NW 1982

Dalton, Olmsted & Fuglevand, Inc. *Environmental Consultants*

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(Kirkland, WA Office – 425-827-4588)

MEMORANDUM

TO: Mark Adams - Department of Ecology

FROM: Matt Dalton

DATE: June 23, 2011

SUBJECT: Results - Push-Probe Groundwater Sampling
Site B - Former Verbeek Wrecking Yard
VCP No. Site NW1982

REF. NO: PSE-004-00

CC: Greg Andrina - PSE
Larry Beard - Landau
Dave Cooper - DOF

This memorandum presents the results of the push-probe groundwater sampling conducted near the downgradient end of where Gas Works Park (GWP) fill was excavated. The purpose of the sampling was to fill a data gap identified by the Department of Ecology (Ecology) as part of their evaluation of past remedial work completed on the Verbeek site. Remedial work is being completed under Ecology's Voluntary Cleanup Program (VCP). Sampling was completed on June 3, 2011.

BACKGROUND

Based on Ecology's previous review of available information, it was determined that the monitoring well MW-1 screen was set too deep (38 to 48 feet below ground surface [bgs]) to be representative of the likely potential migration flow path from the GWP fill. The location of well MW-1 is shown on attached Figure 1. Analysis of samples from this well collected in April 2009 did not detect the presence of GWP fill constituents (benzene, toluene, ethybenzene, xylene and polycyclic aromatic hydrocarbon [PAHs]). Note that this well was previously designated as MW-South in the Site B - Interim Remedial Action Plan (DOF 2010).

To fill the identified data gap, a work plan (DOF 2011) was prepared by Dalton, Olmsted & Fuglevand, Inc. (DOF) and submitted to Ecology for review and approval. The plan

was approved in a telephone call from Mark Adams (Ecology) to Matthew Dalton (DOF) on May 17, 2011. The work consisted of the drilling and sampling of two push-probes. The probes were situated to be downgradient of the former location of GWP-Fill based on hydrogeologic evaluations completed by Landau Associates, Inc.

SAMPLING AND ANALYSIS PROGRAM

Geologic Conditions. Two push-probes were drilled at the locations shown on attached Figure 1. The logs of the probes are presented in Attachment 1. The probes were drilled by Cascade Drilling using a AMS Powerprobe 9630 machine. Continuous soil samples were obtained using a 2"-diameter macro sampler with acrylic liners. The drilling and sampling activities were documented by David Cooper, licensed engineering geologist with DOF. Mr. Cooper described the samples using ASTM D-2488 as a general guide and prepared geologic logs based on his descriptions. The geologic conditions encountered during the drilling are described below. No evidence of contaminated soils (e.g. sheens or odors) were encountered during the drilling.

- DOF-PP1 is located near well MW-1. The probe was drilled to a depth of approximately 24 feet bgs. Fine sandy silt was encountered to a depth of approximately 16.5 feet that overlies water saturated fine sand to silty sand to the final drilling depth.

- DOF-PP2 is located approximately 85 feet north-northwest of DOF-PP1 and was drilled to a depth of 20 feet bgs. Fine to medium sand to silty sand with concrete and asphalt fragments were encountered to a depth of approximately 11 feet. The sandy deposit was underlain by silt to 15 feet that, in turn, overlies silty sand to the final drilling depth.

Groundwater Sampling. Groundwater samples were obtained from the probes using a temporary well screen and peristaltic pump. At DOF-PP1, the screen was set at a depth interval of 16 to 21 feet bgs, while at DOF-PP2, the screen was set at 15 to 20 feet bgs. The probes were pumped until the water visually cleared. One to two gallons of groundwater were removed prior to sampling. Field measurements were made for pH, temperature, electrical conductivity and turbidity. The measurement data are summarized below.

Field Parameter	DOF-PP1	DOF-PP2
pH	6.9	6.4
Electrical Conductivity (uS)	672	418
Temperature (C)	14.9	13.2
Turbidity (NTUs)	103	398

Groundwater Analyses and Results. After purging, the samples were pumped directly into containers provided by Analytical Resources Inc. (ARI), with the appropriate

preservatives. The samples were placed in chilled coolers and delivered to ARI the same day as the samples were collected. Sample handling was documented using standard chain-of-custody procedures. Laboratory data sheets and chain-of-custody records are presented in Attachment B.

