

To:	Matt Graves, LG, Port of Vancouver	Date:	November 21, 2019
From:	Emily Hess, LG, and David Weatherby, LG Emily Hess Mind Weatherby	Project No.:	9085.10.10
RE:	Block D Soil Excavation Oversight and Sampling	Port of Vanco	ouver USA Terminal 1

On behalf of the Port of Vancouver USA (Port), Maul Foster and Alongi, Inc. (MFA) provided oversight of soil excavations and stockpile sampling for the Terminal 1 Block D property located at 110 Columbia Street in Vancouver, Washington (Block D; see the attached figure). The results of the investigation are discussed below.

BACKGROUND

Previous investigations conducted in the Block D vicinity identified two areas with soil concentrations that exceeded the Washington State Department of Ecology's Model Toxics Control Act (MTCA) Method A unrestricted land use cleanup levels (CULs):¹

- Soil sample GP7-S-3.2, collected in June 2017, had an exceedance of the naphthalene CUL. The fact that naphthalene was not detected in the sample collected at 6 feet below ground surface (bgs) at boring GP-7 shows that this exceedance is limited in extent. The detection of naphthalene may be the result of the railroad tie fragments observed at this location from 2 to 3 feet bgs.
- Soil sample GP9-S-3.0, collected in August 2017, had a benzo(a)pyrene CUL exceedance and an exceedance of the carcinogenic polycyclic aromatic hydrocarbon (cPAH) toxic equivalency quotient (TEQ). These exceedances are likely limited in extent, based on the fact that diesel- and lube-oil-range total petroleum hydrocarbons were not detected in the sample collected at 6 feet bgs at boring GP-9, and had much lower concentrations or were not detected in soil at borings GP-2 and GP-10, located to the north and east, respectively.

¹ MFA. Letter (re: Block D baseline environmental assessment—Port of Vancouver USA Terminal 1) to M. Graves, Port of Vancouver USA, Vancouver, Washington, from D. Weatherby and E. Hess, Maul Foster & Alongi, Inc., Vancouver, Washington. November 17, 2017.

Matt Graves, LG, Port of Vancouver November 21, 2019 Page 2

A contaminated media management plan (CMMP)² was prepared for Terminal 1 to provide a summary of the environmental investigations conducted; describe the nature and extent of contamination, based on the findings from the investigations; discuss the management procedures for impacted soil and groundwater reflecting reasonably likely development scenarios; and describe monitoring and maintenance procedures. The attached figure, taken from the CMMP, shows the extent of soil at Terminal 1 with chemical concentrations exceeding the MTCA Method A CULs for unrestricted land use, based on the investigations conducted by Ecology and Environment, Inc.; Hahn and Associates, Inc.; and MFA. The figure shows the exceedances in samples collected above 15 feet bgs, which is the depth for the MTCA soil point of compliance for human health exposure. The lateral extent of contamination was generally presumed to extend half the distance between the sample location with exceedances and adjacent sample locations without exceedances.

The CMMP notes that metals contamination was identified in Block D in soil samples collected below 20 feet bgs, but anticipated that hotel construction excavations were would be limited to 8 feet bgs.

FIELDWORK

The extents of the potential MTCA exceedance as mapped on the figure were delineated by Hayward Baker Inc. using stakes and spray paint in advance of the excavation activities.

On October 31, 2019, Ms. Emily Hess of MFA observed Tapani, Inc.'s advancement of the excavation of the northern area of potential MTCA exceedance (see excavation footprint on figure). Indicators of contamination, such as staining or discoloration, were not observed in the soils exposed in the excavation. The excavation was advanced to approximately 6 feet bgs and the soil was placed on plastic sheeting and stockpiled in Block C. Approximately 75 cubic yards of soil was excavated from this northern area. Ms. Hess collected a composite sample of the excavated soil as sample STKPILE-N. The sample was a composite of 14 individual grab soil samples collected from the soil stockpile. The grab samples were collected manually and homogenized before collection of the composite sample.

On November 4, 2019, Ms. Hess observed Tapani, Inc.'s advancement of the excavation of the southern area of potential MTCA exceedance (see excavation footprint on figure). Indicators of contamination, such as staining or discoloration, were not observed in the soils exposed in the excavation. The excavation was advanced to approximately 6 feet bgs and the soil was placed on plastic sheeting in a stockpile in Block C, separate from the October 31, 2019, stockpile. Approximately 350 cubic yards of soil was excavated from this southern area. Ms. Hess collected a composite sample of the excavated soil as sample STKPILE-S. The sample was a composite of 20 individual grab soil samples collected from the soil stockpile. The grab samples were collected manually and homogenized before collection of the composite sample.

² MFA. Contaminated media management plan, Terminal 1—Port of Vancouver. Prepared for Port of Vancouver USA. Maul Foster & Alongi, Inc., Vancouver, Washington, June 6, 2019.

Matt Graves, LG, Port of Vancouver November 21, 2019 Page 3

Photographs of the excavations and stockpiles are provided in Attachment A.

ANALYTICAL WORK

The two composite stockpile soil samples were submitted under chain-of-custody protocols to Apex Labs of Tigard, Oregon.

Because the previous investigations determined that only polycyclic aromatic hydrocarbons (PAHs) were a chemical of concern for the area, each sample was analyzed for PAHs by USEPA Method 8270D-SIM.

See Attachment B for the laboratory analytical reports and Attachment C for the data validation memorandum. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

RESULTS

The analytical results are presented in the attached table.

- Multiple PAHs were detected in the STCKPILE-N sample. The individual PAH concentrations and the carcinogenic PAH TEQ were below the MTCA Method A CULs. Per the Port's fill acceptance criterion, chemical concentrations in soil must be less than half the MTCA Method A CULs. The PAH concentrations and TEQ meet this criterion, indicating that the soil stockpile is acceptable for use as fill elsewhere on Port property.
- PAHs were not detected in the STCKPILE-S sample, indicating that the soil stockpile is acceptable for use as fill elsewhere on Port property.

Attachments: Limitations

Table Figure A—Photographic Log B—Laboratory Analytical Reports C—Data Validation Memorandum The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

TABLE





Table Summary of Soil Analytical Results Block D Investigation Port of Vancouver

Sample Name:			STKPILE-N	STKPILE-S
Collection Date:	MICAA	MICAB	10/31/2019	11/04/2019
PAHs (mg/kg)				
1-Methylnaphthalene	NV	35	0.0104 U	0.0106 U
2-Methylnaphthalene	NV	320	0.0104 U	0.0106 U
Acenaphthene	NV	4800	0.0104 U	0.0106 U
Acenaphthylene	NV	NV	0.0104 U	0.0106 U
Anthracene	NV	24000	0.0104 U	0.0106 U
Benzo(a)anthracene	NV	1.4	0.0131	0.0106 U
Benzo(a)pyrene	0.1	0.14	0.0117	0.0106 U
Benzo(b)fluoranthene	NV	1.4	0.0152	0.0106 U
Benzo(ghi)perylene	NV	NV	0.0128	0.0106 U
Benzo(k)fluoranthene	NV	14	0.0104 U	0.0106 U
Chrysene	NV	140	0.0146	0.0106 U
Dibenzo(a,h)anthracene	NV	0.14	0.0104 U	0.0106 U
Dibenzofuran	NV	80	0.0104 U	0.0106 U
Fluoranthene	NV	3200	0.0201	0.0106 U
Fluorene	NV	3200	0.0104 U	0.0106 U
Indeno(1,2,3-cd)pyrene	NV	1.4	0.011	0.0106 U
Naphthalene	5.0	1600	0.0104 U	0.0106 U
Phenanthrene	NV	NV	0.0133	0.0106 U
Pyrene	NV	2400	0.0263	0.0106 U
cPAH TEQ ^(a)	0.1	NV	0.0168	ND

NOTES:

Detected results are in **bold** font.

cPAH TEQ = carcinogenic PAH toxicity equivalence.

mg/kg = milligrams per kilogram.

MTCA A = Model Toxics Control Act Method A, unrestricted land use.

MTCA B = Model Toxics Control Act Method B, lower of carcinogen or noncarcinogen value.

ND = not detected.

NV = no value.

PAH = polycyclic aromatic hydrocarbon.

U = Result is non-detect to method detection limit.

