MAUL FOSTER ALONGI

2001 NW 19th Avenue, Suite 200 | Portland, OR 97209 | 971 544-2139 | www.maulfoster.com

May 22, 2018
Project No. 9085.10.08

Matt Graves, LG
Port of Vancouver
3103 Northwest Lower River Road
Vancouver, Washington 98660

Re: Block B Soil Sampling—Port of Vancouver USA Terminal 1

Dear Mr. Graves:

On behalf of the Port of Vancouver USA (Port), Maul Foster & Alongi, Inc. (MFA) completed an investigation of soil conditions at Block B on the Terminal 1 property located at 200 Columbia Street in Vancouver, Washington (see Figure 1). The Port's structural engineer (KPFF) excavated one test pit at Block B to assess the existing conditions of a bulkhead along the Columbia River shoreline. The work by KPFF provided the opportunity for MFA to investigate soil conditions in the test pit. This letter presents the result of the investigation.

PREVIOUS INVESTIGATION

MFA previously conducted a test pit investigation in 2017 to assess soils on Block B near the former Red Lion Hotel.[1] Soil samples collected during the investigation were analyzed for the following constituents:

- Diesel- and oil- range total petroleum hydrocarbons (TPH)
- Gasoline-range TPH
- Arsenic, cadmium, lead, and mercury

The test pit locations for the prior 2017 investigation are shown on Figure 2. During the investigation, indicators of contamination (organic vapors, staining, odor, buried waste) were not observed, and petroleum hydrocarbons were not detected in the soil samples. The lead concentration exceeded the Model Toxics Control Act (MTCA) Method A Cleanup Level (CUL) in only one sample but the concentrations did not meet the criteria for definition as a hazardous waste.

[1] MFA. 2017. Letter (re: Former Hotel Soil Sampling – Port of Vancouver USE Terminal 1) to M. Graves, Port of Vancouver, Vancouver, Washington, from K. Roslund and A. Hughes, MFA, Vancouver, Washington. June 14.

FIELDWORK

The scope of work for the bulkhead wall investigation was communicated to the Port by GRI in February 2018.[2] Since existing as-built information regarding the bulkhead wall was not available, the objective of KPFF's investigation was to complete an exploratory test pit behind the bulkhead wall so that KPFF personnel could obtain additional information regarding the wall construction and type of backfill material, including the presence of debris.

MFA observed the February 14, 2018 bulkhead wall investigation in accordance with the MFA Work Order dated January 29, 2018 and approved by the Port on February 1, 2018. KPFF coordinated the public and private utility locates, contacted the Underground Utility Notification Center before excavation began, and provided the excavator and operator for the investigation. The test pit was advanced at the location shown on Figure 2 under the direction of KPFF and was observed by an MFA geologist. MFA collected and described representative soil samples from the test pit and assessed the soil for visual and olfactory contamination indicators. No indications of contamination, such as visible staining, odor, or buried waste, were observed in the test pit. A photographic log of observations made during the fieldwork is available in Attachment A.

The test pit was excavated to a depth of approximately 8 feet below ground surface (bgs). MFA collected two soil samples (sample IDs TP-S-3.0 and TP-3-6.0) at depths of 3 feet and at 6 feet bgs. Using the excavator, soil was collected from the sidewall of the test pit at the targeted depth and brought to the surface, and a grab sample was collected from the excavator bucket. Following sample collection and documentation of the soil characteristics, the test pit was backfilled using the excavated soils to generally match the surrounding grade. No investigation-derived waste was generated, as excavated soil was placed back in the test pit excavations.

SITE GEOLOGY AND HYDROGEOLOGY

Subsurface soils in the test pit consisted of gravely sand fill, consistent with fill soils observed during the previous MFA investigation on Block B. Gravelly sand was observed from the surface to 2 feet bgs and was underlain by loose, laminated sand to 8 feet bgs, the maximum depth explored. Owing to the sand's loose nature, there was significant sloughing of the sand from the sidewalls as the test pit was advanced. Below are detailed descriptions of the soils encountered in the test pit:

- 0 to 2 feet: brown, grey, black, and red gravelly fine to medium sand; 80 percent sand; 20 percent gravel; very loose; moist.