The samples were centrifuged to settle solid particulates prior to removal of the sample aliquot for analysis (see attached case narrative). Aromatic hydrocarbons were analyzed using Method SW8021B while PAHs were analyzed using Method SW8270D-SIM GC/MS. The results, along with cleanup levels, are summarized in attached Table 1.

No aromatic hydrocarbons or PAHs were detected in any of the samples. The reporting limits are below the applicable groundwater cleanup levels based on the groundwater ingestion exposure pathway. Groundwater downgradient of the former location of GWP-fill meets groundwater cleanup levels contained in the Washington State Model Toxics Control Act (MTCA - Chapter 173-340 WAC).

REFERENCES

DOF (Dalton, Olmsted & Fuglevand, Inc.), 2010, Interim Action Remedial Action Plan, Site B Portion of Verbeek Wrecking Yard, Bothell, Washington, Prepared for Puget Sound Energy and City of Seattle, Ecology Review Draft: January 15, 2010.

DOF, 2011, Push-Probe Groundwater Sampling, Site B - Former Verbeek Wrecking Yard, VCP No. Site NW1982, Memorandum addressed to Mark Adams dated May 16, 2011.

Attachments

Table 1 - Summary of Push-Probe Groundwater Analytical Data
Figure 1 - Push-Probe Groundwater Sample Locations
Attachment A - Push-Probe Logs
Attachment B - Laboratory Data Sheets

TABLE 1 - Summary of Push-Probe Groundwater Analytical Data

Former Verbeek Wrecking Yard
Bothell, WA

Constituent	DOF-PP1 (ug/l)	DOF-PP2 (ug/l)	Cleanup Level	Method (a)
Aromatic Hydrocarbons (ug/l)				
Benzene	<1.0	<1.0	5	A
Toluene	<1.0	<1.0	1000	A
Ethylbenzene	<1.0	<1.0	700	A
m,p-Xylene	<1.0	<1.0	1000	A
o-Xylene	<1.0	<1.0	1000	A
Polycyclic Aromatic Hydrocarbons (ug/l)				
Non-Carcinogenic PAHs				
Naphthalene	<0.10	<0.10	-----	-----
2-Methylnaphthalene	<0.10	<0.10	-----	-----
1-Methylnaphthalene	<0.10	<0.10	-----	-----
Total Naphthalenes	<0.10	<0.10	160	A
Acenaphthylene	<0.10	<0.10	-----	-----
Acenaphthene	<0.10	<0.10	960	B
Fluorene	<0.10	<0.10	640	
Phenanthrene	<0.10	<0.10	-----	-----
Anthracene	<0.10	<0.10	4800	B
Fluoranthene	<0.10	<0.10	640	B
Pyrene	<0.10	<0.10	4800	B
Benzo(g,h,i)perylene	<0.10	<0.10	-----	-----
Dibenzofuran	<0.10	<0.10	32	B
Carcinogenic PAHs				
Benzo(a)anthracene	<0.10	<0.10	0.1	A
Chrysene	<0.10	<0.10	0.1	A
Total Benzofluoranthenes	<0.10	<0.10	0.1	A
Benzo(a)pyrene	<0.10	<0.10	0.1	A
Indeno(1,2,3-cd)pyrene	<0.10	<0.10	0.1	A
Dibenzo(a,h)anthracene	<0.10	<0.10	0.1	A

Notes: Analyses by ARI, Inc. - Delivery group SZ52
---- - Not available
(a) - Method A cleanup levels from Table 740-1 in WAC 173-340 WAC;
Method B cleanup levels from CLARC on Ecology's web site.
Samples were obtained on June 3, 2011

Ref: Probe Locations 6-20-11.cdr

Site B Portion Verbeek Wrecking Yard
Bothell, Washington

Push-Probe Groundwater Sample Locations

PSE-004 **FIGURE 1** June 2011

Dalton, Olmsted & Fuglevand, Inc.