^(a)cPAH TEQ calculated with non-detect results treated as one-half according to Washington State Department of Ecology Implementation Memorandum #10 (Evaluating the Human Health Toxicity of Carcinogenic PAHs [cPAHs] Using Toxicity Equivalency Factors [TEFs]). April 20, 2015.

FIGURE



Partit: X:9045.10 Port of Vancouver/Projects/Fig_Concentrations_in_Sol_Exceeding_M	The set of th		TP-2 TP-3 TP-4 CP-5 CP-6 CP-4 CP-4 CP-4 CP-4 CP-4 CP-4 CP-5 CP-4 CP-4 CP-5 CP-4 CP-5 CP-4 CP-5 CP-1 CP-5 CP-5 CP-5 CP-1 CP-5 CP-1 CP-5 CP-5 CP-5 CP-5 CP-1 CP-5 CP-1 CP-5 CP-5 CP-5 CP-5 CP-1 CP-5 CP-1 CP-5 CP-5 CP-5 CP-5 CP-1 CP-5 CP-1 CP-5 CP-1 CP-5 CP-1 CP-5 CP-5 CP-5 CP-5 CP-5 CP-5 CP-5 CP-5	GP-1 P+2 3 3	TP-5 TP-5 TP-5 TP-5 TP-5 TP-5 TP-5 TP-5
: ehess	greater than 20 feet bgs are not contoured (SB-004 and SB-007). These depths are considered beyond the limit of a typical direct contact exposure scenario.				
Approved b)	Source: Aerial photograph obtained from NOAA. Tax lots (2016) obtained from Clark County GIS; historical sample point locations obtained from E&E and HAI.		Legend	_	
Produced by: surner	NOTES: Historical sample point locations are approximate. Lateral extent of soil (created by HAI, digitized and updated by MFA) for MTCA Method A exceedances. bgs = below ground sruface. E&E = Ecology & Environment, Inc. HAI = Hahn and Associates, Inc. MTCA = Model Toxics Control Act.	 ⊗ 	Groundwater Monitoring Well Soil Gas Boring Soil Boring Soil and Reconnaissance Groundwater Boring		October 2019 Excavation Extent November 2019 Excavation Extent Blocks Terminal 1 Site
oject: 9085.10.02-01	This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.	•	Test Pit Reconnaissance Groundwater Boring		Tax Lot · Railroad



Figure Estimated Extent of Concentrations in Soil Exceeding MTCA Method A Cleanup Levels for Unrestricted Land Use

Port of Vancouver Vancouver, Washington





ATTACHMENT A PHOTOGRAPHIC LOG





Photo No. 1

Description

Paint and stakes with flagging laid out for northern MTCAexceedance area, facing southwest. Soil excavation in area not yet in progress.

October 31, 2019

PHOTOGRAPHS

Project Name: Project Number: 9085.10.10 Location:

Port of Vancouver Block D Soil Excavation Terminal 1 Block D-Vancouver, Washington



Photo No. 2

Description

Final extent of soil excavation for northern area, facing southwest.

October 31, 2019





Photo No. 3

Description

Stockpile for northern excavation area, facing east. Sample STKPILE-N was collected from this stockpile. Stockpile was placed on plastic sheeting in Block C.

October 31, 2019

PHOTOGRAPHS

Project Name: Project Number: 9085.10.10 Location:

Port of Vancouver Block D Soil Excavation Terminal 1 Block D-Vancouver, Washington





Description

Soil excavation in progress for southern area, facing east. Note that concrete from Hayward Baker, Inc.'s soil stabilization work was encountered in southeast portion of excavation.

November 4, 2019





Photo No. 5

Description

Final extent of soil excavation for southern area, facing east.

November 4, 2019

PHOTOGRAPHS

Project Name: Project Number: 9085.10.10 Location:

Port of Vancouver Block D Soil Excavation Terminal 1 Block D-Vancouver, Washington



Photo No. 6

Description

Stockpile for southern excavation area, facing east. Sample STKPILE-S was collected from this stockpile. Note that covered stockpile is from the northern area excavated on 10/31/19. Stockpile was placed on plastic sheeting in Block C.

November 4, 2019



ATTACHMENT B LABORATORY ANALYTICAL REPORTS





6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Monday, November 4, 2019

Emily Hess Maul Foster & Alongi, INC. 2001 NW 19th Ave, STE 200 Portland, OR 97209

RE: A9J1122 - POV-Block D - 9085.10.10

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9J1122, which was received by the laboratory on 10/31/2019 at 12:53:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: <u>pnerenberg@apex-labs.com</u>, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

Cooler #1

(See Cooler Receipt Form for details) 0.8 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: <u>POV-Block D</u>	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	<u>Report ID:</u>
Portland, OR 97209	Project Manager: Emily Hess	A9J1122 - 11 04 19 1408

ANALYTICAL REPORT FOR SAMPLES

	SAMPLE INFO	RMATION		
Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
STKPILE-N	A9J1122-01	Soil	10/31/19 11:00	10/31/19 12:53

Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: <u>POV-Block D</u>	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J1122 - 11 04 19 1408

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM											
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes			
STKPILE-N (A9J1122-01)				Matrix: Soil		Batch:	9101832				
Acenaphthene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Acenaphthylene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Anthracene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Benz(a)anthracene	13.1		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Benzo(a)pyrene	11.7		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Benzo(b)fluoranthene	15.2		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Benzo(k)fluoranthene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Benzo(g,h,i)perylene	12.8		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Chrysene	14.6		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Dibenz(a,h)anthracene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Dibenzofuran	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Fluoranthene	20.1		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Fluorene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Indeno(1,2,3-cd)pyrene	11.0		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
1-Methylnaphthalene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
2-Methylnaphthalene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Naphthalene	ND		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Phenanthrene	13.3		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Pyrene	26.3		10.4	ug/kg dry	1	11/01/19 11:18	EPA 8270D (SIM)				
Surrogate: 2-Fluorobiphenyl (Surr)		Recov	ery: 89 %	Limits: 44-120 %	1	11/01/19 11:18	EPA 8270D (SIM)				
p-Terphenyl-d14 (Surr)			94 %	54-127 %	1	11/01/19 11:18	EPA 8270D (SIM)				

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Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

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Maul Foster & Alongi, INC.										
2001 NW 19th Ave, STE 200		Project	t Number: 9085.1	10.10			Report ID:			
Portland, OR 97209		Project	Manager: Emily	Hess		A9J1122 - 11 04 19 1408				
		ANALYTI	CAL SAMPL	E RESULI	ſS					
		Pe	ercent Dry We	ight						
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes		

				•			
STKPILE-N (A9J1122-01)		Matrix: Soil		Batch: 91	01793		
% Solids	92.5		1.00	% by Weight	1	11/01/19 08:33	EPA 8000C

Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Notes

<u>Maul Foster & Alongi, INC.</u> 2001 NW 19th Ave, STE 200 Portland, OR 97209			Pro Proj	Project: oject Numbe ject Manage	<u>POV-Bl</u> er: 9085.10 er: Emily H	<u>ock D</u> .10 Iess			А	<u>F</u> 9J1122	<u> </u>	<u>.</u> 1408
		QU	ALITY CO	ONTROL	(QC) SA	MPLE R	ESULTS					
Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM												
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	No
Batch 9101832 - EPA 3546							Soil					
Blank (9101832-BLK1)			Prepared	: 10/31/19 1	5:07 Anal	yzed: 11/01	19 10:28					
EPA 8270D (SIM)												
Acenaphthene	ND		8.33	ug/kg we	et 1							
Acenaphthylene	ND		8.33	ug/kg we	et 1							

reenaphtnene	nD .		0.55	ug/ng wet	1					
Acenaphthylene	ND		8.33	ug/kg wet	1			 	 	
Anthracene	ND		8.33	ug/kg wet	1			 	 	
Benz(a)anthracene	ND		8.33	ug/kg wet	1			 	 	
Benzo(a)pyrene	ND		8.33	ug/kg wet	1			 	 	
Benzo(b)fluoranthene	ND		8.33	ug/kg wet	1			 	 	
Benzo(k)fluoranthene	ND		8.33	ug/kg wet	1			 	 	
Benzo(g,h,i)perylene	ND		8.33	ug/kg wet	1			 	 	
Chrysene	ND		8.33	ug/kg wet	1			 	 	
Dibenz(a,h)anthracene	ND		8.33	ug/kg wet	1			 	 	
Dibenzofuran	ND		8.33	ug/kg wet	1			 	 	
Fluoranthene	ND		8.33	ug/kg wet	1			 	 	
Fluorene	ND		8.33	ug/kg wet	1			 	 	
Indeno(1,2,3-cd)pyrene	ND		8.33	ug/kg wet	1			 	 	
1-Methylnaphthalene	ND		8.33	ug/kg wet	1			 	 	
2-Methylnaphthalene	ND		8.33	ug/kg wet	1			 	 	
Naphthalene	ND		8.33	ug/kg wet	1			 	 	
Phenanthrene	ND		8.33	ug/kg wet	1			 	 	
Pyrene	ND		8.33	ug/kg wet	1			 	 	
Surr: 2-Fluorobiphenyl (Surr)		Recove	ry: 93%	Limits: 44-12	0%	Dilu	tion: 1x			
p-Terphenyl-d14 (Surr)			102 %	54-122	7 %		"			

