

Technical Memorandum

TO: Ken Thiessen, State of Oregon Department of Environmental Quality
FROM: Christine Kimmel, LHG, and Sierra Mott
DATE: January 23, 2018
RE: **Environmental Construction Support Summary - Column D-4 Excavation
Boeing Portland Facility, Building 85-105
Gresham, Oregon
Project No. 025116.117.520**

Introduction

This technical memorandum has been prepared on behalf of The Boeing Company (Boeing) to summarize environmental construction support conducted for an excavation located near column D-4 in the 85-105 building at the Boeing Portland facility located at 19000 NE Sandy Boulevard in Gresham, Oregon (Figure 1). The analytical results for soil samples collected in association with the excavation are being provided to the State of Oregon Department of Environmental Quality (ODEQ) to document environmental conditions in the unsaturated, shallow soil interval of the Troutdale Gravel Aquifer (TGA). Remediation of the TGA is ongoing and overseen by ODEQ under Order on Consent ODEQ No. LQSR-NWR-04-12 (ODEQ 2008).

A shallow excavation for an equipment foundation (approximately 2 feet [ft] wide by 6 ft long and 3 ft deep) had been completed to the planned excavation limits when evidence of stained soil was observed at the northeastern edge of the excavation. Per the Institutional Control Plan (ICP; LAI 2005), the contractor notified Boeing Environment, Health and Safety (EHS). Landau Associates, Inc. (LAI) and Boeing EHS visited the excavation site on November 28, 2017 to conduct soil field screening and collect analytical samples. The results are presented in the report. The approximate location of the excavation is shown on Figure 2.

Sample Collection Procedures

Two soil samples were collected along the northeast corner of the excavation near column D-4 on November 28, 2017 to characterize the impacted soil to assist Boeing with soil disposal. One sample [Bldg105-D4(NE-1)] was collected at approximately 1 ft below the finished floor grade in an area of soil where field screening (i.e. soil discoloration) was observed. A second sample [Bldg105-D4(NE2)] was collected at approximately 2 ft below the finished floor grade, directly below the area of discoloration, to confirm the vertical extent of possible contamination. The excavation was completed to the planned limits of the engineering design and impacted soil was not “chased” to remove due to limited access within the building footprint. The final limits of the excavation extended vertically to 3 ft below finished floor grade.

Samples were submitted to Apex Laboratory, located in Tigard, Oregon, and analyzed for:

- Total petroleum hydrocarbons-diesel range (TPH-D) and total petroleum hydrocarbons-oil range (TPH-O) using Northwest Method NWTPH-Dx.
- Total petroleum hydrocarbons gasoline-range (TPH-G) using Northwest Method NWTPH-Gx.
- Volatile organic compounds (VOCs) using US Environmental Protection Agency (EPA) Method 8260B.
- Resource Conservation and Recovery Act (RCRA) 8 metals using EPA Methods 6010C/6020C/7471.

Subsurface Conditions

Subsurface soil conditions consist of brown to gray silty sand with various amounts of gravel, which was interpreted as fill material. Groundwater was not observed in the excavation and, based on nearby monitoring well information, the static groundwater for the TGA in this area of the site is approximately 20 ft below the top of slab.

Analytical Results

Soil analytical results for the excavation are summarized in Table 1. The laboratory report is provided in Attachment 1. The analytical results were compared to the Oregon Risk-Based Concentration (RBC) cleanup levels. The most protective applicable generic RBC (soil ingestion, dermal contact, and inhalation exposure pathway for the construction worker in an occupational setting and protection of groundwater from leaching) receptor was used to evaluate the results.

The analytical results indicate TPH-O concentrations (43,200 milligrams per kilogram [mg/kg]) exceeded the RBC level (11,000 mg/kg) in the shallow sample located within the area of discolored soil. All other reported concentrations were below the laboratory reporting limits except the following:

- A low-level TPH-G concentration (6.48 mg/kg) was reported at the shallow sample [Bldg105-D4(NE-1)]; however, the concentration is below the RBC cleanup level (9,700 mg/kg).
- TPH-O was reported at a concentration of 7,010 mg/kg at the deeper sample [Bldg105-D4(NE-2)]; however, this concentration is below the RBC cleanup level (11,000 mg/kg).
- Low-level concentrations of arsenic, barium, chromium, and lead were detected in one or both samples; however, these concentrations were all well below the respective RBC cleanup levels.

Conclusion

The results of the analytical testing indicate isolated areas of TPH-O concentrations above the RBC cleanup level in the shallow soil (1 ft below the top of slab) along the northeast portion of the excavation. Sample results from below the observed area of discolored soil (2 ft below the top of the slab) indicate concentrations are below the RBC cleanup level or not detected at the laboratory reporting limit. Groundwater is approximately 20 ft below ground surface (bgs) based on nearby groundwater monitoring well data; therefore, the risk of leaching to groundwater is considered very low.