ATTACHMENT A
PUSH-PROBE LOGS
Verbeek Property - June 2011

BORING - DESCRIPTION OF SAMPLES & DATA

DOF-PP1

Field Rep: DG Cooper
Drilling Co.: Cascade
Driller: L Goble
Drill Type: AMS Powerprobe 9630
Size/Type Casing: 1.5" Rod

Location: N305769 E1302084 (NAD 1983)
Elevation (Ft.):
Date Completed: 6/3/11
Weather: Clear 60F
Hammer Type: Direct push

Ground Surface: Fill
Sampler Type: 2" Macro w/ acrylic liner

Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
		Smooth	0-4	30	0900	0-1.4' Moist, bwn, gravelly, SAND, w/some silt, ns, no
						1.4-4' Moist, gry, F sandy, SILT, ns, no
			4-8	48		4-8' Moist, gry, F sandy, SILT, stiff w/mottled bwn zones,
						ns, no
			8-12	40		8-12' Wet, gry, F sandy, SILT, medium stiff, becoming wetter
			12-16	48		12-16' Wet, gry, F sandy, SILT, w/ bwn siltstone inclusions,
						ns, no
			16-20	48		16-16.5' As above
						16.5-20' Sat, gry, F SAND, w/some silt, trace organics
						thin roots @ 18", ns, no
			20-24	48		20-20.5' As above
						20.5-21' Wet, dk bwn, organic, SILT, w/some sand, woody debris
						21-24' Wet, mottled, gry-bwn, silty, SAND,w/minor gravel
						oxidation banding, weathered Till-like

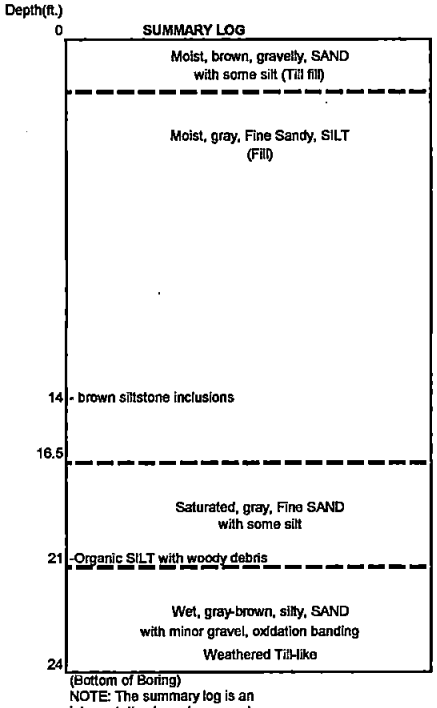
LABORATORY SAMPLES: **Water:** DOF-PP1-W @ 1000

Notes: Temporary Screen set @ 16-21' below ground surface consisting of 1/2" PVC, w/ 5' of 0.010" slot screen. Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 20' bgs. Purged 1 gallon

Groundwater parameters during sampling:

Temp - 14.9C
pH - 6.9
Cond. - 672 uS/cm
Turbidity - 103 ntu
ns - no sheen; no - no odor

Completed boring backfilled with granular bentonite



NOTE: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

BORING - DESCRIPTION OF SAMPLES & DATA

DOF-PP2

Field Rep: DG Cooper
Drilling Co.: Cascade
Driller: L Goble
Drill Type: AMS Powerpobe 9630
Size/Type Casing: 1.5" Rod

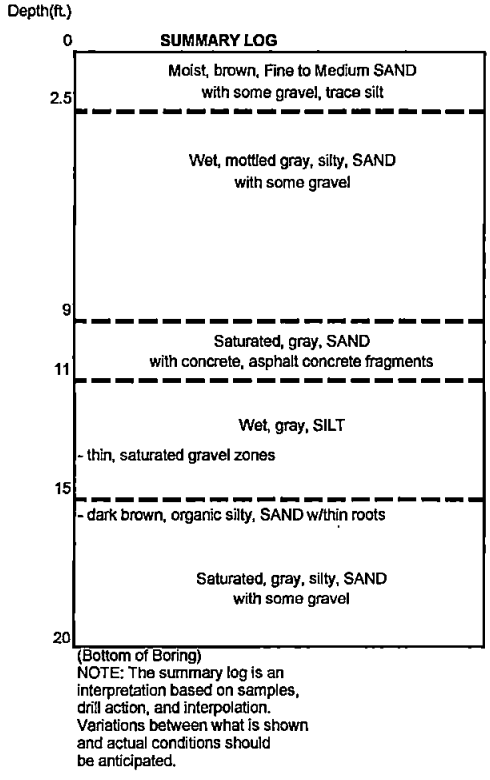
Location: N305861 E1302059 (NAD 1983)
Elevation (Ft.):
Date Completed: 6/3/11
Weather: Clear 60F
Hammer Type: Direct push