102 %

Prepared: 10/31/19 15:07 Analyzed: 11/01/19 10:53

EPA 8270D (SIM)								
Acenaphthene	856	 10.0	ug/kg wet	1	800	 107	40-122%	
Acenaphthylene	864	 10.0	ug/kg wet	1	800	 108	32-132%	
Anthracene	838	 10.0	ug/kg wet	1	800	 105	47-123%	
Benz(a)anthracene	856	 10.0	ug/kg wet	1	800	 107	49-126%	
Benzo(a)pyrene	804	 10.0	ug/kg wet	1	800	 101	45-129%	
Benzo(b)fluoranthene	873	 10.0	ug/kg wet	1	800	 109	45-132%	
Benzo(k)fluoranthene	916	 10.0	ug/kg wet	1	800	 114	47-132%	
Benzo(g,h,i)perylene	867	 10.0	ug/kg wet	1	800	 108	43-134%	
Chrysene	867	 10.0	ug/kg wet	1	800	 108	50-124%	

Apex Laboratories

LCS (9101832-BS1)

Philip Nevenberg



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Apex Laboratories, LLC

6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: POV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	<u>Report ID:</u>
Portland, OR 97209	Project Manager: Emily Hess	A9J1122 - 11 04 19 1408
	QUALITY CONTROL (QC) SAMPLE RESULTS	

		Polya	romatic Hy	ydrocarbo	ons (PAH	s) by EPA	8270D S	IM				
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101832 - EPA 3546							Soil					
LCS (9101832-BS1)			Prepareo	d: 10/31/19	15:07 Ana	lyzed: 11/01	/19 10:53					
Dibenz(a,h)anthracene	909		10.0	ug/kg we	et 1	800		114	45-134%			
Dibenzofuran	843		10.0	ug/kg we	et 1	800		105	44-120%			
Fluoranthene	817		10.0	ug/kg we	et 1	800		102	50-127%			
Fluorene	832		10.0	ug/kg we	et 1	800		104	43-125%			
Indeno(1,2,3-cd)pyrene	863		10.0	ug/kg we	et 1	800		108	45-133%			
1-Methylnaphthalene	784		10.0	ug/kg we	et 1	800		98	40-120%			
2-Methylnaphthalene	787		10.0	ug/kg we	et 1	800		98	38-122%			
Naphthalene	799		10.0	ug/kg we	et 1	800		100	35-123%			
Phenanthrene	839		10.0	ug/kg we	et 1	800		105	50-121%			
Pyrene	813		10.0	ug/kg we	et 1	800		102	47-127%			
Surr: 2-Fluorobiphenyl (Surr)		Rec	overy: 96%	Limits: 44	-120 %	Dili	ution: 1x					
p-Terphenyl-d14 (Surr)			101 %	54	-127 %		"					
QC Source Sample: Non-SDG (A	<u>A9J1014-01)</u>		175	4 1	4						2004	D.(
Acenanhthene	ND		175	uø/kø dr	v 4		ND				30%	R-(
Acenaphthylene	ND		56.4	ug/kg dr	v 4		ND				30%	
Anthracene	ND		56.4	ug/kg dr	y 4		ND				30%	
Benz(a)anthracene	ND		56.4	ug/kg dr	v 4		ND				30%	
Benzo(a)pyrene	ND		56.4	ug/kg dr	v 4		ND				30%	
Benzo(b)fluoranthene	ND		56.4	ug/kg dr	v 4		ND				30%	
Benzo(k)fluoranthene	ND		56.4	ug/kg dr	v 4		ND				30%	
Benzo(g,h,i)perylene	ND		56.4	ug/kg dr	y 4		ND				30%	
Chrysene	ND		56.4	ug/kg dr	y 4		ND				30%	
Dibenz(a,h)anthracene	ND		56.4	ug/kg dr	v 4		ND				30%	
Dibenzofuran	174		56.4	ug/kg dr	y 4		114			42	30%	Q-(
Fluoranthene	ND		56.4	ug/kg dr	v 4		ND				30%	
Fluorene	245		56.4	ug/kg dr	y 4		170			36	30%	Q-(
Indeno(1,2,3-cd)pyrene	ND		56.4	ug/kg dr	y 4		ND				30%	
1-Methylnaphthalene	1350		56.4	ug/kg dr	v 4		959			34	30%	Q-(
2-Methylnaphthalene	2220		56.4	ug/kg dr	v 4		1570			34	30%	Q-(
Naphthalene	738		56.4	ug/kg dr	v 4		382			64	30%	Q-(
Phenanthrene	372		56.4	ug/kg dr	v 4		301			21	30%	, i i i i i i i i i i i i i i i i i i i
Pvrene	178		56.4	ug/kg dr	v 4		128			33	30%	O-(

Apex Laboratories

Philip Nevenberg



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

<u>Maul Foster & Alongi, INC.</u> 2001 NW 19th Ave, STE 200 Portland, OR 97209		Project:POV-Block DProject Number:9085.10.10Project Manager:Emily Hess					A	<u>F</u> A9J1122	<u>Report ID:</u> - 11 04 19	1408		
		QU	ALITY CO	ONTROL	(QC) SA	MPLE R	ESULTS					
		Polya	romatic Hy	/drocarbo	ns (PAH	s) by EPA	8270D S	IM				
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101832 - EPA 3546							Soil					
Duplicate (9101832-DUP1)			Preparec	1: 10/31/19 1	5:07 Ana	yzed: 11/01	/19 12:34					
QC Source Sample: Non-SDG (A9.	<u>J1014-01)</u>											
Surr: 2-Fluorobiphenyl (Surr) p-Terphenyl-d14 (Surr)		Reco	overy: 81 % 86 %	Limits: 44- 54-	-120 % -127 %	Dili	ution: 4x "					
Matrix Spike (9101832-MS1)			Prepared	d: 10/31/19 1	5:07 Ana	yzed: 11/01	/19 11:43					
QC Source Sample: STKPILE-N (A9J1122-0	<u>1)</u>										
Acenaphthene	821		10.3	ug/kg dr	y 1	827	ND	99	40-122%			
Acenaphthylene	829		10.3	ug/kg dr	y 1	827	ND	100	32-132%			
Anthracene	801		10.3	ug/kg dr	y 1	827	ND	97	47-123%			
Benz(a)anthracene	808		10.3	ug/kg dr	y 1	827	13.1	96	49-126%			
Benzo(a)pyrene	752		10.3	ug/kg dr	y 1	827	11.7	90	45-129%			
Benzo(b)fluoranthene	809		10.3	ug/kg dr	y 1	827	15.2	96	45-132%			
Benzo(k)fluoranthene	834		10.3	ug/kg dr	y 1	827	ND	101	47-132%			
Benzo(g,h,i)perylene	819		10.3	ug/kg dr	y 1	827	12.8	97	43-134%			
Chrysene	812		10.3	ug/kg dr	y 1	827	14.6	97	50-124%			
Dibenz(a,h)anthracene	841		10.3	ug/kg dr	y 1	827	ND	102	45-134%			
Dibenzofuran	814		10.3	ug/kg dr	y 1	827	ND	98	44-120%			
Fluoranthene	785		10.3	ug/kg dr	y 1	827	20.1	93	50-127%			
Fluorene	807		10.3	ug/kg dr	y 1	827	ND	98	43-125%			
Indeno(1,2,3-cd)pyrene	804		10.3	ug/kg dr	y 1	827	11.0	96	45-133%			
1-Methylnaphthalene	758		10.3	ug/kg dr	y 1	827	ND	92	40-120%			
2-Methylnaphthalene	756		10.3	ug/kg dr	y 1	827	ND	91	38-122%			
Naphthalene	764		10.3	ug/kg dr	y 1	827	ND	92	35-123%			
Phenanthrene	801		10.3	ug/kg dr	y 1	827	13.3	95	50-121%			
Pyrene	798		10.3	ug/kg dr	y 1	827	26.3	93	47-127%			
Surr: 2-Fluorobiphenyl (Surr)		Rece	overy: 87 %	Limits: 44	120 %	Dilt	ution: 1x					
p-Terphenyl-d14 (Surr)			91 %	54-	127 %		"					

