

November 14, 2011

Mr. Winston Lue
Work Assignment Manager
Office of Resource Conservation and Recovery
U.S. Environmental Protection Agency
1200 Pennsylvania Ave. NW
Washington, D.C. 20460

Contract No. EP-W-09-024
Work Assignment No. 2-05
Blue Lightning PCB Sample Results

Dear Winston:

Enclosed please find a summary report documenting the analytical results for the soil samples collected during the sampling event conducted on September 8, 2011, as part of the Blue Lightning PCB Disposal Demonstration. The summary report is a deliverable under Task 3 of the work assignment statement of work. The summary report provides the PCB analysis results of the soil samples, as well as a summary of the Quality Assurance/Quality Control (QA/QC) procedures and the final analytical data tables. If additional information on the analysis of the samples is required, a full laboratory data package can be provided.

If you have any questions, please contact me at (614) 424-7552.

Sincerely,



Michael Rectanus

Enclosure

cc: Cynthia Bowie (EPA Project Officer)
Amy Hensley (Alternate EPA WAM)
Bruce Buxton (Battelle Program Manager)

**Blue Lightning PCB Disposal Demonstration
Intermediate Soil Sampling Event
Analytical Results Summary**

An intermediate sampling event for the Blue Lightning PCB Disposal Demonstration was conducted on September 8, 2011. Four soil samples were collected during the sampling event. The samples were received at the Battelle Duxbury analytical laboratory on September 12 and immediately logged into the Battelle Laboratory Information Management System (LIMS).

The soil samples were extracted by manual Soxhlet Method 3540C, and analyzed for PCB Aroclors by gas chromatography/electron capture detection (GC/ECD) in accordance with EPA Method 8082A. Table 1 provides a summary of the analytical results in units of nanogram per gram (ng/g or parts per billion [ppb]) on a dry basis for each Aroclor analyzed in the soil samples. Table 1 also provides the total PCB concentration, in units of parts per million (ppm), as the sum of the Aroclor concentrations for each sample. These results provide the most conservative total PCB concentrations for the samples. That is, for the Aroclors resulting in a non-detect, the method detection limit (MDL) for that Aroclor was used to determine the total PCB concentration for each sample shown in Table 1.

Attachment A provides a narrative of the extraction and analysis procedures performed on the soil samples. Attachment B provides the final analytical data tables for the samples, which were created from a direct transfer of the authorized LIMS data. Attachment C provides the Quality Assurance/Quality Control (QA/QC) documents related to sample receipt and handling. A full laboratory data package related to the analysis of the samples is available upon request.

TABLE 1. BLUE LIGHTNING SOIL SAMPLE RESULTS

Client ID	EPA-24-VD-5	EPA-24-SI-5	EPA-22-VS-5	EPA-23-VS-5
Battelle ID	O6796-P	O6797-P	O6798-P	O6799-P
Collection Date	09/08/11	09/08/11	09/08/11	09/08/11
Extraction Date	09/28/11	09/28/11	09/28/11	09/28/11
Analysis Date	10/08/11	10/08/11	10/09/11	10/09/11
Analytical Instrument	ECD	ECD	ECD	ECD
% Moisture	9.77	11.11	5.98	4.76
Matrix	SOIL	SOIL	SOIL	SOIL
Sample Size	1.83	1.79	1.89	1.97
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Aroclor 1016	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1221	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1232	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1242	5855985.57 D	915144.92 D	2634.83 J	2080.31 J
Aroclor 1248	0.9 U	0.9 U	0.9 U	0.9 U
Aroclor 1254	0.9 U	0.9 U	0.9 U	0.9 U
Aroclor 1260	175228.63 D	32169.16 D	366.37 J	94.71 J
Total (ppm)	6031.2	947.3	3.0	2.2

U Analyte not detected at 3:1 signal:noise ratio. The method detection limit (MDL) reported.
D Dilution Run. Initial run outside linear range of instrument.

