Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 25, 2012

William Evans
Port of Tacoma
One Sitcum Plaza
Tacoma, WA 98421

RE: Project: Brown and Haley PCB Investigation
ARI Job No. UY14

Dear Mr. Evans:
Please find enclosed the original Chain-of-Custody record and the final results for the samples from the project referenced above. Three soil samples were received intact on June 12, 2012.

The samples were analyzed for PCBs, as requested.

These analyses proceeded without incident of note.

A copy of these report and all associated raw data will remain on file at ARI. Should you have any questions, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206-695-6211
kellyb@arilabs.com

Enclosures

cc: eFile UY14

KB/kb

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 4714	Turn-around Requested:	Date: 6/11/12	
ARI Client Company: PORT OF TACOMA	Phone: 2533835841	Page: 1 of 1	
Client Contact: BILL EVANS		No. of Coolers: 1	Cooler Temps: 4.5
Client Project Name: Brown & Haley PCB investigation			
Client Project #: MID098028	Samplers: AFICHTHORN		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCB 8082	Notes/Comments
BH-1-US	6/11/12	1145	S	1	X	P.O.# 53586
BH-2-DS	6/11/12	1210	S	1	X	
BH-3-TM	6/11/12	1530	S	1	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: ANITA FICHTHORN	Printed Name: Chris Atwell	Printed Name:	Printed Name:
	Company: PORT OF TACOMA	Company: ARI	Company:	Company:
	Date & Time: 6/12/11 0830	Date & Time: 6/12/11 08 30	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

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Cooler Receipt Form

ARI Client: Port of Tacoma Project Name: Brown + Haley PCB investigat

COC No(s): _____ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 1A714 Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.5		
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#: 9094/6/19	

Cooler Accepted by: CA Date: 6/12/12 Time: 0830

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		YES	(NO)
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		YES	(NO)
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TS Date: 6-12-12 Time: 1353

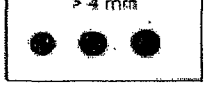
*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

BH-1-Tm Label was not filled out.

By: TS Date: 6-12-12

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: UY14
Client: Port of Tacoma
Project Event: MID098028
Project Name: Brown & Haley PCB Investigation

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	BH-1-US	UY14A	12-10685	Sediment	06/11/12 11:45	06/12/12 08:30
2.	BH-2-DS	UY14B	12-10686	Sediment	06/11/12 12:10	06/12/12 08:30
3.	BH-3-TM	UY14C	12-10687	Sediment	06/11/12 15:30	06/12/12 08:30

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Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Duplicate RPD is not within established control limits

B — Reported value is less than the CRDL but ≥ the Reporting Limit

N — Matrix Spike recovery not within established control limits

NA — Not Applicable, analyte not spiked

H — The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L — Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U — Indicates that the target analyte was not detected at the reported concentration

* — Flagged value is not within established control limits

B — Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J — Estimated concentration when the value is less than ARI's established reporting limits

D — The spiked compound was not detected due to sample extract dilution

E — Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q — Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S — Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA — The flagged analyte was not analyzed for

NR — Spiked compound recovery is not reported due to chromatographic interference

NS — The flagged analyte was not spiked into the sample

M — Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 — The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N — The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y — The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC — Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C — The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P — The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X — Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z — Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

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Quality Control Criteria for Analysis of Solid Matrix Samples for Aroclors (Polychlorinated Biphenyls – PCB) EPA Method 8082B

Analysis Code	Extraction	DL[1] (ppb)	LOD[1] (ppb)	LOQ[1] (ppb)	Analyte	Spike Recovery Control Limits (%)[2,3,8]			RPD[4]
						LCS	MB/LCS Surrogate	Sample Surrogate	
Soil / Sediment Samples (Microwave Extraction – EPA Method 3546)									
PCBSMI 15-3067F	12g to 4 mL	9.83	17	33	Aroclor 1016	55 – 109	--	--	≤ 40
		7.06	17	33	Aroclor 1260	50 – 125	--	--	
PCBSCI 08-3025F		--	--	--	TCMX	--	53 – 108	39 – 122	
		--	--	--	DCBP	--	49 – 126	31 – 140	
PCBDMP20 05-3017F	12.5 g to 2.5 mL[6]	9.33	10	20[6]	Aroclor 1016	46 – 110	--	--	≤ 40
		10.82	15	20[6]	Aroclor 1260	47 – 124	--	--	
PCBDCP20 06-3026F		--	--	--	TCMX	--	43 – 107	34 – 109	
		--	--	--	DCBP	--	48 – 123	24 – 127	
PCBDMP10 05-3017F	12.5 g to 2.5 mL[6]	0.759	5	10[6]	Aroclor 1016	46 – 110	--	--	≤ 40
		1.066	5	10[6]	Aroclor 1260	47 – 124	--	--	
PCBDCP10 06-3026F		--	--	--	TCMX	--	43 – 107	34 – 109	
		--	--	--	DCBP	--	48 – 123	24 – 127	
PCBDMP4 05-3017F	12.5 g to 2.5 mL[6]	0.577	2	4[6]	Aroclor 1016	46 – 110	--	--	≤ 40
		0.610	2	4[6]	Aroclor 1260	47 – 124	--	--	
PCBDCP4 06-3026F		--	--	--	TCMX	--	43 – 107	34 – 109	
		--	--	--	DCBP	--	48 – 123	24 – 127	
Soil / Sediment Samples Medium Level (Vortex Extraction – EPA Method 3546)									
PCBSVX 12-3019F	5 g to 40 mL	109[7]	400	800	Aroclor 1016	30 – 160	--	--	≤ 40
		192[7]	400	800	Aroclor 1260	30 – 160	--	--	
		--	--	--	TCMX	--	30 – 160	30 – 160	
		--	--	--	DCBP	--	30 – 160	30 – 160	