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6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.
2001 NW 19th Ave, STE 200
Portland, OR 97209

Project:POV-Block DProject Number:9085.10.10Project Manager:Emily Hess

<u>Report ID:</u> A9J1122 - 11 04 19 1408

QUALITY CONTROL (QC) SAMPLE RESULTS

				Percen	t Dry Weig	iht						
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9101793 - Total Solids (L	Dry Weigh	nt)					Soil					
Duplicate (9101793-DUP1)			Prepared	1: 10/31/19	08:55 Anal	yzed: 11/01/	/19 08:33					
QC Source Sample: Non-SDG (A9.	<u> J0990-62)</u>											
% Solids	98.1		1.00	% by We	ight 1		98.1			0.03	10%	
Duplicate (9101793-DUP2)			Prepared	1: 10/31/19	08:55 Anal	yzed: 11/01/	19 08:33					
QC Source Sample: Non-SDG (A9.	<u>J1104-02)</u>											
% Solids	90.9		1.00	% by We	ight 1		90.9			0.08	10%	
Duplicate (9101793-DUP3)			Prepared	l: 10/31/19	19:09 Anal	yzed: 11/01/	19 08:33					
QC Source Sample: Non-SDG (A9.	<u>J1135-03)</u>											
% Solids	82.7		1.00	% by We	ight 1		83.1			0.5	10%	
Duplicate (9101793-DUP4)			Prepared	l: 10/31/19	19:09 Anal	yzed: 11/01/	19 08:33					
QC Source Sample: Non-SDG (A9.	<u>J1140-01)</u>											
% Solids	91.9		1.00	% by We	ight 1		91.7			0.3	10%	
Duplicate (9101793-DUP5)			Prepared	1: 10/31/19	19:09 Anal	yzed: 11/01/	19 08:33					
QC Source Sample: Non-SDG (A9.	<u>J1145-03)</u>											
% Solids	84.5		1.00	% by We	ight 1		83.2			2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi	<u>, INC.</u>		Project:	POV-Block D			
2001 NW 19th Ave, ST	TE 200	Р	roject Number:	9085.10.10		Report ID:	
Portland, OR 97209		Pr	oject Manager:	Emily Hess		A9J1122 - 11 04 19	1408
		SAMPLE	PREPARA	TION INFORMATION			
		Polyaromatic I	Hydrocarbon	s (PAHs) by EPA 8270D SIM			
<u>Prep: EPA 3546</u>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sample	d Prepared	Initial/Final	Initial/Final	Factor

			1	1			
Batch: 9101832							
A9J1122-01	Soil	EPA 8270D (SIM)	10/31/19 11:00	10/31/19 15:07	10.43g/5mL	10g/5mL	0.96
			Percent Dry We	ight			
Prep: Total Solids (Dry Weight)				Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 9101793							
A9J1122-01	Soil	EPA 8000C	10/31/19 11:00	10/31/19 19:10			NA

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Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>

Maul Foster & Alongi, INC.	Project: POV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J1122 - 11 04 19 1408

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

Q-04 Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.

R-02 The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.

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Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>

Maul Foster & Alongi, INC.					
2001 NW 19th Ave, STE 200					
Portland, OR 97209					

Project: POV-Block D

Project Number: **9085.10.10** Project Manager: **Emily Hess** <u>Report ID:</u> A9J1122 - 11 04 19 1408

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET	Analyte DETECTED at or above the detection or reporting limit.
ND	Analyte NOT DETECTED at or above the detection or reporting limit.
NR	Result Not Reported
RPD	Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ). If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- <u>" dry"</u> Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry") See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- "____ Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- "---" QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- "*** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL). -For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier. -For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy. For further details, please request a copy of this document.

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Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>

Maul Foster & Alongi, INC. 2001 NW 19th Ave, STE 200 Portland. OR 97209

Project: POV-Block D

Project Number: **9085.10.10** Project Manager: **Emily Hess** <u>Report ID:</u> A9J1122 - 11 04 19 1408

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>

Maul Foster & Alon	igi, INC.	Project:	POV-Block D				
2001 NW 19th Ave,	STE 200	Project Number:	9085.10.10		<u>Report ID:</u>		
Portland, OR 97209	9	Project Manager:	Emily Hess	P	A9J1122 - 11 04 19 1408		
		LABORATORY ACCRED	TATION INI	FORMATION			
All methods a Scope of Cert	<u>TNI Certification ID: OR100062 (Primary Accreditation)</u> - <u>EPA ID: OR01039</u> All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the <u>exception</u> of any analyte(s) listed below:						
<u>Apex Labor</u>	atories						
Matrix	Analysis	TNI_ID	Analyte	TNI_I	D Accreditation		
		All reported analytes are included in Apex	Laboratories' curi	rent ORELAP scope.			

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>



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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 <u>EPA ID: OR01039</u>

Maul Foster & Alongi, INC.	Project: POV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9J1122 - 11 04 19 1408
Client: Project/P Delivery Date/time Delivered Cooler In Chain of C Signed/dat Signed/dat Signed/dat Temperatu Received of Temp. blar Ice type: (0 Condition: Cooler out If some cool Out of tem Samples In All sample	APEX LABS COOLER RECEIPT FORM MFA Vave owe Element WO#: A9 [][22 roject #: Port of Vave owe roject #: Port of Vave owe Black D 90.85 . 10.10 Info: received: 10/3/19 @. 12.53 By:	#7
COC/conta Containers/ Do VOA vi Comments Water samp Comments: Additional j Labeled by:	iner discrepancies form initiated? Yes No NA iner discrepancies form initiated? Yes No NA ivolumes received appropriate for analysis? Yes No Comments: als have visible headspace? Yes No NA bles: pH checked: Yes No NA mformation:	
	MYS SD	

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6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Monday, November 11, 2019 Emily Hess Maul Foster & Alongi, INC. 2001 NW 19th Ave, STE 200 Portland, OR 97209

RE: A9K0099 - POV-Block D - 9085.10.10

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9K0099, which was received by the laboratory on 11/5/2019 at 11:00:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: <u>pnerenberg@apex-labs.com</u>, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

Cooler #1

(See Cooler Receipt Form for details) 3.4 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



The results in this report apply to the samples analyzed in accordance with the chain of

custody document. This analytical report must be reproduced in its entirety.

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Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: <u>POV-Block D</u>	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	<u>Report ID:</u>
Portland, OR 97209	Project Manager: Emily Hess	A9K0099 - 11 11 19 1700

ANALYTICAL REPORT FOR SAMPLES

	SAMPLE INFO	RMATION		
Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
STKPILE-S	A9K0099-01	Soil	11/04/19 17:00	11/05/19 11:00

Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: <u>P(</u>	OV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 90	085.10.10	<u>Report ID:</u>
Portland, OR 97209	Project Manager: Er	mily Hess	A9K0099 - 11 11 19 1700

ANALYTICAL SAMPLE RESULTS

	Polyard	omatic Hydro	carbons (PA	AHs) by EPA 82	70D SIM			
	Sample	Detection	Reporting			Date		
Analyte	Result	Limit	Limit	Units	Dilution	Analyzed	Method Ref.	Notes
STKPILE-S (A9K0099-01)				Matrix: Soil		Batch:	9110555	
Acenaphthene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Acenaphthylene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Anthracene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Benz(a)anthracene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Benzo(a)pyrene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Chrysene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Dibenzofuran	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Fluoranthene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Fluorene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
1-Methylnaphthalene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
2-Methylnaphthalene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Naphthalene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Phenanthrene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Pyrene	ND		10.6	ug/kg dry	1	11/07/19 13:05	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		Recov	very: 86 %	Limits: 44-120 %	1	11/07/19 13:05	EPA 8270D (SIM)	
p-Terphenyl-d14 (Surr)			87 %	54-127 %	1	11/07/19 13:05	EPA 8270D (SIM)	

