLIST

Reviewer: EJ
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction 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 from 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.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU.
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

LDC #: 15332/A29
SDG #: J0876/J5001

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: B
2nd Reviewer: A

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

Y N N/A Did the laboratory conduct an acceptable 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
	7/5/06	ICAL	HH	73.4		1→4	J/UJ/A
			PP	34.6		↓	↓

INICAL.2S

LDC #: 15332A29
SDG #: J0676/J0801

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 of sample analysis 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
	7/5/06	ICV	X	28.2		1-04	J (all) / A
	7/26/06	CCV	HH	99.9		↓	↓
			PP	31.0			

CONCAL2S

LDC #: 15332A2a
SDG #: J0976/~~1601~~

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 7/22/06 **Blank analysis date:** 7/26/06
Conc. units: ug/kg Associated Samples: All CND

Compound	Blank ID	Sample Identification								
	MB-072206									
A	42									

Blank extraction date: _____ **Blank analysis date:** _____
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above 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".

LDC #: 15374A2a

SDG #: J0976/5001

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: [signature]

2nd Reviewer: [signature]

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?

Y (N) N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N (N/A) If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		MB-072206	DCB	33.3 (40-130)	no qual
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

SUR.2S

LDC #: 15332A2a
SDG #: J0926 | ~~J607~~

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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
		S+6	LLL	( )	( )	67.4 (50)	3	J/UJ/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC#: 15332A3
SDG#: JO76/JQ01

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270SIM)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/Kg)		≤ 50 RPD	
	3	4		
Fluorene	38	61U	~~200~~ NC	
Phenanthrene	150	150	0	
Anthracene	48	40	18	
Fluoranthene	350	300	15	
Pyrene	210	150	33	
Benzo (a) anthracene	95	84	12	
Chrysene	120	94	24	
Benzo (b) fluoranthene	56	45	22	
Benzo (k) fluoranthene	90	72	22	
Benzo (a) pyrene	82	61	29	
Indeno (1,2,3-cd) pyrene	48	34	34	
Benzo (g,h,i)perylene	50	35	35	

V:\FIELD DUPLICATES\11025_PAHs\15332A3.wpd

LDC #: 15332A29
SDG #: 10076/~~10092~~)

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 7
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard
S = Standard deviation of the RRFs, X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (25 std)	Recalculated RRF (25 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/5/06	Phenol (1st internal standard)	2.120	2.120	2.228	2.228	3.0	3.0
			Naphthalene (2nd internal standard)	1.185	1.185	1.216	1.216	2.6	2.6
			Fluorene (3rd internal standard)	1.413	1.413	1.433	1.433	2.3	2.3
			~~Pentachlorophenol~~ Anthracene (4th internal standard)	~~0.469~~ 1.326	1.326	~~0.460~~ 1.335	1.335	~~15~~ 1.3	1.337
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.517	0.517	0.505	0.505	7.1	7.1
			Benzo(a)pyrene (6th internal standard)	1.262	1.262	1.264	1.264	3.0	3.0
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th 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.

LDC #: 15332A2a
SDG #: J0676/J001

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: F
2nd Reviewer: L

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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	CCV	7/26/06	Phenol (1st internal standard)	2.228	2.373	2.373	6.5	6.5
			Naphthalene (2nd internal standard)	1.216	1.217	1.217	0.1	0.1
			Fluorene (3rd internal standard)	1.433	1.484	1.484	3.6	3.6
			~~Anthracene~~ Pentachlorophenol (4th internal standard)	1.337	1.335	1.335	0.1	0.1
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.505	0.550	0.550	8.9	8.9
			Benzo(a)pyrene (6th internal standard)	1.264	1.310	1.310	3.6	3.6
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th 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 #: 15332A29
SDG #: J0676 (5001

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: F
2nd reviewer: K

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

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
Nitrobenzene-d5	1558	914.9	58.8	58.8	0
2-Fluorobiphenyl	1558	895.7	57.6	57.6	
Terphenyl-d14	1558	652.7	42.0	42.0	
Phenol-d5	2337	1445	61.9	61.9	
2-Fluorophenol	2337	1379	58.9	58.9	
2,4,6-Tribromophenol	2337	1617	69.3	69.3	
2-Chlorophenol-d4	2337	1366	58.4	58.4	
1,2-Dichlorobenzene-d4	1558	750	48.0	48.0	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 15332A2a
SDG #: 10676/3001

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 concentation

RPD = I MS - MSD I * 2/(MS + MSD) MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol ✓	2290	2290		1110	1240	48.5	48.5	54.1	54.1	11.1	11.1
2-Chlorophenol ✓	↓	↓		1180	1310	51.5	51.5	57.2	57.2	10.4	10.4
1,4-Dichlorobenzene											
N-Nitroso-di-n-propylamine											
1,2,4-Trichlorobenzene											
4-Chloro-3-methylphenol ✓	2290	2290		1230	1320	53.7	53.7	57.6	57.6	7.1	7.1
Acenaphthene ✓	1520	1520		839	916	55.2	55.2	59.9	59.9	8.8	8.8
4-Nitrophenol ✓	2290	2290		1370	1500	59.8	59.8	65.5	65.5	9.1	9.1
2,4-Dinitrotoluene ✓	1520	1520		875	936	57.6	57.6	61.2	61.2	6.7	6.7
Pentachlorophenol											
Pyrene ✓	1520	1520		896	1030	44.9	44.9	53.3	53.3	13.9	13.9

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.