[2] GRI. 2018. Letter (re: Scope of Work and Budget for Terminal 1 Bulkhead Wall Investigation, Port of Vancouver, USA) to G. Westrand, Port of Vancouver USA, from M. Shanahan and B. Bennetts, GRI, Vancouver, Washington.

- 2 to 3 feet: brown, grey, black, and red fine to medium laminated sand; very loose; moist.

- 3 to 8 feet: brown, grey, black, and red fine to coarse laminated sand; 95 percent sand; 5 percent gravel; very loose; moist.

Groundwater was not encountered in the test pit. Based on groundwater monitoring conducted at Terminal 1, groundwater on the property is present approximately 20 feet bgs and is inferred to flow to the north and northwest, away from the Columbia River, located approximately 100 feet south-southwest of the test pit investigation locations (see Figure 2).

ANALYTICAL WORK

The two soil samples were submitted under chain-of-custody protocols to Apex Labs of Tigard, Oregon. The samples were analyzed for the following same constituents as the prior MFA investigation at Block B:

- Diesel- and oil-range TPH by method Northwest (NW) TPH-Dx
- Gasoline-range TPH by method NWTPH-Gx
- Total arsenic, cadmium, and lead by U.S. Environmental Protection Agency (USEPA) Method 6020
- Total mercury by USEPA Method 7471B

See Attachment B for the laboratory analytical report 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 on the attached table.

Gasoline-, diesel-, and oil-range hydrocarbons, cadmium, and mercury were not detected in either of the two samples.

Arsenic and lead were detected in both samples, but at concentrations that are less than the Model Toxics Control Act (MTCA) Method A cleanup levels (CULs) for unrestricted land use.

- Arsenic was detected at concentrations of 1.30 milligrams per kilogram (mg/kg) and 1.63 mg/kg in samples TP-S-3.0 and TP-S-6.0, respectively. The MTCA Method A CUL is 20 mg/kg for Arsenic.

- Lead was detected at concentrations of 2.93 mg/kg and 3.70 mg/kg in samples TP-S-3.0 and TP-S-6.0, respectively. The MTCA Method A CUL is 250 mg/kg for lead.

CONCLUSIONS

The results of this investigation are consistent with the results from the prior MFA investigation at Block B:

- Indicators of contamination (staining, odor, buried waste) were not observed.
- Petroleum hydrocarbons were not detected in the soil samples.
- Arsenic and lead were detected at concentrations less than the MTCA method A CULs.
- During the prior MFA investigation, the lead concentration exceeded the MTCA CUL in one of 15 soils samples collected during that investigation. The results of the current investigation indicate the prior exceedance of the MTCA CUL for lead is an isolated occurrence.
- No further investigation of Block B is recommended at this time.

Sincerely,

Maul Foster & Alongi, Inc.

David Weatherby, RG, LG
Senior Geologist

Cody Schweitzer
Staff Geologist

Attachments: Limitations
Table
Figures
A—Photographic Log
B—Laboratory Analytical Report
C—Data Validation Memorandum

LIMITATIONS

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.

TABLES

Table
Summary of Test Pit Soil Analytical Results
Block B Investigation
Port of Vancouver
Vancouver, Washington

Location:	MTCA A	TP	
Sample Name:		TP-S-3.0	TP-S-6.0
Collection Date:		2/14/2018	2/14/2018
Collection Depth (ft bgs):		3.0	6.0
Metals (mg/kg)			
Arsenic	20	**1.3**	**1.63**
Cadmium	2	0.241 U	0.236 U
Lead	250	**2.93**	**3.7**
Mercury	2	0.0963 U	0.0943 U
TPH (mg/kg)			
Gasoline Range Hydrocarbons	100[a]	6.42 U	7.16 U
Diesel Range Hydrocarbons	2000	25 U	25 U
Lube Oil Range Hydrocarbons	2000	50 U	50 U

NOTES:

Detected results are indicated by bold font.