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Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

<u>Maul Foster & Alongi, INC.</u> 2001 NW 19th Ave, STE 200 Portland, OR 97209		Proj Project Project	ject: <u>POV-</u> t Number: 9085 .1 Manager: Emily	<u>Block D</u> 10.10 Hess			<u>Report ID:</u> A9K0099 - 11 11 19	1700
		ANALYTI	CAL SAMPL	E RESULT	ГS			
		Pe	ercent Dry We	ight				
Analyte	Sample Result	Detection	Reporting	Units	Dilution	Date	Method Ref	Notes

7 mary to	result	Linnt	Linnt	Onits	Difution	T mary 200	Wiethou Rei.	110105
STKPILE-S (A9K0099-01)				Matrix: Soil		Batch:	9110505	
% Solids	93.3		1.00	% by Weight	1	11/07/19 11:23	EPA 8000C	

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6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Notes

Maul Foster & Alongi, INC.]	Project:	POV-Bl	ock D						
2001 NW 19th Ave, STE 200			Pro	ject Numb	er: 9085.10	.10				I	Report ID:	<u>:</u>
Portland, OR 97209			Proj	ject Manag	er: Emily H	less			A	\$K0099) - 11 11 19	9 1700
		QU	ALITY CO	ONTROI	L (QC) SA	MPLE R	ESULTS					
		Polya	romatic Hy	drocarb	ons (PAHs	s) by EPA	8270D SI	Μ				
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	No
Batch 9110555 - EPA 3546							Soil					
Blank (9110555-BLK1)			Prepared	: 11/07/19	07:11 Anal	yzed: 11/07/	19 11:24					
EPA 8270D (SIM)												
Acenaphthene	ND		9.09	ug/kg w	et 1							
Acenaphthylene	ND		9.09	ug/kg w	et 1							
Anthracene	ND		9.09	ug/kg w	ret 1							
			0.00	/1								

Blank (9110555-BLK1)			Preparec	d: 11/07/19 07:1	1 An	alyzed: 11/07/1	19 11:24			
EPA 8270D (SIM)										
Acenaphthene	ND		9.09	ug/kg wet	1			 	 	
Acenaphthylene	ND		9.09	ug/kg wet	1			 	 	
Anthracene	ND		9.09	ug/kg wet	1			 	 	
Benz(a)anthracene	ND		9.09	ug/kg wet	1			 	 	
Benzo(a)pyrene	ND		9.09	ug/kg wet	1			 	 	
Benzo(b)fluoranthene	ND		9.09	ug/kg wet	1			 	 	
Benzo(k)fluoranthene	ND		9.09	ug/kg wet	1			 	 	
Benzo(g,h,i)perylene	ND		9.09	ug/kg wet	1			 	 	
Chrysene	ND		9.09	ug/kg wet	1			 	 	
Dibenz(a,h)anthracene	ND		9.09	ug/kg wet	1			 	 	
Dibenzofuran	ND		9.09	ug/kg wet	1			 	 	
Fluoranthene	ND		9.09	ug/kg wet	1			 	 	
Fluorene	ND		9.09	ug/kg wet	1			 	 	
Indeno(1,2,3-cd)pyrene	ND		9.09	ug/kg wet	1			 	 	
1-Methylnaphthalene	ND		9.09	ug/kg wet	1			 	 	
2-Methylnaphthalene	ND		9.09	ug/kg wet	1			 	 	
Naphthalene	ND		9.09	ug/kg wet	1			 	 	
Phenanthrene	ND		9.09	ug/kg wet	1			 	 	
Pyrene	ND		9.09	ug/kg wet	1			 	 	
Surr: 2-Fluorobiphenyl (Surr)		Recove	ery: 83%	Limits: 44-12	0%	Dilut	tion: 1x		 	
p-Terphenyl-d14 (Surr)			91 %	54-122	7 %		"			

LCS (9110555-BS1)

Prepared: 11/07/19 07:11 Analyzed: 11/07/19 11:49

EPA 8270D (SIM)								
Acenaphthene	698	 10.0	ug/kg wet	1	800	 87	40-122%	
Acenaphthylene	710	 10.0	ug/kg wet	1	800	 89	32-132%	
Anthracene	689	 10.0	ug/kg wet	1	800	 86	47-123%	
Benz(a)anthracene	703	 10.0	ug/kg wet	1	800	 88	49-126%	
Benzo(a)pyrene	662	 10.0	ug/kg wet	1	800	 83	45-129%	
Benzo(b)fluoranthene	700	 10.0	ug/kg wet	1	800	 87	45-132%	
Benzo(k)fluoranthene	719	 10.0	ug/kg wet	1	800	 90	47-132%	
Benzo(g,h,i)perylene	697	 10.0	ug/kg wet	1	800	 87	43-134%	
Chrysene	714	 10.0	ug/kg wet	1	800	 89	50-124%	

Apex Laboratories

Philip Nevenberg



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project: POV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	Report ID:
Portland, OR 97209	Project Manager: Emily Hess	A9K0099 - 11 11 19 1700
		U PO