(1) Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) are defined in ARI SOP 1018S.
(2) Highlighted control limits (**bold font**) are adjusted from the calculated values to reflect that ARI does not use control limits < 10 for the lower limit or < 100 for the upper limit.
(3) 30 – 160 are default limits used when there is insufficient data to calculate historic control limits
(4) Acceptance criteria for the relative percent difference (RPD) between analytes in replicate analyzes. If C_O and C_D are the concentrations of the original and duplicate respectively then $RPD = \frac{|C_O - C_D|}{\frac{C_O + C_D}{2}} x100$

(6) LOQ determined by lowest concentration used to calibrate the GC-ECD instrument.
(7) MDL Study PC66 6/24/09
(8) Control Limits calculated using all data generated between 1/1/11 and 11/30/11

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ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: BH-1-US
SAMPLE

Lab Sample ID: UY14A
LIMS ID: 12-10685
Matrix: Sediment
Data Release Authorized:
Reported: 06/21/12

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028
Date Sampled: 06/11/12
Date Received: 06/12/12

Date Extracted: 06/15/12
Date Analyzed: 06/21/12 07:43
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.9 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 200
Silica Gel: Yes

Percent Moisture: 29.5%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	780	< 780 U
53469-21-9	Aroclor 1242	780	< 780 U
12672-29-6	Aroclor 1248	12,000	< 12,000 Y
11097-69-1	**Aroclor 1254**	**780**	**11,000**
11096-82-5	**Aroclor 1260**	**780**	**2,100**
11104-28-2	Aroclor 1221	780	< 780 U
11141-16-5	Aroclor 1232	780	< 780 U
37324-23-5	Aroclor 1262	780	< 780 U
11100-14-4	Aroclor 1268	780	< 780 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: BH-2-DS
SAMPLE

Lab Sample ID: UY14B
LIMS ID: 12-10686
Matrix: Sediment
Data Release Authorized:
Reported: 06/21/12

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028
Date Sampled: 06/11/12
Date Received: 06/12/12

Date Extracted: 06/15/12
Date Analyzed: 06/20/12 09:55
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 24.8%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	3.9	< 3.9 U
53469-21-9	Aroclor 1242	3.9	< 3.9 U
12672-29-6	Aroclor 1248	20	< 20 Y
11097-69-1	**Aroclor 1254**	**3.9**	**34**
11096-82-5	**Aroclor 1260**	**3.9**	**16 P**
11104-28-2	Aroclor 1221	3.9	< 3.9 U
11141-16-5	Aroclor 1232	3.9	< 3.9 U
37324-23-5	Aroclor 1262	3.9	< 3.9 U
11100-14-4	Aroclor 1268	3.9	< 3.9 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.8%
Tetrachlorometaxylene	74.0%

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ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546
Page 1 of 1

Sample ID: BH-3-TM
SAMPLE

Lab Sample ID: UY14C
LIMS ID: 12-10687
Matrix: Sediment
Data Release Authorized:
Reported: 06/21/12

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028
Date Sampled: 06/11/12
Date Received: 06/12/12

Date Extracted: 06/15/12
Date Analyzed: 06/20/12 10:16
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.8 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 20.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	3.9	< 3.9 U
53469-21-9	Aroclor 1242	3.9	< 3.9 U
12672-29-6	Aroclor 1248	68	< 68 Y
11097-69-1	**Aroclor 1254**	**3.9**	**58**
11096-82-5	**Aroclor 1260**	**3.9**	**12**
11104-28-2	Aroclor 1221	3.9	< 3.9 U
11141-16-5	Aroclor 1232	3.9	< 3.9 U
37324-23-5	Aroclor 1262	3.9	< 3.9 U
11100-14-4	Aroclor 1268	3.9	< 3.9 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.5%
Tetrachlorometaxylene	77.5%

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SW8082/PCB SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-061512	93.2%	48-123	75.5%	43-107	0
LCS-061512	93.2%	48-123	75.8%	43-107	0
BH-1-US	D	24-127	D	34-109	0
BH-2-DS	87.8%	24-127	74.0%	34-109	0
BH-3-TM	93.5%	24-127	77.5%	34-109	0

Microwave (MARS) Control Limits PCBSMM
Prep Method: SW3546
Log Number Range: 12-10685 to 12-10687

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Extraction Method: SW3546

Sample ID: MB-061512
METHOD BLANK

Lab Sample ID: MB-061512
LIMS ID: 12-10685
Matrix: Sediment
Data Release Authorized:
Reported: 06/21/12

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028
Date Sampled: NA
Date Received: NA

Date Extracted: 06/15/12
Date Analyzed: 06/20/12 08:31
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.5 g
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	Aroclor 1248	4.0	< 4.0 U
11097-69-1	Aroclor 1254	4.0	< 4.0 U
11096-82-5	Aroclor 1260	4.0	< 4.0 U
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	93.2%
Tetrachlorometaxylene	75.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PSDDA PCB by GC/ECD
Page 1 of 1

Sample ID: LCS-061512
LAB CONTROL

Lab Sample ID: LCS-061512
LIMS ID: 12-10685
Matrix: Sediment
Data Release Authorized:
Reported: 06/21/12

QC Report No: UY14-Port of Tacoma
Project: Brown & Haley PCB Investigation
MID098028
Date Sampled: NA
Date Received: NA

Date Extracted: 06/15/12
Date Analyzed: 06/20/12 08:52
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.5 g-dry-wt
Final Extract Volume: 2.50 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	84.0	101	83.2%
Aroclor 1260	93.1	101	92.2%

PCB Surrogate Recovery

Decachlorobiphenyl	93.2%
Tetrachlorometaxylene	75.8%

Results reported in µg/kg (ppb)