Results that exceed cleanup levels are shaded. Non-detect results are not evaluated against cleanup criteria.

ft bgs = feet below ground surface.

mg/kg = milligrams per kilogram.

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

TPH = total petroleum hydrocarbons.

U = the result is non-detect at the method reporting limit.

[a]MTCA cleanup level is for gasoline-range organics with no detectable benzene present.

FIGURES

Site Address: 200 Columbia Street, Vancouver, Washington
Source: Taxlots obtained from Clark County GIS, US Geological Survey (1990) 7.5-minute topographic quadrangle: Portland
Section DLC51, Township 2 North, Range 1 East

Figure 1
Site Location

Port of Vancouver
Terminal 1
Vancouver, Washington

0 1,000 2,000
Feet

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Path: X:\9085.10 Port of Vancouver\Projects\Fig1_Site Location_2.mxd
Print Date: 5/23/2017
Approved By: K. Roslund
Produced By: rroberts
Project: 9085.10.08-01

Figure 2
Investigation Locations

Port of Vancouver
Terminal 1 Block B
Vancouver, Washington

Legend

- Prior MFA Test Pit Locations
- Test Pit Location
- Project Area
- Blocks
- Railroad
- Tax Lot

0 50 100
Feet

Source: Aerial photograph (2016) and tax lots (2016) obtained from Clark County GIS.

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Path: X:\9085.10 Port of Vancouver\Projects\Fig2_Investigation Location_POV_vs_COV.mxd
Print Date: 5/11/2018
Approved By: kroslund
Produced By: mjosef
Project: 9085.10.08-01

ATTACHMENT A

PHOTOGRAPHIC LOG

PHOTOGRAPHS

Project Name: Port of Vancouver Block B Test Pit
Project Number: 9085.10.08
Location: Terminal 1 – Vancouver, Washington

Photo No. 1

Description
Test pit excavation in progress.

Photo No. 2

Description
Test pit excavation complete.

ATTACHMENT B

LABORATORY ANALYTICAL REPORT

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Friday, February 23, 2018

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

RE: Block B Test Pit / 9085.10.08

Enclosed are the results of analyses for work order A8B0477, which was received by the laboratory on 2/16/2018 at 12:47:00PM.

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

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

Apex Laboratories

Philip Nerenberg, Lab Director

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.

Apex Labs

12232 S.W. Garden Place
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Maul Foster & Alongi, INC.	Project: **Block B Test Pit**	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TP-S-3.0	A8B0477-01	Soil	02/14/18 09:40	02/16/18 12:47
TP-S-6.0	A8B0477-02	Soil	02/14/18 09:45	02/16/18 12:47

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2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
TP-S-3.0 (A8B0477-01)			**Matrix: Soil**		**Batch: 8020852**			
Diesel	ND	---	25.0	mg/kg dry	1	02/20/18 21:52	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 95 %*	*Limits: 50-150 %*	"	"	"	
TP-S-6.0 (A8B0477-02)			**Matrix: Soil**		**Batch: 8020852**			
Diesel	ND	---	25.0	mg/kg dry	1	02/20/18 22:14	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
Surrogate: o-Terphenyl (Surr)			*Recovery: 94 %*	*Limits: 50-150 %*	"	"	"	