QUALITY CONTROL (QC) SAMPLE RESULTS

Analyte Detection Result Reporting Limit Onlts Dilution Spile Amount Source Result % REC % REC % REC MPD Limit Batch 9110555 - EPA 3546 Prepared: 1//07/19 07:11 Analyzed: 1//07/19 07:11					М	8270D SII	s) by EPA	ns (PAHs	drocarbo	romatic Hy	Polya			
Bach 9110555-E9A 364 Prepared: 11/07/19 07:11 Analyzed: 11/07/19 11:47 Diberazofuran 66 Diberazofuran 666 07 85 64 44 5-134% Diberazofuran 666 07 86 44 5-134% Diberazofuran 66 44 5-134% Floorene 66 44 5-134% Diberazofuran 66 Diberazofuran 66 Diberazofuran 66 Diberazofuran <th c<="" th=""><th>Notes</th><th>RPD Limit</th><th>RPD</th><th>% REC Limits</th><th>% REC</th><th>Source Result</th><th>Spike Amount</th><th>Dilution</th><th>Units</th><th>Reporting Limit</th><th>Detection Limit</th><th>Result</th><th>Analyte</th></th>	<th>Notes</th> <th>RPD Limit</th> <th>RPD</th> <th>% REC Limits</th> <th>% REC</th> <th>Source Result</th> <th>Spike Amount</th> <th>Dilution</th> <th>Units</th> <th>Reporting Limit</th> <th>Detection Limit</th> <th>Result</th> <th>Analyte</th>	Notes	RPD Limit	RPD	% REC Limits	% REC	Source Result	Spike Amount	Dilution	Units	Reporting Limit	Detection Limit	Result	Analyte
LCS (9110555-B51) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 11:49 Head Analyzed: 11/07/19 11:49 Dibenzofuran 686 10.0 ug/kg wet 1 800 93 45-134% Dibenzofuran 686 10.0 ug/kg wet 1 800 86 44-120% Fluorence 686 10.0 ug/kg wet 1 800 87 45-133% 1.Methylnaphthalene 643 10.0 ug/kg wet 1 800 81 38-122% 2.Methylnaphthalene 643 10.0 ug/kg wet 1 800 83 38-122% Pyrene 661 10.0 ug/kg wet 1 800 83 47-127% Pyrene 661 1						Soil							Batch 9110555 - EPA 3546	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						19 11:49	yzed: 11/07/	7:11 Anal	d: 11/07/19	Prepareo			LCS (9110555-BS1)	
Dibenzofuran 686 10.0 ug/kg wet 1 800 86 44-120% Fluorantene 659 10.0 ug/kg wet 1 800 82 50-127% Indeno(1,2,3-cd)pyrene 694 10.0 ug/kg wet 1 800 86 43-133% 1-Methylnaphthalene 645 10.0 ug/kg wet 1 800 81 40-120% 2-Methylnaphthalene 645 10.0 ug/kg wet 1 800 83 47-127% Phenathrene 683 10.0 ug/kg wet 1 800 85 50-121% Pyrene 661 10.0 ug/kg wet 1 800 85 50-121% 26 64 10.0 ug/kg wet 1100				45-134%	93		800	t 1	ug/kg w	10.0		744	Dibenz(a,h)anthracene	
Fluoranthene 659 10.0 ug/kg wet 1 800 82 50-127% Fluorene 686 10.0 ug/kg wet 1 800 86 43-125% 1-Methylaphthalene 645 10.0 ug/kg wet 1 800 81 38-122% 2-Methylaphthalene 649 10.0 ug/kg wet 1 800 81 38-122% Phenanthrene 663 10.0 ug/kg wet 1 800 83 47-127% Phenanthrene 661 10.0 ug/kg wet 1 800 83 47-127% Sur: 2-Ethorobiphenyl (Sur) Recovery: 83 % Linits: 44-127 % Dilution: 1x P-Erphenyl-d14 (Surr) Recovery: 85 % Linits: 44-12 % ND <td></td> <td></td> <td></td> <td>44-120%</td> <td>86</td> <td></td> <td>800</td> <td>t 1</td> <td>ug/kg w</td> <td>10.0</td> <td></td> <td>686</td> <td>Dibenzofuran</td>				44-120%	86		800	t 1	ug/kg w	10.0		686	Dibenzofuran	
Fluorene 686 10.0 ug/kg wet 1 800 86 43-123% Indeno(1,2,3-cd)pyrene 694 10.0 ug/kg wet 1 800 81 45-133% 2-Methylmaphthalene 649 10.0 ug/kg wet 1 800 81 38-122% Naphthalene 654 10.0 ug/kg wet 1 800 83 35-123% Prene 661 10.0 ug/kg wet 1 800 83 37-127% Sur: 2-Fluorobiphenyl (Surr) Recovery: 83 % Limits: 44-120 % Diduton: 1x P_Terphenyl-d14 (Surr) Recovery: 83 % Limits: 44-120 % Diduton: 1x Acenaphthene ND 11/07/19 07:11 Analyzed: 11/07/19 12:40 CSource Sample: Non-SDG (A9K0056-01) Machaphthylene ND <t< td=""><td></td><td></td><td></td><td>50-127%</td><td>82</td><td></td><td>800</td><td>t 1</td><td>ug/kg w</td><td>10.0</td><td></td><td>659</td><td>Fluoranthene</td></t<>				50-127%	82		800	t 1	ug/kg w	10.0		659	Fluoranthene	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				43-125%	86		800	t 1	ug/kg w	10.0		686	Fluorene	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				45-133%	87		800	t 1	ug/kg w	10.0		694	Indeno(1,2,3-cd)pyrene	
				40-120%	81		800	t 1	ug/kg w	10.0		645	1-Methylnaphthalene	
Naphthalene 654 10.0 ug/kg wet 1 800 82 35-123% Phenanthrene 663 10.0 ug/kg wet 1 800 83 47-127% Pyrene 661 10.0 ug/kg wet 1 800 83 47-127% Sur: 2:Fluorobiphenyl (Surr) Recovery: 83 % Limits: 44-120 % Dilution: Ix p-Terphenyl-d14 (Surr) 86 % 54-127 % 30% Acenaphthene ND 1500 ug/kg dry 40 ND 30% Acenaphthylene ND 549 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 </td <td></td> <td></td> <td></td> <td>38-122%</td> <td>81</td> <td></td> <td>800</td> <td>t 1</td> <td>ug/kg w</td> <td>10.0</td> <td></td> <td>649</td> <td>2-Methylnaphthalene</td>				38-122%	81		800	t 1	ug/kg w	10.0		649	2-Methylnaphthalene	
Phenanthrene 683 10.0 ug/kg wet 1 800 85 50-121% Pyrene 661 10.0 ug/kg wet 1 800 83 47-127% Sur: 2-Fluorobiphenyl (Surr) Recovery: 83 % Limits: 44-120 % Dilution: Ix p-Terphenyl-dl 4 (Surr) Recovery: 83 % Limits: 44-120 % Dilution: Ix Duplicate (9110555-DUP1) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 12:40 Acenaphthene ND 549 ug/kg dry 40 ND 30% Acenaphthylene ND 549 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 649 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND				35-123%	82		800	t 1	ug/kg w	10.0		654	Naphthalene	
Pyrene 661 10.0 ug/kg wet 1 800 83 47-127% Sur: 2-Fluorobiphenyl (Surr) Recovery: 83 % Limits: 44-120 % Dibution: Ix p-Terphenyl-dl4 (Surr) 86 % 54-127 % " " " Duplicate (9110555-DUP1) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 12:40 OC Source Sample: Non-SDG (A9K0056-01) Accanaphtene ND 549 ug/kg dry 40 ND 30% Accanaphtene ND 549 ug/kg dry 40 ND 30% Benz(a)anthracene ND 649 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(b/fluoranthene ND 499 ug/kg dry 40 ND				50-121%	85		800	t 1	ug/kg w	10.0		683	Phenanthrene	
Surr: 2-Fluorobiphenyl (Surr) Recovery: 83 % Limits: 44-120 % Dilution: Ix p-Terphenyl-d14 (Surr) 86 % 54-127 % " Duplicate (9110555-DUP1) Preprend: I1/07/19 07:11 Analyzed: I1/07/19 12:40 QC Source Sample: Non-SDG (A9K0056-01) Accenaphthene ND 1500 ug/kg dry 40 ND 30% Acenaphthene ND 649 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40				47-127%	83		800	t 1	ug/kg w	10.0		661	Pyrene	
p-Terphenyl-d14 (Surr) 86 % 54-127 % " Duplicate (9110555-DUP1) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 12:40 OC Source Sample: Non-SDG (A9K0056-01) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 12:40 Acenaphthene ND 1500 ug/kg dry 40 ND 30% Acenaphthylene ND 549 ug/kg dry 40 ND 30% Benz(a)anthracene ND 499 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene						tion: 1x	Dilu	120 %	Limits: 44	overy: 83 %	Reco		Surr: 2-Fluorobiphenyl (Surr)	
Duplicate (9110555-DUP1) Prepared: 11/07/19 07:11 Analyzed: 11/07/19 12:40 OC Source Sample: Non-SDG (A9K0056-01) Acenaphthene ND 1500 ug/kg dry 40 ND 30% Acenaphthylene ND 549 ug/kg dry 40 ND 30% Actinacene ND 549 ug/kg dry 40 ND 30% Benz(a)anthracene ND 649 ug/kg dry 40 ND 30% Benzo(a)anthracene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30%						"		127 %	54	86 %			p-Terphenyl-d14 (Surr)	
Accenaphthene ND 1500 ug/kg dry 40 ND 30% Acenaphthene ND 549 ug/kg dry 40 ND 30% Acenaphthylene ND 649 ug/kg dry 40 ND 30% Benz(a)anthracene ND 499 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(b)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND <td></td> <td></td> <td></td> <td></td> <td></td> <td>19 12:40</td> <td>yzed: 11/07/</td> <td>7:11 Anal</td> <td>l: 11/07/19</td> <td>Preparec</td> <td></td> <td>K0056-01)</td> <td>Duplicate (9110555-DUP1)</td>						19 12:40	yzed: 11/07/	7:11 Anal	l: 11/07/19	Preparec		K0056-01)	Duplicate (9110555-DUP1)	
Acenaphthylene ND 549 ug/kg dry 40 ND 30% Anthracene ND 649 ug/kg dry 40 ND 30% Benz(a)anthracene ND 499 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND	R-(30%				ND		<i>v</i> 40	ug/kg di	1500		ND	Acenanhthene	
Anthracene ND 649 ug/kg dry 40 ND 30% Benz(a)anthracene ND 499 ug/kg dry 40 ND 30% Benz(a)anthracene ND 499 ug/kg dry 40 ND 30% Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(b)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND	R-(30%				ND		, 40	ug/kg di	549		ND	Acenaphthylene	
Benz(a) anthracene ND 499 ug/kg dry 40 ND 30% Benzo(a) pyrene ND 499 ug/kg dry 40 ND 30% Benzo(b) fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k) fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i) perylene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i) perylene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h) anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 518 66 30% Fluorene	R-(30%				ND		v 40	ug/kg di	649		ND	Anthracene	
Benzo(a)pyrene ND 499 ug/kg dry 40 ND 30% Benzo(b)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 S800 66 30% Fluorenthene ND 499 ug/kg dry 40 518 71 30% Indeno(1,2,3-cd)pyrene		30%				ND		40	ug/kg dr	499		ND	Benz(a)anthracene	
Benzo(b)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 518 66 30% Fluoranthene ND 499 ug/kg dry 40 518 130% Indeno(1,2,3-cd)pyrene <		30%				ND		40	ug/kg dr	499		ND	Benzo(a)pyrene	
Benzo(k)fluoranthene ND 499 ug/kg dry 40 ND 30% Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 3420 66 30% Fluoranthene ND 499 ug/kg dry 40 518 71 30% Fluorene 2770 499 ug/kg dry 40 5800 30% 1-Methylnaphthalene		30%				ND		v 40	ug/kg di	499		ND	Benzo(b)fluoranthene	
Benzo(g,h,i)perylene ND 499 ug/kg dry 40 ND 30% Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 518 66 30% Fluoranthene ND 499 ug/kg dry 40 518 71 30% Fluorene 2770 499 ug/kg dry 40 ND 71 30% Indeno(1		30%				ND		v 40	ug/kg di	499		ND	Benzo(k)fluoranthene	
Chrysene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 3420 66 30% Fluoranthene ND 499 ug/kg dry 40 518 71 30% Fluorene 2770 499 ug/kg dry 40 5800 71 30% Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 5800 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 19200 65 30% <t< td=""><td></td><td>30%</td><td></td><td></td><td></td><td>ND</td><td></td><td>v 40</td><td>ug/kg di</td><td>499</td><td></td><td>ND</td><td>Benzo(g,h,i)pervlene</td></t<>		30%				ND		v 40	ug/kg di	499		ND	Benzo(g,h,i)pervlene	
Dibenz(a,h)anthracene ND 499 ug/kg dry 40 ND 30% Dibenzofuran 1720 499 ug/kg dry 40 3420 66 30% Fluoranthene ND 499 ug/kg dry 40 518 66 30% Fluoranthene ND 499 ug/kg dry 40 518 71 30% Fluorene 2770 499 ug/kg dry 40 5800 71 30% Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 ND 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 5220 60		30%				ND		v 40	ug/kg di	499		ND	Chrysene	
Dibenzofuran 1720 499 ug/kg dry 40 3420 66 30% Fluoranthene ND 499 ug/kg dry 40 518 *** 30% Fluoranthene ND 499 ug/kg dry 40 518 *** 30% Fluorene 2770 499 ug/kg dry 40 5800 71 30% Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 ND 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 5220 60 30% Naphthalene 6590 499 ug/kg dry 40 5220 <t< td=""><td></td><td>30%</td><td></td><td></td><td></td><td>ND</td><td></td><td>v 40</td><td>ug/kg di</td><td>499</td><td></td><td>ND</td><td>Dibenz(a,h)anthracene</td></t<>		30%				ND		v 40	ug/kg di	499		ND	Dibenz(a,h)anthracene	
Fluoranthene ND 499 ug/kg dry 40 518 *** 30% Fluorene 2770 499 ug/kg dry 40 5800 71 30% Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 ND 71 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 19200 62 30% Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 5220 68 30%	Q-1	30%	66			3420		v 40	ug/kg di	499		1720	Dibenzofuran	
Fluorene 2770 499 ug/kg dry 40 5800 71 30% Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 ND 71 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 19200 62 30% Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 5220 68 30%	Q-1	30%	***			518		v 40	ug/kg di	499		ND	Fluoranthene	
Indeno(1,2,3-cd)pyrene ND 499 ug/kg dry 40 ND 30% 1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 19200 62 30% Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 5220 68 30%	Q-1	30%	71			5800		v 40	ug/kg di	499		2770	Fluorene	
1-Methylnaphthalene 10900 499 ug/kg dry 40 21400 65 30% 2-Methylnaphthalene 10100 499 ug/kg dry 40 19200 62 30% Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 13400 68 30%		30%				ND		40	ug/kg di	499		ND	Indeno(1,2,3-cd)pyrene	
2-Methylnaphthalene 10100 499 ug/kg dry 40 19200 62 30% Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 5220 68 30%	Q-1	30%	65			21400		v 40	ug/kg di	499		10900	1-Methylnaphthalene	
Naphthalene 2800 499 ug/kg dry 40 5220 60 30% Phenanthrene 6590 499 ug/kg dry 40 5220 60 30%	Q-1	30%	62			19200		40	ug/kg di	499		10100	2-Methylnaphthalene	
Phenanthrene 6590 499 ug/kg dry 40 13400 68 30%	Q-1	30%	60			5220		y 40	ug/kg dr	499		2800	Naphthalene	
	O-1	30%	68			13400		v 40	ug/kg dr	499		6590	Phenanthrene	
Pyrene 1120 499 ug/kg dry 40 2120 61 30%	0-1	30%	61			2120		v 40	ug/kg dr	499		1120	Pvrene	