LDC #: 15332A2a
SDG #: J0076/~~1001~~

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: P
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

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

LCS/LCSD samples: LCS - 072206

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol	1560		1160		74.4	74.4				
2-Chlorophenol	1560		1140		73.1	73.1				
1,4-Dichlorobenzene	NA									
N-Nitroso-di-n-propylamine	↓									
1,2,4-Trichlorobenzene	↓									
4-Chloro-3-methylphenol	1170		1560		75	75				
Acenaphthene	1560		1160		74.4	74.4				
4-Nitrophenol	1560		1140		73.1	73.1				
2,4-Dinitrotoluene	1560		1200		76.9	76.9				
Pentachlorophenol	NA									
Pyrene	1130		1560		72.4	72.9	NA			

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

LDC #: 15332 A2a
SDG #: J0976 | J2907

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 5
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #1 . Phenanthrene

Conc. = $\frac{(127824)(20)(2)(100)(\quad)}{(112341)(1.33)(32.1)(\quad)(\quad)}$

= 110 ug/kg

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

LDC #: 15332A2b **VALIDATION COMPLETENESS WORKSHEET** Date: 8/8/06

SDG #: JQ076/JQ081 Level III/IV Page: 1 of 1

Laboratory: Analytical Resources, Inc. Reviewer:

2nd Reviewer:

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270D-SIM)

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: 2/10/06 — 2/21/06
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, r^2 ≥0.990
IV.	Continuing calibration	SW	ICV ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples /SRM	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation. not reported
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	GPC clean-up performed
XVI.	Field duplicates	SW	D = 3 + 4
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: ** Indicates sample underwent Level IV validation

sediments

1	LDW-SC8-8-10**	11	MB-012206	21		31	
2	LDW-SC28-12-12.6	12		22		32	
3	LDW-SC33-8-10	13		23		33	
4	LDW-SC201-8-10	14		24		34	
5	LDW-SC33-8-10MS	15		25		35	
6	LDW-SC33-8-10MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 15332A26
SDG #: J0076/J0077

VALIDATION FINDINGS CHECKLIST

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

Method: Semivolatiles (EPA SW 846 Method 8270C)

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 DFTPP 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 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 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
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?	✓			

LDC #: 15332A26
SDG #: J2076/J2001

VALIDATION FINDINGS CHECKLIST

Reviewer: M
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction 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 from 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.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU.
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

LDC #: 15332A26
SDG #: J0876/5021

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 of sample analysis 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
	7/26/06	CCV	J	29.9		1→4	J/UJ/A
	1223		R	37.6		↓	↓
	7/21/06	ICV	R	36.4		1→4	J/UJ/A
	1600		QQ	44.36		↓	↓

CONCAL2S

LDC #: 15332A26
SDG #: J0076/J6-07

Reviewer: R
2nd Reviewer: A

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS-072206	R	32.8 (40-130)	( )	( )	1→4	J/UJ/P
				( )	( )	( )		
				( )	( )	( )	— — —	—
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 15332A26
SDG #: J0876/J0907

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds identified in the field duplicate pairs?

Compound	Concentration (ug/kg) 3	4	≤ 50 RPD
KKK	23	19	19
O	5.5	3.7	39

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 15332A26
SDG #: J0976/J980

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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	CCV	7/26/06	~~Phenol~~ 1,3-Dichlorobenzene (1st internal standard)	1.36708	1.52202	1.522	11.33334	11.33
			~~Naphthalene~~ Hexachlorobutadiene (2nd internal standard)	0.13218	0.13830	0.138	4.62978	4.63
			~~Fluorene~~ Dimethylphthalate (3rd internal standard)	1.06544	0.80162	0.802	24.76135	24.76
			Pentachlorophenol (4th internal standard)	0.09239	0.08037	0.0804	13.00860	13.01
			~~Bis(2-ethylhexyl)phthalate~~ Butyl Benzyl phthalate (5th internal standard)	0.68280	0.68514	0.685	0.34296	0.343
			~~Benzo(a)pyrene~~ Dibenzo(a,h) anthracene (6th internal standard)	1.10702	1.06719	1.0672	3.59869	3.598
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th 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 #: 1555 LA26
SDG #: J0976/~~J001~~

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: R
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$	A_x = Area of compound,	A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards	C_x = Concentration of compound,	C_{is} = Concentration of internal standard
%RSD = 100 * (S/X)	S = Standard deviation of the RRFs,	X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (2.5 std)	Recalculated RRF (2.5 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/21/06	1,3-Dichlorobenzene ~~Phenol~~ (1st internal standard)	1.303	1.303	1.367	1.367	6.4	6.4
			Hexachlorobutadiene ~~Naphthalene~~ (2nd internal standard)	0.121	0.121	0.132	0.132	14.0	14.0
			Dimethylphthalate ~~Fluorene~~ (3rd internal standard)	0.978	0.978	1.065	1.065	11.5	11.5
			Pentachlorophenol ~~Pentachlorophenol~~ (4th internal standard)	0.105	0.105	0.092	0.092	26.3	26.3
			Butyl Benzyl phthalate ~~Bis(2-ethylhexyl)phthalate~~ (5th internal standard)	0.669	0.669	0.683	0.683	3.6	3.6
			Dibenzo(a,h)anthracene ~~Benzo(a)pyrene~~ (6th internal standard)	1.054	1.054	1.107	1.107	5.5	5.5
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th 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.