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2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
TP-S-3.0 (A8B0477-01)			**Matrix: Soil**		**Batch: 8020791**			
Gasoline Range Organics	ND	---	6.42	mg/kg dry	50	02/19/18 11:55	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 104 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*96 %*	*Limits: 50-150 %*	"	"	"	
TP-S-6.0 (A8B0477-02)			**Matrix: Soil**		**Batch: 8020791**			
Gasoline Range Organics	ND	---	7.16	mg/kg dry	50	02/19/18 12:22	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)			*Recovery: 104 %*	*Limits: 50-150 %*	1	"	"	
1,4-Difluorobenzene (Sur)			*96 %*	*Limits: 50-150 %*	"	"	"	

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Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
TP-S-3.0 (A8B0477-01)				**Matrix: Soil**				
Batch: 8020807								
Arsenic	**1.30**	---	1.20	mg/kg dry	10	02/20/18 15:41	EPA 6020A	
Cadmium	ND	---	0.241	"	"	"	"	
Lead	**2.93**	---	0.241	"	"	"	"	
Mercury	ND	---	0.0963	"	"	"	"	
TP-S-6.0 (A8B0477-02)				**Matrix: Soil**				
Batch: 8020807								
Arsenic	**1.63**	---	1.18	mg/kg dry	10	02/20/18 15:44	EPA 6020A	
Cadmium	ND	---	0.236	"	"	"	"	
Lead	**3.70**	---	0.236	"	"	"	"	
Mercury	ND	---	0.0943	"	"	"	"	

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2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
TP-S-3.0 (A8B0477-01)			**Matrix: Soil**		**Batch: 8020806**			
% Solids	**88.6**	---	1.00	% by Weight	1	02/20/18 08:15	EPA 8000C	
TP-S-6.0 (A8B0477-02)			**Matrix: Soil**		**Batch: 8020806**			
% Solids	**87.3**	---	1.00	% by Weight	1	02/20/18 08:15	EPA 8000C	

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Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8020852 - EPA 3546 (Fuels)							**Soil**					
Blank (8020852-BLK1)					Prepared: 02/20/18 13:38 Analyzed: 02/20/18 19:05							
NWTPH-Dx												
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	---	50.0	"	"	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 97 %*	*Limits: 50-150 %*			*Dilution: 1x*					
LCS (8020852-BS1)					Prepared: 02/20/18 13:38 Analyzed: 02/20/18 19:26							
NWTPH-Dx												
Diesel	109	---	25.0	mg/kg wet	1	125	---	87	76-115	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 95 %*	*Limits: 50-150 %*			*Dilution: 1x*					
Duplicate (8020852-DUP1)					Prepared: 02/20/18 13:38 Analyzed: 02/20/18 20:08							
QC Source Sample: Other (A8B0382-01)												
NWTPH-Dx												
Diesel	ND	---	26.8	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	ND	---	53.7	"	"	---	ND	---	---	---	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 85 %*	*Limits: 50-150 %*			*Dilution: 1x*					
Duplicate (8020852-DUP3)					Prepared: 02/20/18 13:38 Analyzed: 02/21/18 10:49							
QC Source Sample: Other (A8B0514-02RE1)												
NWTPH-Dx												
Diesel	**26900**	---	922	mg/kg dry	40	---	25300	---	---	6	30%	
Oil	ND	---	1840	"	"	---	ND	---	---	---	30%	
Surr: o-Terphenyl (Surr)			*Recovery: %*	*Limits: 50-150 %*			*Dilution: 40x*					*S-01*

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Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8020791 - EPA 5035A							**Soil**					
Blank (8020791-BLK1)					Prepared: 02/19/18 08:00		Analyzed: 02/19/18 11:28					
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*			*"*					
LCS (8020791-BS2)					Prepared: 02/19/18 08:00		Analyzed: 02/19/18 11:01					
NWTPH-Gx (MS)												
Gasoline Range Organics	22.6	---	5.00	mg/kg wet	50	25.0	---	91	80-120	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 100 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*			*"*					
Duplicate (8020791-DUP1)					Prepared: 02/16/18 15:28		Analyzed: 02/19/18 13:16					V-15
QC Source Sample: Other (A8B0457-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	6.80	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 106 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*			*"*					