Apex Laboratories

Philip Nevenberg



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

<u>Maul Foster & Alongi, INC.</u> 2001 NW 19th Ave, STE 200 Portland, OR 97209			Pro Pro		А	<u>Report ID:</u> A9K0099 - 11 11 19 1700						
		QU	ALITY CO	ONTROL	(QC) SA	MPLE R	RESULTS					
		Polya	romatic Hy	drocarbo	ns (PAH	s) by EPA	8270D S	М				
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9110555 - EPA 3546							Soil					
Duplicate (9110555-DUP1)			Prepareo	l: 11/07/19 0	7:11 Ana	lyzed: 11/07	/19 12:40					
QC Source Sample: Non-SDG (A9)	K0056-01)		-									
Surr: 2-Fluorobiphenyl (Surr) p-Terphenyl-d14 (Surr)		Reco	overy: 91 % 94 %	Limits: 44- 54-	120 % 127 %	Dili	ution: 40x "					S-05 S-05
Matrix Spike (9110555-MS1)			Preparec	l: 11/07/19 0	7:11 Anal	lyzed: 11/07	/19 13:31					
QC Source Sample: STKPILE-S (EPA 8270D (SIM)	<u>A9K0099-0</u>	<u>1)</u>										
Acenaphthene	734		10.6	ug/kg dry	/ 1	850	ND	86	40-122%			
Acenaphthylene	751		10.6	ug/kg dry	/ 1	850	ND	88	32-132%			
Anthracene	720		10.6	ug/kg dry	/ 1	850	ND	85	47-123%			
Benz(a)anthracene	735		10.6	ug/kg dry	/ 1	850	8.67	86	49-126%			
Benzo(a)pyrene	687		10.6	ug/kg dry	/ 1	850	7.34	80	45-129%			
Benzo(b)fluoranthene	732		10.6	ug/kg dry	/ 1	850	10.4	85	45-132%			
3enzo(k)fluoranthene	726		10.6	ug/kg dry	/ 1	850	ND	85	47-132%			
Benzo(g,h,i)perylene	724		10.6	ug/kg dry	/ 1	850	7.76	84	43-134%			
Chrysene	742		10.6	ug/kg dry	/ 1	850	7.96	86	50-124%			
Dibenz(a,h)anthracene	754		10.6	ug/kg dry	/ 1	850	ND	89	45-134%			
Dibenzofuran	727		10.6	ug/kg dry	/ 1	850	ND	86	44-120%			
luoranthene	694		10.6	ug/kg dry	/ 1	850	8.11	81	50-127%			
luorene	716		10.6	ug/kg dry	/ 1	850	ND	84	43-125%			
ndeno(1,2,3-cd)pyrene	718		10.6	ug/kg dry	/ I	850	6.96	84	45-133%			
-Methylnaphthalene	683		10.6	ug/kg dry	/ 1	850	ND	80	40-120%			
Z-Methylnaphthalene	680		10.6	ug/kg dry	/ 1	850	ND	80	38-122%			
vapntnalene	683		10.6	ug/kg dry	/ 1	850	ND	80	35-123%			
henanthrene	719		10.6	ug/kg dry	/ 1	850	ND	85	50-121%			
yrene	708		10.6	ug/kg dry	/ 1	850	9.59	82	47-127%			
urr: 2-Fluorobiphenyl (Surr)		Reco	overy: 86 %	Limits: 44-	120 %	Dili	ution: 1x					
p-Terphenyl-d14 (Surr)			85 %	54-	127 %		"					

Apex Laboratories

Philip Nevenberg



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.			
2001 NW 19th Ave, STE 200			
Portland OR 97209			