Ground Surface: Fill
Sampler Type: 2" Macro w/ acrylic liner

Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Spl length inches	Time	Sample Description
		Smooth	0-4	30	1100	0-2.5' Moist, bwn, F-M SAND, w/some gravel, trace silt, ns,no
						2.5-4' Wet, gry, silty, SAND, w/some gravel, ns,no
			4-8	48		4-8' Wet, mottled, gry, silty, SAND, w/some gravel, ns,no
			8-12	40		8-9' As above
						9-11' Sat, gry, SAND, w/some silt, concrete and asphalt concrete
						fragments, ns, no
						11-12' Wet, gry, SILT, stiff, ns,no
			12-16	48		12-15' Wet, As above, thin saturated gravel @ 13 & 14.5'
						15-15.5' Wet, dk bwn, organic, silty, SAND, w/thin roots
						15.5-16' Wet, bwn, silty, SAND, w/some gravel, ns,no
			16-20	48		16-20' Sat, gry, silty, SAND, w/some gravel, ns,no

LABORATORY SAMPLES: **Water:** DOF-PP2-W @ 1200

Notes: Temporary Screen set @ 15-20' below ground surface consisting of 1/2" PVC, w/ 5' of 0.010" slot screen. Water sample collected using peristaltic pump through 1/4" diameter polyethylene tubing with intake @ 19' bgs. Purged 2 gallons



NOTE: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

Groundwater parameters during sampling:

Temp - 13.2C

pH - 6.4

Cond. - 418 uS/cm

Turbidity - 398 ntu

ns - no sheen; no - no odor

Completed boring backfilled with granular bentonite

ATTACHMENT B
LABORATORY DATA SHEETS
Verbeek Property - June 2011

Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 15, 2011

Matt Dalton
Dalton, Olmsted, & Fuglevand
6034 N Star Road
Ferndale, WA 98248

RE: Verbeek Property – PSE-004
ARI Job No SZ52

Dear Matt:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and final analytical results for samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples and a trip blank on June 3, 2011. For details regarding sample receipt, refer to the enclosed Cooler Receipt Form.

The samples were analyzed for PAH and BETX, as requested on the COCs. Samples for PAH analysis were centrifuged to remove particulates. Per instructions the samples were analyzed for the full PAH list, a variance from the COC.

Laboratory QC was within requirements for both methods. There were no anomalies associated with the analyses.

An electronic copy of this report will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Susan Dunnihoo
Director, Client Services
sue@arilabs.com
206-695-6207

Enclosures

cc: eFile SZ52

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: SZ52 ~~SZ49~~ ~~SZ53~~	Turn-around Requested: NORMAL	Page: 1 of 1	
ARI Client Company: DALTON OLMSTED & FUGLEVAND	Phone: 206-660-3466	Date: 6/3/11	Ice Present? Y
Client Contact: MATT DALTON / DAVE COOPER		No. of Coolers: 1	Cooler Temps: 10.4
Client Project Name: VERGEER PROPERTY			
Client Project #: PSE-004	Samplers: D. Cooper		

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	* cPAHs 8270-SIM	* PAHs plus naphthalenes 8270-SIM	GTEX 8021						Notes/Comments
DOF-PP1-W	6/3/11	1000	WATER	7	X	X	X						
DOF-PP2-W	↓	1200	↓	7	X	X	X						
TRIP	↓	—	↓	2	~~X~~	~~X~~	X						

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
* CENTRIFUGE TO REMOVE PARTICULATES	Printed Name: D. Cooper	Printed Name: Jennifer Millsap	Printed Name	Printed Name
	Company: DOF	Company: ARI	Company	Company
	Date & Time: 6/3/11 1410	Date & Time: 6/3/11 1410	Date & Time	Date & Time