LDC #: 15332A26
SDG #: J0876/[illegible]

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

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
Nitrobenzene-d5	1558	1455	93.2	93.2	6
2-Fluorobiphenyl	1558	939.4	60.4	60.4	
Terphenyl-d14	1558	674.8	43.2	43.2	
Phenol-d5	2337	1522	65.1	65.1	
2-Fluorophenol	2337	1494	64.0	64.0	
2,4,6-Tribromophenol	2337	2115	90.4	90.4	
2-Chlorophenol-d4	2337	1406	60.3	60.3	
1,2-Dichlorobenzene-d4	1558	883.3	56.8	56.8	

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 15332A25
SDG #: J0876/J901

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 concentation

RPD = | MS - MSD | * 2/(MS + MSD) MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~Phenol~~											
~~2-Chlorophenol~~											
1,4-Dichlorobenzene ✓	153	153		102	80.7	66.7	66.7	52.7	52.7	23.3	23.3
N-Nitroso-di-n-propylamine ✓	153	153		81	103	52.9	52.9	67.3	67.3	23.9	23.9
1,2,4-Trichlorobenzene ✓	153	153		107	97.2	69.9	69.9	63.5	63.5	9.6	9.6
4-Chloro-3-methylphenol											
Acenaphthene											
4-Nitrophenol											
2,4-Dinitrotoluene											
Pentachlorophenol ✓	230	229		269	231	117	117	101	101	15.2	15.2
Pyrene											

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.

LDC #: 15332A26
SDG #: J8876/J8897

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

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

LCS/LCSD samples: LCS-072206

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol										
2-Chlorophenol										
1,4-Dichlorobenzene	156	NA	111	NA	71.2	71.2				
N-Nitroso-di-n-propylamine	156	↓	90	↓	57.7	57.7				
1,2,4-Trichlorobenzene	156	↓	51.2	↓	32.8	32.8				
4-Chloro-3-methylphenol										
Acenaphthene										
4-Nitrophenol										
2,4-Dinitrotoluene										
Pentachlorophenol	156	NA	179	NA	115	115	NA			
Pyrene										

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

LDC #: 15332A26
SDG #: J8876 [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer:
2nd reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #1 . Dibenzo (a,h) anthracene

Conc. = (109826)(2)(2)(1000)( ) / (245396)(1.107)(32.1)( )( )

= 50 ug/kg

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

LDC #: 15332A3
SDG #: JO76/JQ01
Laboratory: Analytical Resources, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 8/9/06
Page: 1 of 1
Reviewer: FJ
2nd Reviewer: M

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 2/6 – 2/24/06
II.	GC/ECD Instrument Performance Check	-	
III.	Initial calibration	A	
IV.	Continuing calibration /1 CV	A	
V.	Blanks	A	
VI.	Surrogate spikes /internal stds	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	SW	
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	sulfur & acid clean up
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	
XII.	Compound quantitation and reported CRQLs	SW	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	ND	D=18+19
XV.	Field blanks	N	

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

Validated Samples: ** Indicates sample underwent Level IV validation

1	LDW-SC8-8-10**	11	LDW-SC19-9-11.9**	21	LDW-SC49-6-8**	31	
2	LDW-SC8-8-10DL**	12	LDW-SC49-8-10	22	LDW-SC20-8-10	32	
3	LDW-SC10-6-8	13	LDW-SC21-10-11.3	23	LDW-SC20-8-10DL	33	
4	LDW-SC12-6.7-8.7	14	LDW-SC23-6-8	24	LDW-SC19-9-11.9MS	34	
5	LDW-SC14-6-8.7	15	LDW-SC23-8-10.2**	25	LDW-SC19-9-11.9MSD	35	
6	LDW-SC14-6-8.7DL	16	LDW-SC25-8-9.1	26		36	
7	LDW-SC14-10-11	17	LDW-SC28-12-12.6	27		37	
8	LDW-SC15-8-10	18	LDW-SC33-8-10	28		38	
9	LDW-SC19-6-7	19	LDW-SC201-8-10	29		39	
10	LDW-SC19-6-7DL	20	LDW-SC41-6-7.9	30		40	

LDC #: 15332A3
SDG #: J076/J801

VALIDATION FINDINGS CHECKLIST

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

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
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 the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or ____%R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed 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 the QC limits?	-	✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	✓			
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
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?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 15332A3
SDG #: J076J601

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_____

LDC #: 15332A3
SDG #: J076/JQ01

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

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

METHOD: GC ___ HPLC

Are surrogates required by the method? Yes____ or No____.

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

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	6	not specified	TCMX	43.2 (50-150)	no qual 2X DIL
	10	↓	DCB	DO (50-150)	↓ 50X DIL
	18	↓	TCMX	31.8 (50-150)	J|UJ|P
	21	↓	TCMX	45.8 (50-150)	no qual 10X DIL
	22	↓	TCMX	36.4 (50-150)	J|UJ|P

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decafluorobiphenyl (DCB)	U	Tripentyltin
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate

LDC #: 15332A3
SDG #: J076/JQ01

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ~~GC~~ HPLC

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

(Y) N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only
(Y) N N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	LCS-072106	Y	49.1 (50-150)	( )	( )	~~JQ01MBS1~~, 22, 23, 27	J/UJ/P
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 153323A3
SDG #: J076J601

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: D
2nd Reviewer: K

METHOD: ___ GC ___ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

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

#	Compound Name	Finding	Associated Samples	Qualifications
		% RPD Bet column		
	BB	49	1	J/A detect
	BB		9	↓
	note: BB for #9 has 40% RPD Bet column			(passed)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 15332A3
SDG #: J076/J601

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	AA, BB	exceeded cal Range	1	NA
	BB	↓	5	NA
	AA, BB, Z	↓	9	NA
	BB	↓	22	NA

Comments: See sample calculation verification worksheet for recalculations

LDC #: 15332 A3
SDG #: J076/JQ01

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: ___ GC ___ HPLC

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?