Project:POV-Block DProject Number:9085.10.10Project Manager:Emily Hess

<u>Report ID:</u> A9K0099 - 11 11 19 1700

QUALITY CONTROL (QC) SAMPLE RESULTS

	Percent Dry Weight											
Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9110505 - Total Solids (Dr	y Weigh	t)					Soil					
Duplicate (9110505-DUP1)			Prepared	: 11/06/19	08:13 Anal	yzed: 11/07/	19 11:23					
OC Source Sample: Non-SDG (A9K)	<u>)083-01)</u>											
% Solids	92.5		1.00	% by Wei	ight 1		92.1			0.4	10%	
Duplicate (9110505-DUP2)			Prepared	: 11/06/19	08:13 Anal	yzed: 11/07/	19 11:23					
QC Source Sample: STKPILE-S (A' EPA 8000C	<u>9K0099-0</u>	<u>1)</u>										
% Solids	94.0		1.00	% by Wei	ght 1		93.3			0.7	10%	
Duplicate (9110505-DUP3)			Prepared	: 11/06/19	18:31 Anal	yzed: 11/07/	19 11:23					
QC Source Sample: Non-SDG (A9K)	<u>0144-06)</u>											
% Solids	80.0		1.00	% by Wei	ight 1		79.7			0.4	10%	
Duplicate (9110505-DUP4)			Prepared	1: 11/06/19	18:31 Anal	yzed: 11/07/	19 11:23					
QC Source Sample: Non-SDG (A9K)	0152-01)											
% Solids	79.7		1.00	% by Wei	ight 1		78.9			1	10%	
Duplicate (9110505-DUP5) Prepared: 11/06/19 18:31 Analyzed: 11/07/19 11:23												
QC Source Sample: Non-SDG (A9K)	<u>0160-02)</u>											
% Solids	89.2		1.00	% by We	ight 1		89.0			0.2	10%	
Duplicate (9110505-DUP6)			Prepared	: 11/06/19	18:31 Anal	yzed: 11/07/	19 11:23					
QC Source Sample: Non-SDG (A9K)	0162-04)											
% Solids	79.5		1.00	% by Wei	ght 1		79.5			0.04	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

Apex Laboratories

Philip Nevenberg

Philip Nerenberg, Lab Director



6700 S.W. Sandburg Street Tigard, OR 97223 503-718-2323 EPA ID: OR01039

Maul Foster & Alongi, INC.	Project:	POV-Block D					
2001 NW 19th Ave, STE 200	Project Number:	9085.10.10		Report ID:	<u>.</u>		
Portland, OR 97209	Project Manager:	Emily Hess		A9K0099 - 11 11 19	9 1700		
SAMPLE PREPARATION INFORMATION							
	Polyaromatic Hydrocarbon	s (PAHs) by EPA 8270D SIM					
Prep: EPA 3546			Sample	Default	RL Prep		

Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 9110555							
A9K0099-01	Soil	EPA 8270D (SIM)	11/04/19 17:00	11/07/19 07:11	10.11g/5mL	10g/5mL	0.99
			Percent Dry We	ght			
Prep: Total Solids (D	ry Weight)				Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 9110505							
A9K0099-01	Soil	EPA 8000C	11/04/19 17:00	11/06/19 08:13			NA

Apex Laboratories

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Philip Nerenberg, Lab Director



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Maul Foster & Alongi, INC.	
2001 NW 19th Ave, STE 200	
Portland, OR 97209	

Project: <u>POV-Block D</u> Project Number: **9085.10.10**

Project Manager: Emily Hess

<u>Report ID:</u> A9K0099 - 11 11 19 1700

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

- Q-17 RPD between original and duplicate sample is outside of established control limits.
- **R-02** The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.
- S-05 Surrogate recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.

Apex Laboratories

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Philip Nerenberg, Lab Director



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Maul Foster & Alongi, INC. 2001 NW 19th Ave, STE 200 Portland, OR 97209

Project: POV-Block D

Project Number: **9085.10.10** Project Manager: **Emily Hess** <u>Report ID:</u> A9K0099 - 11 11 19 1700

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET	Analyte DETECTED at or above the detection or reporting limit.
ND	Analyte NOT DETECTED at or above the detection or reporting limit.
NR	Result Not Reported
RPD	Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ). If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- <u>" dry"</u> Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry") See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- "____ Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- "---" QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- "*** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL). -For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier. -For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy. For further details, please request a copy of this document.

> The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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Philip Nerenberg, Lab Director



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Project: POV-Block D

Project Number: **9085.10.10** Project Manager: **Emily Hess** <u>Report ID:</u> A9K0099 - 11 11 19 1700

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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laul Foster & Alo	ongi, INC.	Project:	POV-Block D				
2001 NW 19th Ave, STE 200		Project Number:	Project Number: 9085.10.10		<u>Report ID:</u>		
Portland, OR 97209 Project Manage		Project Manager:	Emily Hess	A9	A9K0099 - 11 11 19 1700		
LABORATORY ACCREDITATION INFORMATION							
TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039							
All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the <u>exception</u> of any analyte(s) listed below:							
<u>Apex Labo</u>	oratories						
Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation		
All reported analytes are included in Apex Laboratories' current ORELAP scope.							

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Philip Nerenberg, Lab Director



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Maul Foster & Alongi, INC.	Project: POV-Block D	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.10	<u>Report ID:</u>
Portland, OR 97209	Project Manager: Emily Hess	A9K0099 - 11 11 19 1700
Client:	APEX LABS COOLER RECEIPT FORM Element WO#: A9 K $P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of Von(- Bloch P 90%5.10.1)$ $P = P + Of P + Of P + Of P + Of P - Bloch P 90%5.10.1$ $P = P + Of P $	0099 0 5Other H NoX Dler #6 Cooler #7
Bottle labels/COCs agree? Y COC/container discrepancies Containers/volumes received Do VOA vials have visible he Comments Water samples: pH checked: Comments: Additional information: Labeled by: With	Yes No Comments: form initiated? Yes No NA appropriate for analysis? Yes No Comments: eadspace? Yes No NA Yes No NA X Yes No NA X eadspace? Yes No NA Yes No NA X Yes No NA X Cooler Inspected by: See Project C	
	CAH.	

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ATTACHMENT C DATA VALIDATION MEMORANDUM



DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9085.10.10 | NOVEMBER 18, 2019 | PORT OF VANCOUVER

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for excavation soil samples collected at the Block D property located in Vancouver, Washington. The samples were collected in October and November 2019.

Apex Laboratories, LLC (Apex) performed the analyses. Apex report numbers A9J1122 and A9K0099 were reviewed. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Percent Moisture	USEPA 8000C
Polycyclic Aromatic Hydrocarbons	USEPA 8270D-SIM

USEPA = U.S. Environmental Protection Agency.

Samples Analyzed				
Report A9J1122	Report A9K0099			
STKPILE-N	STKPILE-S			

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2017) and appropriate laboratory and method-specific guidelines (Apex, 2018; USEPA, 1986).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All method blanks were non-detect for all target analytes.

Trip Blanks

Trip blanks were not required for this sampling event.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. All surrogate recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS samples were extracted and analyzed at the required frequency. MSD results were not reported; batch precision was evaluated with laboratory duplicate sample results. All MS results were within acceptance limits for percent recovery.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the MRL were not evaluated for precision.

In report A9J1122, the USEPA 8270D-SIM laboratory duplicate (9101832-DUP1) had several exceedances of the relative percent difference (RPD) limit. Additionally, the reporting limits had been raised by Apex due to the dilution. The laboratory duplicate was prepared with a sample associated with a different project; thus, no qualifications were necessary.

In report A9K0099, the USEPA 8270D-SIM laboratory duplicate (9110555-DUP1) had several exceedances of the RPD limit. Additionally, the reporting limits had been raised due to a dilution required for the analysis. The laboratory duplicate was prepared with a sample associated with a different project; thus, no qualifications were necessary.

All remaining laboratory duplicate RPDs were within acceptance limits.

LABORATORY CONTROL SAMPLE RESULTS

A laboratory control sample (LCS) is spiked with target analytes to provide information on laboratory accuracy. The LCS samples were extracted and analyzed at the required frequency. All LCS results were within acceptance limits for percent recovery.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. No field duplicates were submitted for analysis with this sampling event.

REPORTING LIMITS

Apex used routine reporting limits for non-detect results, except for laboratory quality control requiring dilutions because of high analyte concentrations and/or matrix interferences.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None were found.

Apex. 2018. Quality systems manual. Revision 6. Apex Laboratories, LLC., Tigard, Oregon. July 2.

USEPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018) and VI phase III (2019).

USEPA. 2017. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.