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2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8020807 - EPA 3051A							**Soil**					
Blank (8020807-BLK1)					Prepared: 02/19/18 13:11		Analyzed: 02/20/18 13:23					
EPA 6020A												
Arsenic	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Cadmium	ND	---	0.192	"	"	---	---	---	---	---	---	
Lead	ND	---	0.192	"	"	---	---	---	---	---	---	
Mercury	ND	---	0.0769	"	"	---	---	---	---	---	---	
LCS (8020807-BS1)					Prepared: 02/19/18 13:11		Analyzed: 02/20/18 13:33					
EPA 6020A												
Arsenic	52.6	---	1.00	mg/kg wet	10	50.0	---	105	80-120	---	---	
Cadmium	51.9	---	0.200	"	"	"	---	104	"	---	---	
Lead	55.2	---	0.200	"	"	"	---	110	"	---	---	
Mercury	1.04	---	0.0800	"	"	1.00	---	104	"	---	---	
Duplicate (8020807-DUP1)					Prepared: 02/19/18 13:11		Analyzed: 02/20/18 14:05					
QC Source Sample: Other (A8B0071-BK)												
EPA 6020A												
Arsenic	**10.9**	---	1.14	mg/kg dry	10	---	12.4	---	---	13	40%	
Cadmium	**0.364**	---	0.228	"	"	---	0.378	---	---	4	40%	
Lead	**14.1**	---	0.228	"	"	---	15.2	---	---	8	40%	
Mercury	ND	---	0.0911	"	"	---	ND	---	---	---	40%	A-02, R-01
Matrix Spike (8020807-MS1)					Prepared: 02/19/18 13:11		Analyzed: 02/20/18 14:09					
QC Source Sample: Other (A8B0071-BK)												
EPA 6020A												
Arsenic	68.5	---	1.07	mg/kg dry	10	53.4	12.4	105	75-125	---	---	
Cadmium	58.6	---	0.214	"	"	"	0.378	109	"	---	---	
Lead	71.7	---	0.214	"	"	"	15.2	106	"	---	---	
Mercury	1.12	---	0.0854	"	"	1.07	ND	99	"	---	---	A-02, R-01
Matrix Spike (8020807-MS2)					Prepared: 02/19/18 13:11		Analyzed: 02/20/18 15:48					
QC Source Sample: TP-S-6.0 (A8B0477-02)												
EPA 6020A												
Arsenic	64.2	---	1.20	mg/kg dry	10	60.2	1.63	104	75-125	---	---	
Cadmium	62.2	---	0.241	"	"	"	0.212	103	"	---	---	
Lead	65.7	---	0.241	"	"	"	3.70	103	"	---	---	
Mercury	1.19	---	0.0962	"	"	1.20	ND	99	"	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Maul Foster & Alongi, INC.	Project: **Block B Test Pit**	
2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8020807 - EPA 3051A							**Soil**					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8020806 - Total Solids (Dry Weight)							**Soil**					
Duplicate (8020806-DUP1)					Prepared: 02/19/18 13:00		Analyzed: 02/20/18 08:15					
QC Source Sample: Other (A8B0457-01)												
EPA 8000C												
% Solids	**77.7**	---	1.00	% by Weight	1	---	80.5	---	---	4	10%	
Duplicate (8020806-DUP2)					Prepared: 02/19/18 18:32		Analyzed: 02/20/18 08:15					
QC Source Sample: Other (A8B0498-01)												
EPA 8000C												
% Solids	**82.8**	---	1.00	% by Weight	1	---	83.5	---	---	0.9	10%	
Duplicate (8020806-DUP3)					Prepared: 02/19/18 18:32		Analyzed: 02/20/18 08:15					
QC Source Sample: Other (A8B0498-11)												
EPA 8000C												
% Solids	**85.4**	---	1.00	% by Weight	1	---	86.3	---	---	1	10%	
Duplicate (8020806-DUP4)					Prepared: 02/19/18 18:32		Analyzed: 02/20/18 08:15					
QC Source Sample: Other (A8B0501-02)												
EPA 8000C												
% Solids	**76.3**	---	1.00	% by Weight	1	---	76.3	---	---	0.03	10%	