#	Compound Name	Finding	Associated Samples	Qualifications
	AA, BB	exceeded cal Range	1	R/A
	all except Above	diluted	2	R/A
	BB	exceeded cal Range	5	R/A
	All except Above	diluted	6	R/A
	AA, BB, Z	exceeded cal Range	9	R/A
	all except above	diluted	10	R/A
	BB	exceeded cal Range	22	R/A
	all except above	diluted	23	R/A

Comments: _____

LDC #: 15332A3
SDG #: J076/J801

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC ✓ HPLC ____

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

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (250 std)	Recalculated CF (250 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/21/06	1260 -1	0.1316	0.1316	0.1375	0.1375	15.1	15.1
		RTX-5							
2		ZB-35	1260	0.1249	0.1249	0.1280	0.1280	11.9	11.9
3									
4									

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.

LDC #: 15332A3
SDG #: J076 | J201

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

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

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	CCV 10:10	7/19/06	1260-1 RTX-5	500	491.1	491.1	1.8	1.8
			ZB35	↓	458.7	458.7	8.3	8.3
2	CCV 15:08	7/19/06	↓	↓	453.1	453.1	9.4	9.4
					444.1	444.1	11.2	11.2
3	CCV 2104	7/19/06	↓	↓	497.8	497.8	0.4	0.4
					504.1	504.1	0.8	0.8
4	CCV 1805	7/20/06	↓	↓	535.5	535.5	7.1	7.1
					526.4	526.4	5.3	5.3

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 #: 15332A3
SDG #: J076/J080 1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: B
2nd reviewer: A

METHOD: GC __ HPLC

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	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
TCMX	ZB35	40	~~69.3~~ 27.73	69.2	69.3	0
DCB	ZB35	40	~~126.7~~ 50.66	127	127	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 15332 A3
SDG #: J076 / JQ01

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) and relative percent differences (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 concentration SC = Sample concentration
SA = Spike added
RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 24+25

Compound	Spike Added (ug/kg)		Sample Conc. (ug/g)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Aroclor 1260	19.6	19.8	ND	12.4	14.0	63.3	63.3	70.7	70.7	12.1	12.1

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.

LDC #: 15332 A3
SDG #: J076 (J801)

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

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

METHOD: GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked concentration, SA = Spike added, SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100 LCS = Laboratory Control Sample percent recovery LCSD = Laboratory Control Sample duplicate percent recovery

LCS/LCSD samples: LCS- 071406

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Aroclor 1260	102	NA	0	80.7	NA	79.1	79.1	NA			

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

LDC #: 15332A3
SDG #: J076/J201

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (GC __ HPLC

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 within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. #1 Compound Name 1260

Final Concentration = $\frac{1603.35 \times 5}{25.4}$

= 316.6 ug/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications
	Aroclor 1260 =	1015650 x 80 / 467253 x 0.1280	= 1358.54		
	Aroclor 1260-1+2+5 =	1358.54 +	1866.614 + 1584.908		
		3	3		
		= 1603.35			

Comments:

SAMPCALew.wpd

LDC #: 15332A19 **VALIDATION COMPLETENESS WORKSHEET** Date: 8/8/06
SDG #: JO76/~~JQ01~~ Level III/IV Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS ~~Tri~~butyl-tin (Krone) / 8270D-SIM

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: 2/18 → 2/27/06
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A ~~SW~~	
IV.	Continuing calibration / ICV	A	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples / SRM	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation. not reported
XIV.	System performance	A	Not reviewed for Level III validation.
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: ** Indicates sample underwent Level IV validation

sediment

1	LDW-SC25-8-9.1**	11	MB-071406	21		31	
2	LDW-SC25-8-9.1DL**	12		22		32	
3	LDW-SC28-12-12.6	13		23		33	
4	LDW-SC28-12-12.6DL	14		24		34	
5	LDW-SC25-8-9.1MS	15		25		35	
6	LDW-SC25-8-9.1MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

No TOC

LDC #: 15332A19
SDG #: J076 / J807

VALIDATION FINDINGS CHECKLIST

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

Method: Semivolatiles (EPA SW 846 Method 8270C)

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 DFTPP 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 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 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
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?	✓			

LDC #: 15332A19
SDG #: J076/J801

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction 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 from 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.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 15332A19
SDG #: J076/J080

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1	p-Terphenyl-d14	395838 (91680-366722)		J/A det quant *
		5	↓	377320 (↓)		NO QUAL (MS)
		3	↓	371428 (↓)		J/A det quant *
					* Dibutyl Tin & Butyl Tin ion	

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 15332A19
SDG #: J076/J209

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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~~ compound	Finding	Associated Samples	Qualifications
		All	diluted	2, 4	R/A

Comments: _____

LDC #: 15334A17
SDG #: J076/~~J207~~

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (0.5/1 std)	Recalculated RRF (0.5 / std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	NT1	7/17/06	~~Phenol~~ Tributyl tin (1st internal standard)	0.809	0.809	0.754	0.754	5.9	5.9
			~~Naphthalene~~ Dibutyl tin (2nd internal standard)	0.053	0.053	0.049	0.049	6.0	6.0
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th 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.

LDC #: 15332A19
SDG #: J0761 ~~J0071~~

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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	CC0718	7/18/06	~~Phenol~~ Trifluoropropyl Trim (1st internal standard)	0.60846	0.70221	0.70221	15.40758	15.40758
	11:37		~~Naphthalene~~ Dibutyl Tin (2nd internal standard)	0.04867	0.05428	0.05428	11.52071	11.52
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th 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 #: 15332A19
SDG #: J076/J807

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

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
Nitrobenzene-d5 (Tripropyl Tin chloride)	47.18	24.39 x a85%	43.9	51.69 = 43.9	0
2-Fluorobiphenyl (Tripentyl Tin chloride)	47.18	26.30 x 0.880	49.2	55.74 = 49.2	0
Terphenyl-d14				Hexyl chloride	
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 15232A19
SDG #: J076/1807

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 concentation

RPD = | MS - MSD | * 2/(MS + MSD) MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~Phenol~~ tributyl Tin Ion	41.8	41.9	ND	~~48.6~~ 20.3	19.7	48.6	48.6	47.0	47.0	3.0	3.0
2-Chlorophenol											
1,4-Dichlorobenzene											
N-Nitroso-di-n-propylamine											
1,2,4-Trichlorobenzene											
4-Chloro-3-methylphenol											
Acenaphthene											
4-Nitrophenol											
2,4-Dinitrotoluene											
Pentachlorophenol											
Pyrene											

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.