SZ52.COC

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: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: DOF

Project Name: Verbeek Priority

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No. ~~SZ49~~ SZ52

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)	10.4	

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90941619

Cooler Accepted by: JM Date: 6/3/11 Time: 1410

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	6/1/11	

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

Samples Logged by: JM Date: 6/3/11 Time: 1420

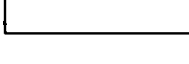
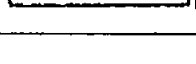
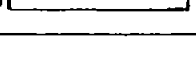
***** Notify Project Manager of discrepancies or concerns *****

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

Additional Notes, Discrepancies, & Resolutions:

DOF-PPL-W = 5min 1of4

By: JM Date: 6/3/11

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	
			Small → "sm"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

~~5249~~ 5252

Cooler#: 1	Temperature(°C): 10.4	
Sample ID	**Bottle Count**	**Bottle Type**
DOF-PP1-W	7	3-500 mL AG, 4-40 mL VOAs
DOF-PP2-W	7	" "
Trip	2	2-40 mL VOAs

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: JMA Date: 6/3/11 Time: 1411

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: SZ52
Client: Dalton, Olmsted & Fuglevand, Inc
Project Event: PSE-004
Project Name: Verbeek Property

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	DOF-PP1-W	SZ52A	11-12345	Water	06/03/11 10:00	06/03/11 14:10
2.	DOF-PP2-W	SZ52B	11-12346	Water	06/03/11 12:00	06/03/11 14:10
3.	Trip	SZ52C	11-12347	Water	06/03/11	06/03/11 14:10

Printed 06/07/11

Analytical Resources, Incorporated
Analytical Chemists and Consultants

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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Dalton, Olmsted & Fuglevand, Inc.	**ARI Project No.:** SZ52
Client Project: Verbeek Property	**Client Project No.:** PSE-004

Case Narrative

1. Two samples were submitted for preparation for ~~metals~~ PAH analysis on June 6, 2011, and were in good condition.
2. The samples were submitted for removal of solid particulate by means of centrifuging according to modified Corp of Engineers draft interim guide lines. The sediments for separation were received in 500mL amber sample bottles.
3. The samples were centrifuged in decontaminated 500mL glass bottles, in a pre-cooled centrifuge (4°C) at 1,000rpm for 30 minutes.
4. The supernatant water was decanted into clean 500mL amber bottles and delivered to sample receiving for distribution.
5. There were no other anomalies in the sample or methods on this project.

Approved by: _____ Date: 6/7/2011
Title: *Geotechnical Laboratory Technician*

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: MB-060811
METHOD BLANK

Lab Sample ID: MB-060811
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/14/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: NA
Date Received: NA

Date Extracted: 06/08/11
Date Analyzed: 06/13/11 23:51
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	84.7%
d14-Dibenzo(a,h)anthracene	91.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
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Sample ID: DOF-PP1-W
SAMPLE

Lab Sample ID: SZ52A
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/14/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: 06/03/11
Date Received: 06/03/11

Date Extracted: 06/08/11
Date Analyzed: 06/14/11 01:12
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	74.0%
d14-Dibenzo(a,h)anthracene	50.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
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Sample ID: DOF-PP2-W
SAMPLE

Lab Sample ID: SZ52B
LIMS ID: 11-12346
Matrix: Water
Data Release Authorized: MW
Reported: 06/14/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: 06/03/11
Date Received: 06/03/11

Date Extracted: 06/08/11
Date Analyzed: 06/14/11 01:40
Instrument/Analyst: NT4/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	71.7%
d14-Dibenzo(a,h)anthracene	67.3%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
PSE-004

Client ID	MNP	DBA	TOT OUT
MB-060811	84.7%	91.3%	0
LCS-060811	74.0%	67.0%	0
DOF-PP1-W	74.0%	50.0%	0
DOF-PP2-W	71.7%	67.3%	0

	LCS/MB LIMITS	QC LIMITS
(MNP) = d10-2-Methylnaphthalene	(36-101)	(30-106)
(DBA) = d14-Dibenzo(a,h)anthracene	(42-121)	(10-130)

Prep Method: SW3520C
Log Number Range: 11-12345 to 11-12346

SZ52.00013

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
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Sample ID: LCS-060811
LAB CONTROL SAMPLE