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8020852							
A8B0477-01	Soil	NWTPH-Dx	02/14/18 09:40	02/20/18 13:37	10.27g/5mL	10g/5mL	0.97
A8B0477-02	Soil	NWTPH-Dx	02/14/18 09:45	02/20/18 13:37	10.24g/5mL	10g/5mL	0.98

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8020791							
A8B0477-01	Soil	NWTPH-Gx (MS)	02/14/18 09:40	02/14/18 09:40	4.89g/5mL	5g/5mL	1.02
A8B0477-02	Soil	NWTPH-Gx (MS)	02/14/18 09:45	02/14/18 09:45	4.45g/5mL	5g/5mL	1.12

Total Metals by EPA 6020 (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8020807							
A8B0477-01	Soil	EPA 6020A	02/14/18 09:40	02/19/18 13:11	0.469g/50mL	0.5g/50mL	1.07
A8B0477-02	Soil	EPA 6020A	02/14/18 09:45	02/19/18 13:11	0.486g/50mL	0.5g/50mL	1.03

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8020806							
A8B0477-01	Soil	EPA 8000C	02/14/18 09:40	02/19/18 13:00	1N/A/1N/A	1N/A/1N/A	NA
A8B0477-02	Soil	EPA 8000C	02/14/18 09:45	02/19/18 13:00	1N/A/1N/A	1N/A/1N/A	NA

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Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

Notes and Definitions

Qualifiers:

A-02	MDL raised to account for tungsten interference
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-01	Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.
V-15	Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling.

Notes and Conventions:

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected.
RPD	Relative Percent Difference
MDL	If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
WMSC	Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
Batch QC	In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
Blank Policy	Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they 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. For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor. Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
---	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).