ATTACHMENT A
SAMPLE ANALYSIS NARRATIVE

**PCB Aroclor – QA/QC Summary
Batch 11-0333**

Project:	PCB Disposal Demonstrations
Parameters:	PCB Aroclor
Laboratory:	Battelle-Duxbury
Matrix:	Soil
Data Set:	DP-11-0559
Analytical SOP:	5-128
Method Reference:	EPA 8082A modified

Sample Custody

Collection Date	Receipt Date	Temp (°C)
9/8/2011	9/12/2011	20.8

Corrective Actions	Two corrective actions. <ul style="list-style-type: none"> • Sample count not noted on original custody • All samples received outside of standard temperature range. Work Assignment Leader contacted; deviation noted.
Sample Storage	The samples were frozen until extraction.
Related samples	NA

METHOD SUMMARIES

Sample Preparation	Approximately 2 g of soil were spiked with surrogates and extracted in methylene chloride using Soxhlet apparatus. The extract was dried over anhydrous sodium sulfate and concentrated over a water bath. The extracts were cleaned with copper (for sulfur removal), then processed through a pre-packed Forisil cleanup column, and concentrated. The samples were fortified with internal standards (IS) just prior to analysis
Prep comments	None.

**PCB Aroclor – QA/QC Summary
Batch 11-0333**

Analysis	Extracts intended for PCB analysis were analyzed using gas chromatography/electron capture detection (GC/ECD), following Battelle SOP 5-128, which is based on key components described in EPA Method 8082A. Sample data were quantified by the method of internal standards, using the IS compounds. Calibration verification was performed at the beginning and end of each 24-hour period in which samples were analyzed. Concentrations of target compounds were calculated versus internal standards using the average response factors (RF) generated from the initial calibration. The instrument was calibrated using a multi-level Aroclor 1016:1260 solution.
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Holding Times	Extraction Date(s)		Analysis Date(s)	
		9/28/2011	-	10/8/2011

Procedural Blank (PB)	A PB was prepared with this analytical batch to ensure the sample extraction and analysis methods are free of contamination.
<5 X MDL	No exceedences noted. No comments.

Note: MDL is the method detection limit.

Laboratory Control Spike (LCS)	A LCS was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy.
40-120% recovery	No exceedences noted. No comments.

Laboratory Duplicate	A laboratory duplicate was prepared with this analytical batch. The relative percent difference of target analytes were calculated to measure precision.
≤30% RPD	No exceedences noted. No comments.

Note: RPD is the relative percent difference.

Matrix Spike (MS)	A MS sample was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure data quality in terms of accuracy.
40-120% recovery	Two exceedences noted. The concentration of PCB added to the MS was masked by the concentration in the sample selected as the background for the MS sample; no recovery data could be calculated. No further corrective actions taken. No comments.

**PCB Aroclor – QA/QC Summary
Batch 11-0333**

Surrogate Recoveries	Two surrogate compounds were added prior to extraction, including PCB 34 and PCB 152. The recovery of each surrogate compound was calculated to measure data quality in terms of accuracy (extraction efficiency).
40 – 120%	Five exceedences noted. Both surrogates added to samples O6796 and O6796MS were un-recovered due to extremely high levels of PCB in the samples that interfered with the surrogate response. Recoveries could not be determined in these samples. The results are qualified with “N” indicating the result is outside the control limits, and “MI” indicating matrix interference. The surrogate PCB34 was over-recovered in sample O6797DUP due to matrix interference. The result is reported and qualified with “N” indicating the value is outside the control limits, and “ME” indicating the value is an estimate because of matrix interference.

Initial Calibration (ICAL)	The GC/ECD was calibrated with six-level quadratic calibration curve for Aroclor 1016:1260.
$R^2 \geq 0.995$	No exceedences noted. No comments.

Note: R^2 is the co-efficient of determination.

Continuing Calibration Verification (CCV)	Continuing calibration standards were run every 24 hours to ensure that initial calibration is still valid.
$\leq 25\%$ difference	No exceedences noted. No comments.

Independent Calibration Check (ICC)	The independent check was run after each ICAL to verify the calibration. This standard is from a different source than the ICAL.
$\leq 25\%$ difference	No exceedences noted. No comments.