Lab Sample ID: LCS-060811
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/14/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 06/08/11
Date Analyzed LCS: 06/14/11 00:18
Instrument/Analyst LCS: NT4/JZ

Sample Amount LCS: 500 mL
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Naphthalene	2.08	3.00	69.3%
2-Methylnaphthalene	2.14	3.00	71.3%
1-Methylnaphthalene	2.18	3.00	72.7%
Acenaphthylene	2.12	3.00	70.7%
Acenaphthene	2.24	3.00	74.7%
Fluorene	2.27	3.00	75.7%
Phenanthrene	2.44	3.00	81.3%
Anthracene	2.29	3.00	76.3%
Fluoranthene	2.57	3.00	85.7%
Pyrene	2.55	3.00	85.0%
Benzo(a)anthracene	2.53	3.00	84.3%
Chrysene	2.69	3.00	89.7%
Benzo(a)pyrene	2.20	3.00	73.3%
Indeno(1,2,3-cd)pyrene	2.26	3.00	75.3%
Dibenz(a,h)anthracene	2.11	3.00	70.3%
Benzo(g,h,i)perylene	2.18	3.00	72.7%
Dibenzofuran	2.30	3.00	76.7%
Total Benzofluoranthenes	5.06	6.00	84.3%

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	74.0%
d14-Dibenzo(a,h)anthracene	67.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: MB-060711
METHOD BLANK

Lab Sample ID: MB-060711
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/08/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: NA
Date Received: NA

Date Analyzed: 06/07/11 08:43
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	95.5%
Bromobenzene	101%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: DOF-PP1-W
SAMPLE

Lab Sample ID: SZ52A
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/08/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: 06/03/11
Date Received: 06/03/11

Date Analyzed: 06/07/11 09:52
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	98.3%
Bromobenzene	100%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: DOF-PP2-W
SAMPLE

Lab Sample ID: SZ52B
LIMS ID: 11-12346
Matrix: Water
Data Release Authorized: MW
Reported: 06/08/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: 06/03/11
Date Received: 06/03/11

Date Analyzed: 06/07/11 10:20
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	97.4%
Bromobenzene	97.6%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: Trip
SAMPLE

Lab Sample ID: SZ52C
LIMS ID: 11-12347
Matrix: Water
Data Release Authorized:
Reported: 06/08/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: 06/03/11
Date Received: 06/03/11

Date Analyzed: 06/07/11 09:24
Instrument/Analyst: PID2/MH

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	1.0	< 1.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	96.9%
Bromobenzene	97.1%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

BETX WATER SURROGATE RECOVERY SUMMARY

ARI Job: SZ52
Matrix: Water

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004

Client ID	TFT	BBZ	TOT OUT
MB-060711	95.5%	101%	0
LCS-060711	99.6%	101%	0
LCSD-060711	101%	102%	0
DOF-PP1-W	98.3%	100%	0
DOF-PP2-W	97.4%	97.6%	0
Trip	96.9%	97.1%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(79-120)	(80-120)
(BBZ) = Bromobenzene	(79-120)	(80-120)

Log Number Range: 11-12345 to 11-12347

FORM II BETX

SZ52:00019

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-060711
LAB CONTROL SAMPLE

Lab Sample ID: LCS-060711
LIMS ID: 11-12345
Matrix: Water
Data Release Authorized: MW
Reported: 06/08/11

QC Report No: SZ52-Dalton, Olmsted & Fuglevand, Inc
Project: Verbeek Property
Event: PSE-004
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 06/07/11 07:46
LCSD: 06/07/11 08:15
Instrument/Analyst LCS: PID2/MH
LCSD: PID2/MH

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	4.58	3.70	124%	4.64	3.70	125%	1.3%
Toluene	38.0	36.5	104%	38.2	36.5	105%	0.5%
Ethylbenzene	11.2	10.7	105%	11.3	10.7	106%	0.9%
m,p-Xylene	39.6	40.1	98.8%	39.9	40.1	99.5%	0.8%
o-Xylene	18.9	18.1	104%	19.1	18.1	106%	1.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	99.6%	101%
Bromobenzene	101%	102%