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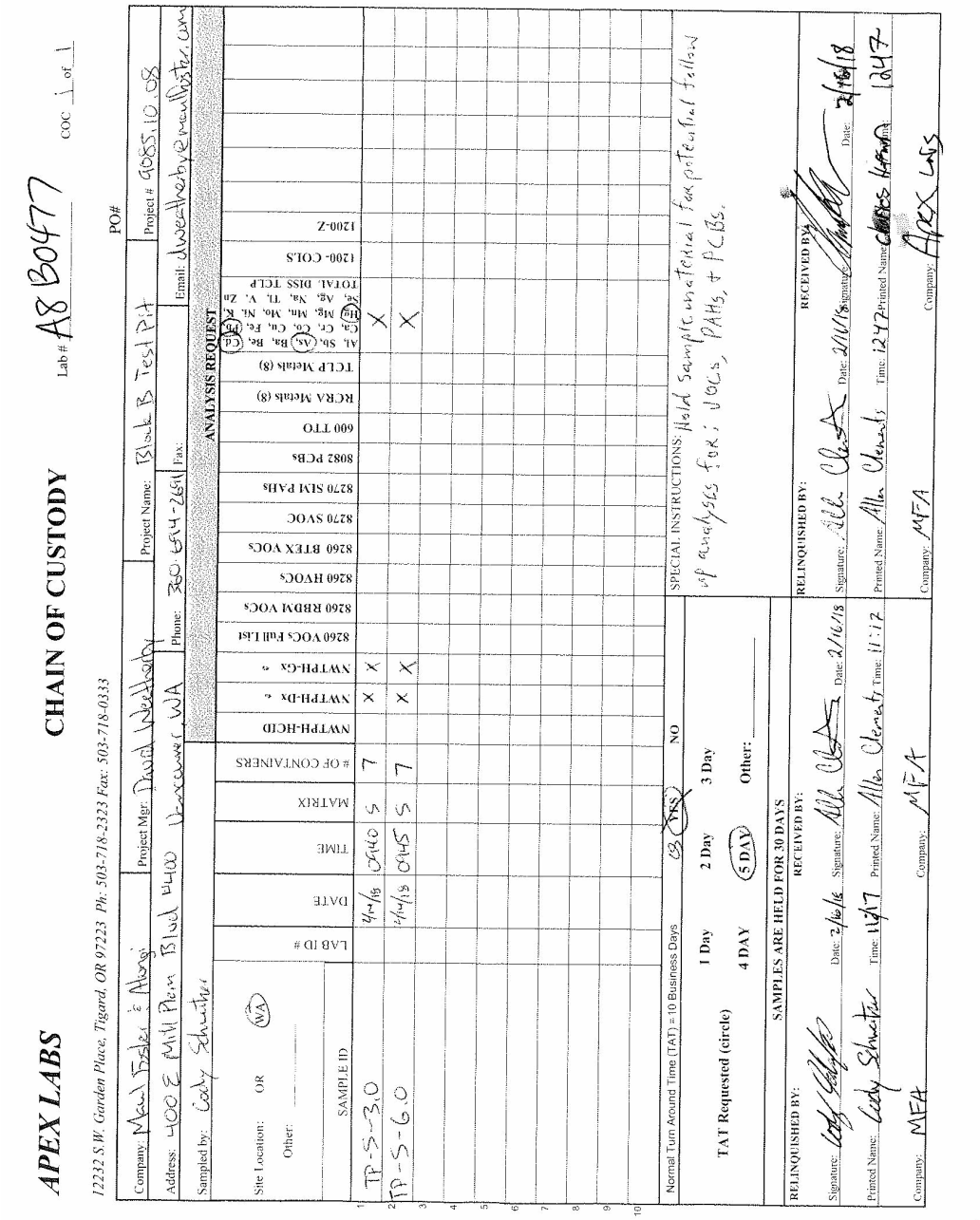

APEX LABS — **CHAIN OF CUSTODY** — Lab # A8B0477 — COC 1 of 1

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2333 Fax: 503-718-0333

PO#

Company: Maul Foster & Alongi — Project Mgr: David Weatherby — Project Name: Block B Test Pit — Project # 9085.10.08

Address: 1100 E Mill Plain Blvd #400 Vancouver, WA — Phone: 360 694-2691 Fax: — Email: dweatherby@maulfoster.com

Sampled by: Cody Schuster

Site Location: OR (WA) — Other: _____

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx e	NWTPH-Gx e	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCs	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Ag, Se, Na, Tl, V, Zn TOTAL DISS TCLP	1200- COLS	1200-Z
1 TP-S-3.0		2/1/18	0940	S	7		X	X											X		
2 TP-S-6.0		2/1/18	0945	S	7		X	X											X		
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Normal Turn Around Time (TAT) = 10 Business Days — (3) YES — NO

SPECIAL INSTRUCTIONS: Hold sample material for potential follow up analysis for VOCs, PAHs & PCBs.

TAT Requested (circle): 1 Day — 2 Day — 3 Day — 4 DAY — (5 DAY) — Other: _____

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: Cody Schuster — Printed Name: Cody Schuster — Company: MFA — Date: 2/16/18 — Time: 1417

RECEIVED BY: Signature: Allen Clemens — Printed Name: Allen Clemens — Company: MFA — Date: 2/16/18 — Time: 11:12

RELINQUISHED BY: Signature: Allen Clemens — Printed Name: Allen Clemens — Company: MFA — Date: 2/16/18 — Time: 1247

RECEIVED BY: Signature: [illegible] — Printed Name: [illegible] — Company: Apex Labs — Date: 2/16/18 — Time: 1247