LDC #: 15332A19
SDG #: J076/J207

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 1
2nd Reviewer: 2

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

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

LCS/LCSD samples: LCS-071406

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Tributyl Tin Ion										
Phenol	27.7	NA	44.6	NA	62.1	62.1	NA			
2-Chlorophenol										
1,4-Dichlorobenzene										
N-Nitroso-di-n-propylamine										
1,2,4-Trichlorobenzene										
4-Chloro-3-methylphenol										
Acenaphthene										
4-Nitrophenol										
2,4-Dinitrotoluene										
Pentachlorophenol										
Pyrene										

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

LDC #: 15332A19
SDG #: J076/J080

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1	p-Terphenyl-d14	395838 (91680-366722)		J/A det quant *
		5	↓	377320 (↓)		NO QUAL (MS)
		3	↓	371428 (↓)		J/A det quant *
					* Dibutyl Tin & Butyl Tin ion	

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 15332A19
SDG #: J076/J209

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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~~ compound	Finding	Associated Samples	Qualifications
		All	diluted	2, 4	R/A

Comments: _____

LDC #: 15336A17
SDG #: J076/~~J207~~

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (0.5/1 std)	Recalculated RRF (0.5/ std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	NT1	7/17/06	~~Phenol~~ Tributyl tin (1st internal standard)	0.809	0.809	0.754	0.754	5.9	5.9
			~~Naphthalene~~ Dibutyl tin (2nd internal standard)	0.053	0.053	0.049	0.049	6.0	6.0
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th 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.

LDC #: 15332A19
SDG #: J0761 ~~J0071~~

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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	CC0718	7/18/06	~~Phenol~~ Trifluoropropyl Trim (1st internal standard)	0.60846	0.70221	0.70221	15.40758	15.40758
	11:37		~~Naphthalene~~ Dibutyl Tin (2nd internal standard)	0.04867	0.05428	0.05428	11.52071	11.52
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th 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 #: 15232A19
SDG #: J076/1807

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 concentation

RPD = | MS - MSD | * 2/(MS + MSD) MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
~~Phenol~~ tributyl Tin Ion	41.8	41.9	ND	~~48.6~~ 20.3	19.7	48.6	48.6	47.0	47.0	3.0	3.0
2-Chlorophenol											
1,4-Dichlorobenzene											
N-Nitroso-di-n-propylamine											
1,2,4-Trichlorobenzene											
4-Chloro-3-methylphenol											
Acenaphthene											
4-Nitrophenol											
2,4-Dinitrotoluene											
Pentachlorophenol											
Pyrene											

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.

LDC #: 15332A19
SDG #: J076/J207

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 1
2nd Reviewer: 2

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

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

LCS/LCSD samples: LCS-071406

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Tributyl Tin Ion										
Phenol	27.7	NA	44.6	NA	62.1	62.1	NA			
2-Chlorophenol										
1,4-Dichlorobenzene										
N-Nitroso-di-n-propylamine										
1,2,4-Trichlorobenzene										
4-Chloro-3-methylphenol										
Acenaphthene										
4-Nitrophenol										
2,4-Dinitrotoluene										
Pentachlorophenol										
Pyrene										

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

LDC #: 15332A19
SDG #: J076/J207

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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 = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

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)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. _____, _____:

Conc. = $\frac{(\quad)(\quad)(\quad)(\quad)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)(\quad)(\quad)}$

all ND

=

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

LDC #: 15332A4 **VALIDATION COMPLETENESS WORKSHEET** Date: 8/8/06
SDG #: JO76/~~J0901~~ Level III/IV Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: MM
2nd Reviewer: R

METHOD: Metals (EPA SW 846 Method 6010B/7000)

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: 2/10/06 - 2/15/06
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	SW	
V.	Matrix Spike Analysis	SW	
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS, SRM
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

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

Validated Samples: ** Indicates sample underwent Level IV validation

1	LDW-SC8-8-10**	11		21		31	
2	LDW-SC12-6.7-8.7	12		22		32	
3	LDW-SC14-6-8.7	13		23		33	
4	LDW-SC14-10-11	14		24		34	
5	LDW-SC25-8-9.1	15		25		35	
6	LDW-SC28-12-12.6	16		26		36	
7	LDW-SC8-8-10MS	17		27		37	
8	LDW-SC8-8-10DUP	18		28		38	
9	PB	19		29		39	
10		20		30		40	

Notes: _____

LDC #: 15332A4
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

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

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
V. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
VI. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 15332A4
SDG #: J876

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JM
2nd Reviewer: R

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
VIII. Internal Standards (EPA SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 15332A6f

SDG #: JB 76

VALIDATION FINDINGS WORKSHEET

Sample Specific Element Reference

Page: 1 of 1

Reviewer: MH

2nd reviewer: K

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,5,6	Sediment	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
2-4	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
~~7~~		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
↓ 8	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___

Analysis Method

ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻,

Comments: [Mercury by CVAA if performed]

ELEMENTS.4

LDC #: 15332A9
SDG #: J096

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer: AC

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

(Y) N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N (N/A) Was a midrange cyanide standard distilled?

(Y) N N/A Are all correlation coefficients ≥0.995?