ATTACHMENT B
FINAL ANALYTICAL DATA TABLES



The Business of Innovation

Project Client: Battelle Columbus Operations
Project Name: PCB Disposal Demonstrations
Project Number: 100006480-1

Client ID	EPA-24-VD-5	EPA-24-SI-5	EPA-22-VS-5	EPA-23-VS-5
Battelle ID	O6796-P	O6797-P	O6798-P	O6799-P
Sample Type	SA	SA	SA	SA
Collection Date	09/08/11	09/08/11	09/08/11	09/08/11
Extraction Date	09/28/11	09/28/11	09/28/11	09/28/11
Analysis Date	10/08/11	10/08/11	10/09/11	10/09/11
Analytical Instrument	ECD	ECD	ECD	ECD
% Moisture	9.77	11.11	5.98	4.76
% Lipid	NA	NA	NA	NA
Matrix	SOIL	SOIL	SOIL	SOIL
Sample Size	1.83	1.79	1.89	1.97
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Aroclor 1016	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1221	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1232	3.2 U	3.2 U	3.2 U	3.2 U
Aroclor 1242	5855985.57 D	915144.92 D	2634.83 J	2080.31 J
Aroclor 1248	0.9 U	0.9 U	0.9 U	0.9 U
Aroclor 1254	0.9 U	0.9 U	0.9 U	0.9 U
Aroclor 1260	175228.63 D	32169.16 D	366.37 J	94.71 J

Surrogate Recoveries (%)

Cl3(34)	0 NMI	117	91	95
Cl6(152)	0 NMI	60	94	97

Battelle

The Business of Innovation

Project Client: Battelle Columbus Operations
Project Name: PCB Disposal Demonstrations
Project Number: 100006480-1

Client ID	090827-01: Sand, White Quartz				
Battelle ID	BS771LCS-P				
Sample Type	LCS				
Collection Date	09/28/11				
Extraction Date	09/28/11				
Analysis Date	10/08/11				
Analytical Instrument	ECD				
% Moisture	NA				
% Lipid	NA				
Matrix	SEDIMENT				
Sample Size	2.06				
Size Unit-Basis	G_DRY				
Units	NG/G_DRY		Target	% Recovery	Qualifier
Aroclor 1016	456.33	J	388.35	118	
Aroclor 1221	3.2	U			
Aroclor 1232	3.2	U			
Aroclor 1242	3.2	U			
Aroclor 1248	0.9	U			
Aroclor 1254	0.9	U			
Aroclor 1260	445.06	J	388.35	115	

Surrogate Recoveries (%)

Cl3(34)	109
Cl6(152)	101



The Business of Innovation

Project Client: Battelle Columbus Operations
Project Name: PCB Disposal Demonstrations
Project Number: 100006480-1

Client ID	EPA-24-VD-5	EPA-24-VD-5			
Battelle ID	O6796-P	O6796MS-P			
Sample Type	SA	MS			
Collection Date	09/08/11	9/8/2011			
Extraction Date	09/28/11	9/28/2011			
Analysis Date	10/08/11	10/8/2011			
Analytical Instrument	ECD	ECD			
% Moisture	9.77	9.68			
% Lipid	NA	NA			
Matrix	SOIL	SOIL			
Sample Size	1.83	0.97			
Size Unit-Basis	G_DRY	G_DRY			
Units	NG/G_DRY	NG/G_DRY	Target	% Recovery	Qualifier
Aroclor 1016	3.2 U	3.2 U	4123.71	0	N
Aroclor 1221	3.2 U	3.2 U			
Aroclor 1232	3.2 U	3.2 U			
Aroclor 1242	5855985.57 D	3.2 U			
Aroclor 1248	0.9 U	0.9 U			
Aroclor 1254	0.9 U	0.9 U			
Aroclor 1260	175228.63 D	26492.29	4123.71	0	n

Surrogate Recoveries (%)