Apex Laboratories

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2001 NW 19th Ave, STE 200	Project Number: 9085.10.08	**Reported:**
Portland, OR 97209	Project Manager: David Weatherby	02/23/18 13:09

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster + Alongi Element WO#: A8 B0477

Project/Project #: Block B Test Pit / 9085.10.08

Delivery info:

Date/Time Received: 2/16/18 @ 1247 By: CFH

Delivered by: Apex ✓ Client ___ ESS ___ FedEx ___ UPS ___ Swift ___ Senvoy ___ SDS ___ Other ___

Cooler Inspection Inspected by: (SL) : 2/16/18 @ 1410

Chain of Custody Included? Yes ✓ No ___ Custody Seals? Yes ___ No ✓

Signed/Dated by Client? Yes ✓ No ___

Signed/Dated by Apex? Yes ✓ No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	—						
Received on Ice? (Y/N)	(Y)						
Temp. Blanks? (Y/N)	(Y)						
Ice Type: (Gel/Real/Other)	(Real)						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

Samples Inspection: Inspected by: CM : 2/16/18 @ 1805

All Samples Intact? Yes X No ___ Comments:

Bottle Labels/COCs agree? Yes X No ✓ (2) Comments: Containers read TP1-S-3.0 + TP1-S-6.0, MeOH VOA TP1 TP-S-3.0 container reads TP1-S

Containers/Volumes Received Appropriate for Analysis? Yes X No ___ Comments:

Do VOA Vials have Visible Headspace? Yes ___ No ___ NA X

Comments

Water Samples: pH Checked and Appropriate (except VOAs): Yes ___ No ___ NA X

Comments:

Additional Information:

Labeled by: CM Witness: (SL) Cooler Inspected by: CM See Project Contact Form: Y

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ATTACHMENT C

DATA VALIDATION MEMORANDUM

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9085.10.08 | MAY 22, 2018 | PORT OF VANCOUVER

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for soil samples collected at the Block B property located in Vancouver, Washington. The samples were collected on February 14, 2018.

Apex Laboratories (Apex) performed the analyses. Apex report number A8B0477 was reviewed. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Diesel- and Motor Oil-Range Hydrocarbons	NWTPH-Dx
Gasoline Range Hydrocarbons	NWTPH-Gx
Percent Dry Weight	USEPA 8000C
Total Metals	USEPA 6020B

NWTPH = Northwest Total Petroleum Hydrocarbon.
USEPA = U.S. Environmental Protection Agency.

Samples Analyzed
Report A8B0477
TP-S-3.0
TP-S-6.0

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2017a,b) and appropriate laboratory and method-specific guidelines (Apex, 2016; USEPA, 1986).

Data validation procedures were modified as appropriate to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., NWTPH-Dx).

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 in report A8B0477 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 submitted for this sampling event.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples.

In report A8B0477, one of the NWTPH-Dx laboratory duplicates (802085-DUP3) prepared with an unassociated project sample had an unrecoverable surrogate result due to the sample dilution required by high analyte concentration and/or matrix interference. Because the duplicate was prepared with an unassociated project sample and all other surrogate recoveries were within acceptance limits, no qualifications were made by the reviewer.

All remaining 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/MSD samples were extracted and analyzed at the required frequency. All recoveries were within acceptance limits for percent recovery and RPDs.

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. All 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 precision and accuracy. The LCS samples were extracted and analyzed at the required frequency. All LCS analytes were within acceptance limits for percent recovery.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. A field duplicate was not submitted for analysis with report A8B0477.

REPORTING LIMITS

Apex used routine reporting limits for non-detect results, except for samples 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.

REFERENCES

Apex. 2016. Quality systems manual. Revision 5. Apex Laboratories, LLC., Tigard, Oregon. April 1.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).

USEPA. 2017a. USEPA contract laboratory program, national functional guidelines for inorganic Superfund methods data review. EPA 540-R-2017-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

USEPA. 2017b. 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.