(Y) N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
1	7/13/06	CRDL	Zn	65.0 (70-130)	1, 5, 6, 8	N. Zn (>2X CRDL)

Comments:

LDC #: 15332A4
SDG #: JD476

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

Reviewer: MM
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Were ICP interference check samples performed as required?
(Y) N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
1	7/13/06	ICSA	Cr	-6.2 ug/L	1, 5, 6, 8	Vo qual (Al, Ca, Mg, Fe
			Mo	8.1		
			Se	-94.1		<90% in ICSA Solution).
			Zn	-10.1		

Comments:

LDC #: 15332A4
SDG #: JQN6

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125?~~ 70-130 If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	~~8~~ 7	sediment	Sb	16.8	~~1-6, 8~~ MM 1, 5, 6, 8	J/UJ/A (post spike 92.1%)

Comments:

MS.4S2

LDC #: 15332A4
SDG #: JQ76

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: AK

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Sb	2064	2000	103.2	103.2	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	7.87	8.0	98.4	98.4	Y
CCV	ICP (Continuing calibration)	Ag	969.4	1000	96.9	96.9	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	4.02	4.0	100.5	100.5	Y
	Cyanide (Initial calibration)						
	Cyanide (Continuing calibation)						

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

LDC #: 15332A4
SDG #: J0476

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recaluculated using the following formula:

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

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

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

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

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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	TR	921	1000	92.1	92.1	Y
LCS	Laboratory control sample	Pb	206.2	200	103	103	
7	Matrix spike	As	(SSR-SR) 341	363	93.9	93.1	
8	Duplicate	V	99.1	92.6	8.6	8.6	
1	ICP serial dilution	Cr	312.5	300.3 ~~625~~	4.1	4.0	

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

TOTCLC.4SW

LDC #: 15324A4
SDG #: J076

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MW
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
(Y) N N/A Are all detection limits below the CRDL?

Detected analyte results for 1 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$$As = \frac{0.1149\ mg/L \times 0.05L \times 2 \times 1000\ g/kg}{1.006g \times 0.546} = 20.9\ mg/kg$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	As	21	21	Y
	Cd	1.9	1.9	|
	Cr	54.3	54.7	|
	Co	9.4	9.4	|
	Cu	90.7	91.4	|
	Pb	84	84	|
	Hg	0.85	0.85	|
	Mo	2.3	2.3	|
	Ni	24	24	|
	Ag	2.3	2.3	|
	V	92.1	92.6	|
	Zn	182	183	✓

LDC #: 15332A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 8/8/06
SDG #: JO76/JQ01 Level III/IV Page: 1 of 1
Laboratory: Analytical Resources, Inc. Reviewer: MM
2nd Reviewer: X

METHOD: TOC (Plumb), Total Solids (EPA Method 160.3)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 2/10/06 - 2/15/06
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	MS
V	Duplicates	A	Dup. Triplicates.
VI.	Laboratory control samples	A	LCS, SRM.
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(15, 16)
X.	Field blanks	N	

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

Validated Samples: ** Indicates sample underwent Level IV validation

1	LDW-SC8-8-10**	11	LDW-SC23-6-8	21	LDW-SC8-8-10DUP	31	
2	LDW-SC10-6-8	12	LDW-SC23-8-10.2**	22	LDW-SC20-8-10MS	32	
3	LDW-SC12-6.7-8.7	13	LDW-SC25-8-9.1	23	LDW-SC20-8-10DUP	33	
4	LDW-SC14-6-8.7	14	LDW-SC28-12-12.6	24	LDW-SC8-8-10TRP	34	
5	LDW-SC14-10-11	15	LDW-SC33-8-10	25	LDW-SC20-8-10TRP	35	
6	LDW-SC15-8-10	16	LDW-SC201-8-10	26	MB	36	
7	LDW-SC19-6-7	17	LDW-SC41-6-7.9	27		37	
8	LDW-SC19-9-11.9**	18	LDW-SC49-6-8**	28		38	
9	LDW-SC49-8-10	19	LDW-SC20-8-10	29		39	
10	LDW-SC21-10-11.3	20	LDW-SC8-8-10MS	30		40	

Notes:

LDC #: 15332A6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?			✓	
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 15332A6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MM
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.				

LDC #: 15332A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: MY
2nd reviewer: Y

All circled methods are applicable to each sample.

Sample ID	Parameter
1-19	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} (TS) ____ ____ ____
20,22	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} ____ ____ ____ ____
21,24,23,25	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN (TOC) CR^{6+} (TS) ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____

Comments: ____

LDC#: 15332A6
SDG#: see cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: MM
2nd Reviewer: MC

Inorganics, Method see cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (%)		RPD	
	15	16		
TS	65.3	65.1	0	(≤20)
TOC	1.53	1.55	1	(≤30)

V:\FIELD DUPLICATES\FD_inorganic\15332A6.wpd

LDC #: 13326
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: MY
2nd Reviewer: AL

METHOD: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of _____ was recalculated. Calibration date: _____

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

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

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte		_____(units)	_____ (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration		Blank					
Calibration verification		Standard 1					
		Standard 2					
		Standard 3					
		Standard 4					
		Standard 5					
		Standard 6					
		Standard 7					
Calibration verification ICV	TOC	5000	5454		109.08	109.09	Y
Calibration verification CCV	TOC	5000	5143		102.86	102.87	↓
Calibration verification							

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

LDC #: 15332A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See cover

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

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TOC	0.545	0.500	109	109.0	Y
20	Matrix spike sample	↓	(SSR-SR) 2.40	2.11	113.7	113.8	↓
21,24	Duplicate sample	TS	54.8 54.3	54.6	0.5	0.5	↓

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

LDC #: 15332A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: MM
2nd reviewer: C