Cl3(34)	0 NMI	0 NMI
Cl6(152)	0 NMI	0 NMI

Battelle

The Business of Innovation

Project Client: Battelle Columbus Operations

Project Name: PCB Disposal Demonstrations

Project Number: 100006480-1

Client ID	EPA-24-SI-5	EPA-24-SI-5		
Battelle ID	O6797-P	O6797DUP-P		
Sample Type	SA	QADU		
Collection Date	09/08/11	9/8/2011		
Extraction Date	09/28/11	9/28/2011		
Analysis Date	10/08/11	10/8/2011		
Analytical Instrument	ECD	ECD		
% Moisture	11.11	10.36		
% Lipid	NA	NA		
Matrix	SOIL	SOIL		
Sample Size	1.79	1.82		
Size Unit-Basis	G_DRY	G_DRY		
Units	NG/G_DRY	NG/G_DRY	RPD	Qualifier
Aroclor 1016	3.2 U	3.2 U		NA
Aroclor 1221	3.2 U	3.2 U		NA
Aroclor 1232	3.2 U	3.2 U		NA
Aroclor 1242	915144.92 D	903703.63 D		1.3
Aroclor 1248	0.9 U	0.9 U		NA
Aroclor 1254	0.9 U	0.9 U		NA
Aroclor 1260	32169.16 D	32731.87 D		1.7

Surrogate Recoveries (%)

Cl3(34)	117	135 NME
Cl6(152)	60	59

Glossary of Data Qualifiers**Flag: Application:**

A	Tentatively identified; semi-quantitative.
B	Analyte concentration found in the sample at a concentration <5x the level found in the procedural blank.
D	Dilution Run. Initial run outside linear range of instrument.
E	Estimate, result is greater than the highest concentration level in the calibration.
H	Surrogate diluted out. Used when surrogate recovery is affected by excessive dilution of the sample extract.
J	Analyte detected below the sample-specific Reporting Limit (RL).
ME	Significant Matrix Interference - Estimated value.
MI	Significant Matrix Interference - value could not be determined or estimated.
n	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO), but meets the contingency criteria.
N	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO).
NA	Not applicable.
T	Holding Time (HT) exceeded.
U	Analyte not detected at 3:1 signal:noise ratio. The method detection limit (MDL) reported.

ATTACHMENT C
SAMPLE CUSTODY DOCUMENTATION

Sample Receipt Form

Approved: Authorized:

Project Number: _____ Client: _____

Received by: Schumitz, Matt Date/Time Received: Monday, September 12, 2011 9:30 AM

No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Commercial Carrier Tracking Number: 8488 4905 7075

COC Forms: Shipped with samples No Forms

Cooler(s)/Box(es)

Cnt	Type	Tracking No.	Seal	Seal Condition	Container Condition	Temp C	Smps
1 of 1	Cooler	8488 4905 7075	Tape	Intact	Intact	20.8	4

Samples

Sample Labels: Sample labels agree with COC forms
 Discrepancies (see Sample Custody Corrective Action Form)

Container Seals: Tape Custody Seals Other Seals (See sample Log)
 Seals intact for each shipping container
 Seals broken (See sample log for impacted samples)

Condition of Samples: Sample containers intact
 Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): 20.8 Temperature Blank used Yes No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: Yes No Unknown

Initial pH 5-9?: Yes No NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: Yes No NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: Yes No NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: Yes No Unknown /Lot No.: UnKnown

Storage Location: Chem North: Freezer - F0002 (Walk-in) BDO IDs Assigned: 06796 - 06799

Samples logged in by: Schumitz, Matt Date/Time: 09/12/2011 9:30 AM

Approved By: _____ Approved On: _____

Authorized By: _____ Authorized On: _____

Report Corrective Actions

Corrective Action No: 1 of 1

Authorized Approved:

COC Client: _____

COC Project: _____

COC Date: 9/12/2011 9:35:0

	Description of Problem:	Explanation:
Custody	Incomplete sample custody forms	THERE IS NO NUMERICAL VALUE LISTED FOR THE QAUNTITY OF SAMPLES
Temperature and Preservation	Receipt temperature outside of acceptability	SAMPLES ARRIVED AT 20.8 DEGREES

Documentation of project manager notification

Sample Custodian: Schumitz, Matt **Date:** 9/12/2011 9:46:00 AM

Laboratory Manager: Thorn, Jonathan **Date:** 10/25/2011 4:54:00 PM

Project Manager: Peven-McCarthy, Carole **Date:** 9/21/2011 8:18:00 AM

Documentation of client notification (should be completed by project manager within 24 hrs):

On _____ I contacted _____ at _____

Results of communication with client (Describe any corrective action directed by the client):

Client informed. Lab will proceed with analysis.

Date this form was received back to the custodian: _____

Reference Number: _____



The Business of Innovation

Sample Receipt Form Details

ShpNo SHP-110912-01

Battelle Project No:

Approved: Authorized

Project Number: _____ Client: _____
 Received by: Schumitz, Matt Date/Time Received: Monday, September 12, 2011 9:30 AM
 No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
O6796	EPA-24-VD-5	09/08/11 16:46	09/12/11 9:38	1	SOIL	20.8	NA	No	NA	F0002 (Walk-in)			FROM BL 24 - VADOSE
O6797	EPA-24-SI-5	09/08/11 17:10	09/12/11 9:39	1	SOIL	20.8	NA	No	NA	F0002 (Walk-in)			FROM BL 24 - SATURA
O6798	EPA-22-VS-5	09/08/11 17:15	09/12/11 9:40	1	SOIL	20.8	NA	No	NA	F0002 (Walk-in)			FROM BL 22 - VADOSE
O6799	EPA-23-VS-5	09/08/11 17:34	09/12/11 9:40	1	SOIL	20.8	NA	No	NA	F0002 (Walk-in)			FROM BL 23 - VADOSE

Total Samples: 4

FedEx Express[®] US Airbill

FedEx Tracking Number

8488 4905 7075

1 From This portion can be removed for Recipient's records.

Date _____ FedEx Tracking Number **848849057075**

Sender's Name **Mike Rectanus**

Company **BATTELLE**

Address **505 KING AVE**

City **COLUMBUS**

State **OH** ZIP **43201-2896**

Dept./Floor/Suite/Room _____

2 Your Internal Billing Reference **3182**

3 To Recipient's Name **Matthew Schmittz**

Company **Battelle**

Address **397 Washington St**

City **Duxbury**

State **MA** ZIP **02332**

Dept./Floor/Suite/Room _____

02 28883

8488 4905 7075



02 28883

02 28883

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02 28883

4a Express Package Service

FedEx Priority Overnight
Next business morning

FedEx Standard Overnight
Next business afternoon

FedEx 2Day
Second business day

FedEx Express Saver
Third business day

Express Freight Service
Minimum charge: One-pound rate

FedEx 1Day Freight
Next business day

FedEx 2Day Freight
Second business day

FedEx 3Day Freight
Third business day

Packaging
FedEx Envelope* FedEx Pak* FedEx Box FedEx Tube **Out**

Special Handling
Include FedEx address in Section 3

SATURDAY Delivery
Available only for FedEx Priority Overnight, FedEx 2Day, FedEx 3Day, FedEx First Overnight, and FedEx 2Day Freight to select ZIP codes.

HOLD Saturday at FedEx Location
Not available for FedEx Priority Overnight and FedEx 2Day to select locations.

HOLD Sunday at FedEx Location
Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipping contain dangerous goods?
One box, multiple checked: No Yes
As per attached Shipper's Declaration and/or other applicable regulations.

Payment Bill to: Sender Recipient Third Party Credit Card Cash/Check

Enter FedEx Acct. No. or Credit Card No. below.

Obtain Receipt
Acct. No. Credit Card Cash/Check

Total Packages

Total Weight

Total Charges

Credit Card Num.

Sign to Authorize Delivery Without a Signature

By signing this airbill, you authorize us to deliver the contents of your shipment without obtaining a signature. Our liability is limited to the actual value of the contents. For more information, visit our Web site at www.fedex.com or call 1-800-CO-FEDEX.

02 28883

MON - 12 SEP 7
PRIORITY OVERNIGHT

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