METHOD: Inorganics, Method See cover

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

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 1 reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$TOC = \frac{TOC\ \text{Wet dry} \times TOC\ (\%\ \text{Solids})}{TS}$$

Recalculation:

$$TOC = \frac{19154 \times 0.5756}{0.546} = 20192\ \text{ppm}$$

$$= 2.02\ \%$$

#	Sample ID	Analyte	Reported Concentration (%)	Calculated Concentration (%)	Acceptable (Y/N)
1	1	TS	54.6	54.6	Y
		TOC	2.02	2.02	Y

Note:

LDC #: 15405A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 8/25/06

SDG #: DPWG19875/WG19595 Level IV Page: 1 of 1

Laboratory: AXYS Analytical Services Ltd. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 2/15/06
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration	A	
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates /BMP	N/A	Dxt
VII.	Laboratory control samples	A	LCS, SRM
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	A	
XI.	Compound quantitation and CRQLs	A	
XII.	System performance	A	
XIII.	Overall assessment of data	SW A	
XIV.	Field duplicates	N	
XV.	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:

1	LDW-SC20-8-10	11		21		31	
2	LDW-SC20-8-10DUP	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	

Notes: _____

LDC #: 15405A21
SDG #: cover

VALIDATION FINDINGS CHECKLIST

Reviewer: A
2nd Reviewer: A

Method: Dioxins/Dibenzofurans (EPA ~~SW 846~~ Method ~~8290~~ 1613B

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				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
III. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for unlabeled standards and ≤ 30% for labeled standards?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IV. Continuing calibration				
Was a routine calibration performed at the beginning and end of each 12 hour period?	✓			
Were all percent differences (%D) ≤ 20% for unlabeled standards and ≤ 30% for labeled standards?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. 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.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 15405A21
SDG #: cover

VALIDATION FINDINGS CHECKLIST

Reviewer: n
2nd Reviewer: Q

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
VIII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
IX. Internal standards				
Were internal standard recoveries within the 40-135% criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks $\geq$ 10?	✓			
X. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard $\geq$ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within $\pm$ 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N $\geq$ 2.5, at $\pm$ seconds RT) detected in the corresponding PCDPE channel?		✓		
Was an acceptable lock mass recorded and monitored?	✓			
XI. 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?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		

LDC #: 15405A21
SDG #: cont

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

LDC #: 15405A21
SDG #: cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA ~~SW 846~~ Method ~~8290~~) 1613B

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

(Y) N N/A Were all samples associated with a method blank?
(Y) N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
(Y) N N/A Was the method blank contaminated?

Blank extraction date: 7/11/06 **Blank analysis date:** 7/19/06 **Associated samples:** All

Conc. units: ng/kg

Compound	Blank ID	Sample Identification								
	WG19595-	101	1,2							
F	0.089		>5X							
G	0.376		↓							
J	0.052									
Q	0.086									
U	0.052		↓							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 15405A21
SDG #: cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA ~~SW 846~~ Method ~~8290~~) 1613B

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
		1,2	H (DB5)		R/A

Comments: _____

LDC #: 15765A21
SDG #: cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA ~~SW-846~~ Method ~~8290~~ 1613B

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,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	4/27/06	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.99	0.99	0.97	0.97	11.9	11.7
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
2	ICAL	6/26/06	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.35	1.35	1.25	1.25	15.0	15.0
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.12	1.12	1.06	1.06	13.6	13.6
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.96	0.96	0.92	0.92	8.25	8.36
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.09	1.09	1.06	1.05	7.43	7.43
			OCDF (^{13}C-OCDD)	1.57	1.57	1.51	1.51	4.69	4.61
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

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.

LDC #: 15405A71
SDG #: Cover

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: AC
2nd Reviewer: AC

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA ~~SW-846~~ Method ~~8290~~) 1613B

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 = $(A_x)(C_s)/(A_s)(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_s = Area of associated internal standard
C_x = Concentration of compound, C_s = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported ~~RRF~~ conc (CC)	Recalculated ~~RRF~~ conc (CC)	Reported %D	Recalculated %D
1	DX62-303	7/19/06	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.35	9.01	~~8.97~~ 9.00	not reported	
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.12	9.44	~~94.0~~ 94.3		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.96	49.0	~~49.3~~ 49.1		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.09	46.9	~~49.1~~ 46.8		
			OCDF (^{13}C-OCDD)	1.57	91.8	~~90.0~~ 91.6		
2	DX62-304	7/19/06	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.35	9.02	8.99		
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.12	9.31	9.28		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.96	47.4	47.5		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,3,4,6,7,8,-HpCDD)	1.09	47.0	47.0		
			OCDF (^{13}C-OCDD)	1.57	89.5	89.3		
3	DB63-182	7/26/06	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.99	10.1	10.1		
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

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

LDC #: 154052J
SDG #: Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer:
2nd Reviewer:

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

LCS ID: WG195795-102

Compound	Spike Added (ng/mL)		Spiked Sample Concentration (ng/mL)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
2,3,7,8-TCDD	10		8.59		85.9	85.9				
1,2,3,7,8-PeCDD	50		44.4		88.8	88.8				
1,2,3,4,7,8-HxCDD	↓		47.8		95.5	95.6				
1,2,3,4,7,8,9-HpCDF	↓		45.6		91.2	91.2				
OCDF	100		93.4		93.4	93.4				

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.

Ions Monitored for HRGC/HRMS Analysis of PCDDs/PCDFs

Descriptor	Accurate mass[a]	Ion ID	Elemental Composition	Analyte	Descriptor	Accurate Mass[a]	Ion ID	Elemental Composition	Analyte
1	303.9016	M	$C_{12}H_4{}^{35}Cl_4O$	TCDF	4	407.7818	M+2	$C_{12}H^{35}Cl_6{}^{37}ClO$	HpCDF
	305.8987	M+2	$C_{12}H_4{}^{35}Cl_3{}^{37}C10$	TCDF		409.7788	M+4	$C_{12}H^{35}Cl_5{}^{37}Cl_2O$	HpCDF
	315.9419	M	$^{13}C_{12}H_4{}^{35}Cl_4O$	TCDF (S)		417.8250	M	$^{13}C_{12}H^{35}Cl_7O$	HpCDF (S)
	317.9389	M+2	$^{13}C_{12}H_4{}^{35}Cl_3{}^{37}ClO$	TCDF (S)		419.8220	M+2	$^{13}C_{12}H^{35}Cl_6{}^{37}ClO$	HpCDF
	319.8965	M	$C_{12}H_4{}^{35}Cl_4O_2$	TCDD		423.7767	M+2	$C_{12}H^{35}Cl_6{}^{37}ClO_2$	HpCDD
	321.8936	M+2	$C_{12}H_4{}^{35}Cl_3{}^{37}C10_2$	TCDD		425.7737	M+4	$C_{12}H^{35}Cl_5{}^{37}Cl_2O_2$	HpCDD
	331.9368	M	$^{13}C_{12}H_4{}^{35}Cl_4O_2$	TCDD (S)		435.8169	M+2	$^{13}C_{12}H^{35}Cl_6{}^{37}ClO_2$	HpCDD (S)
	333.9338	M+2	$^{13}C_{12}H_4{}^{35}Cl_3{}^{37}ClO_2$	TCDD (S)		437.8140	M+4	$^{13}C_{12}H^{35}Cl_5{}^{37}Cl_2O_2$	HpCDD (S)
	375.8364	M+2	$C_{12}H_4{}^{35}Cl_5{}^{37}ClO$	HxCDPE		479.7165	M+4	$C_{12}H^{35}Cl_7{}^{37}Cl_2O$	NCDPE
	[354.9792]	LOCK	C_9F_{13}	PFK		[430.9728]	LOCK	C_8F_{17}	PFK
2	339.8597	M+2	$C_{12}H_3{}^{35}Cl_4{}^{37}ClO$	PeCDF	5	441.7428	M+2	$C_{12}{}^{35}Cl_7{}^{37}ClO$	OCDF
	341.8567	M+4	$C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O$	PeCDF		443.7399	M+4	$C_{12}{}^{35}Cl_6{}^{37}Cl_2O$	OCDF
	351.9000	M+2	$^{13}C_{12}H_3{}^{35}Cl_4{}^{37}C10$	PeCDF (S)		457.7377	M+2	$C_{12}{}^{35}Cl_7{}^{37}ClO_2$	OCDD
	353.8970	M+4	$^{13}C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O$	PeCDF (S)		459.7348	M+4	$C_{12}{}^{35}Cl_6{}^{37}Cl_2O_2$	OCDD
	355.8546	M+2	$C_{12}H_3{}^{35}Cl_4{}^{37}ClO_2$	PeCDD		469.7780	M+2	$^{13}C_{12}{}^{35}Cl_7{}^{37}ClO_2$	OCDD (S)
	357.8516	M+4	$C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O_2$	PeCDD		471.7750	M+4	$^{13}C_{12}{}^{35}Cl_6{}^{37}Cl_2O_2$	OCDD (S)
	367.8949	M+2	$^{13}C_{12}H_3{}^{35}Cl_4{}^{37}ClO_2$	PeCDD (S)		513.6775	M+4	$C_{12}{}^{35}Cl_6{}^{37}Cl_2O$	DCDPE
	369.8919	M+4	$^{13}C_{12}H_3{}^{35}Cl_3{}^{37}Cl_2O_2$	PeCDD (S)		[422.9278]	LOCK	$C_{10}F_{17}$	PFK
	409.7974	M+2	$C_{12}H_3{}^{35}Cl_6{}^{37}ClO$	HpCDPE					
	[354.9792]	LOCK	C_9F_{13}	PFK					
3	373.8208	M+2	$C_{12}H_2{}^{35}Cl_5{}^{37}ClO$	HxCDF					
	375.8178	M+4	$C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O$	HxCDF					
	383.8639	M	$^{13}C_{12}H_2{}^{35}Cl_6O$	HxCDF (S)					
	385.8610	M+2	$^{13}C_{12}H_2{}^{35}Cl_5{}^{37}ClO$	HxCDF (S)					
	389.8156	M+2	$C_{12}H_2{}^{35}Cl_5{}^{37}ClO_2$	HxCDD					
	391.8127	M+4	$C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O_2$	HxCDD					
	401.8559	M+2	$^{13}C_{12}H_2{}^{35}Cl_5{}^{37}ClO_2$	HxCDD (S)					
	403.8529	M+4	$^{13}C_{12}H_2{}^{35}Cl_4{}^{37}Cl_2O_2$	HxCDD (S)					
	445.7555	M+4	$C_{12}H_2{}^{35}Cl_6{}^{37}Cl_2O$	OCDPE					
	[430.9728]	LOCK	C_9F_{17}	PFK					

(a) The following nuclidic masses were used:

H = 1.007825	O = 15.994915
C = 12.000000	^{35}Cl = 34.968853
^{13}C = 13.003355	^{37}Cl = 36.965903
F = 18.9984	

S = Internal/recovery standard

LDC #: 15405A21
SDG #: Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer:
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

(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)

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

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

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

Example:

Sample I.D. 1 , A :

Conc. = $\frac{(1.0e4)(2000)(1)}{(6.25e8)(1.12)(0.622)(17)}$ ~~(40.0)~~

= 0.318 ng/kg

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