The TPH-O-impacted soil was removed, as much as practical, within the engineered extent of the excavation. However, the location of the TPH-O-impacted soil will be stored electronically in the project files for reference to allow for future investigations, if needed, as access is acquired (i.e. future foundation modification of building demolition).

Use of This Technical Memorandum

This Technical Memorandum has been prepared for the exclusive use of The Boeing Company. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without

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* * * * *

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.



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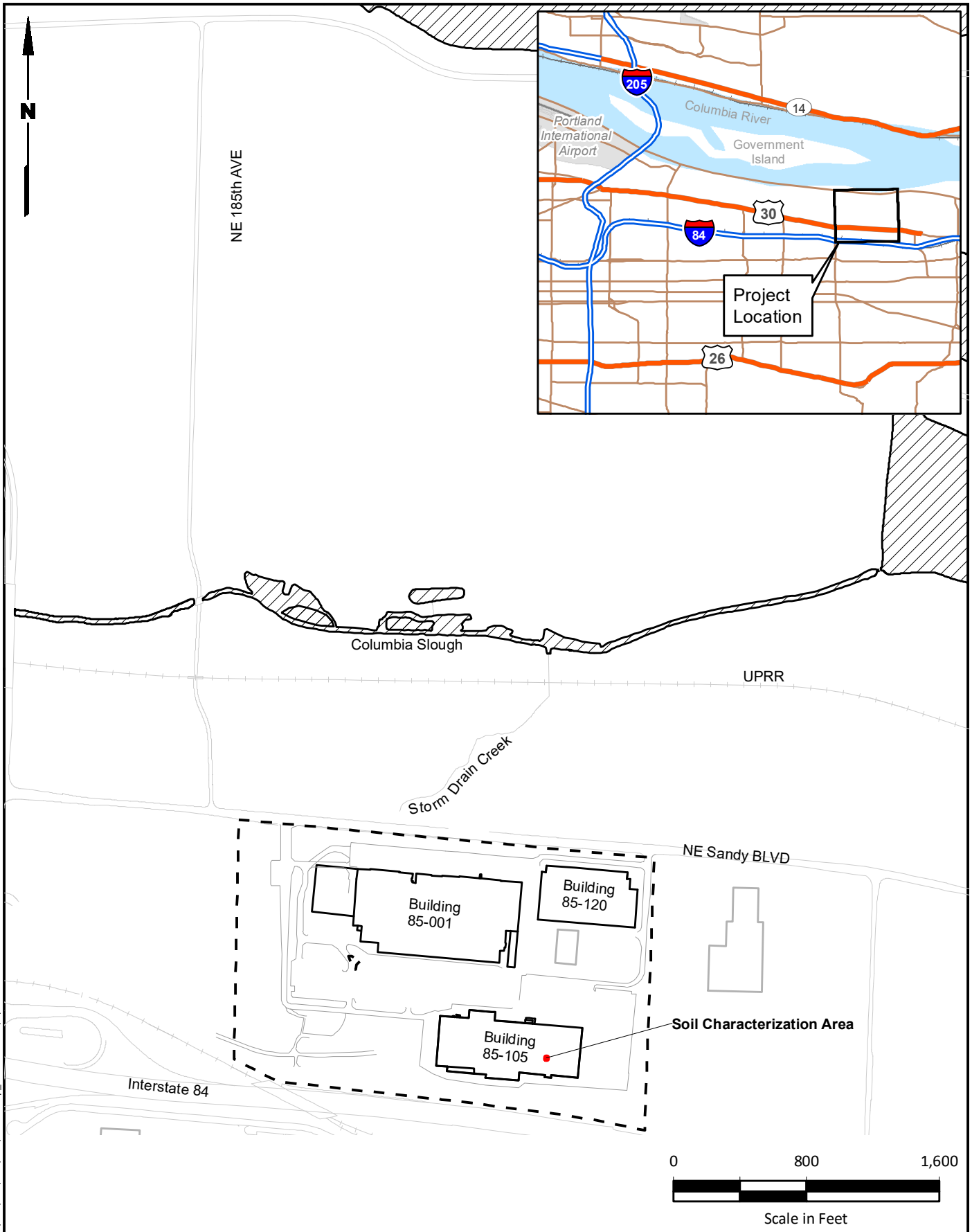
P:\025\116\FileRm\R\TGA\Bldg 85-105 D4 Excavation\Boeing_BOP_Landau_012318_85-105 Column D4 Excavation Soil Sampling TM.docx

Attachments

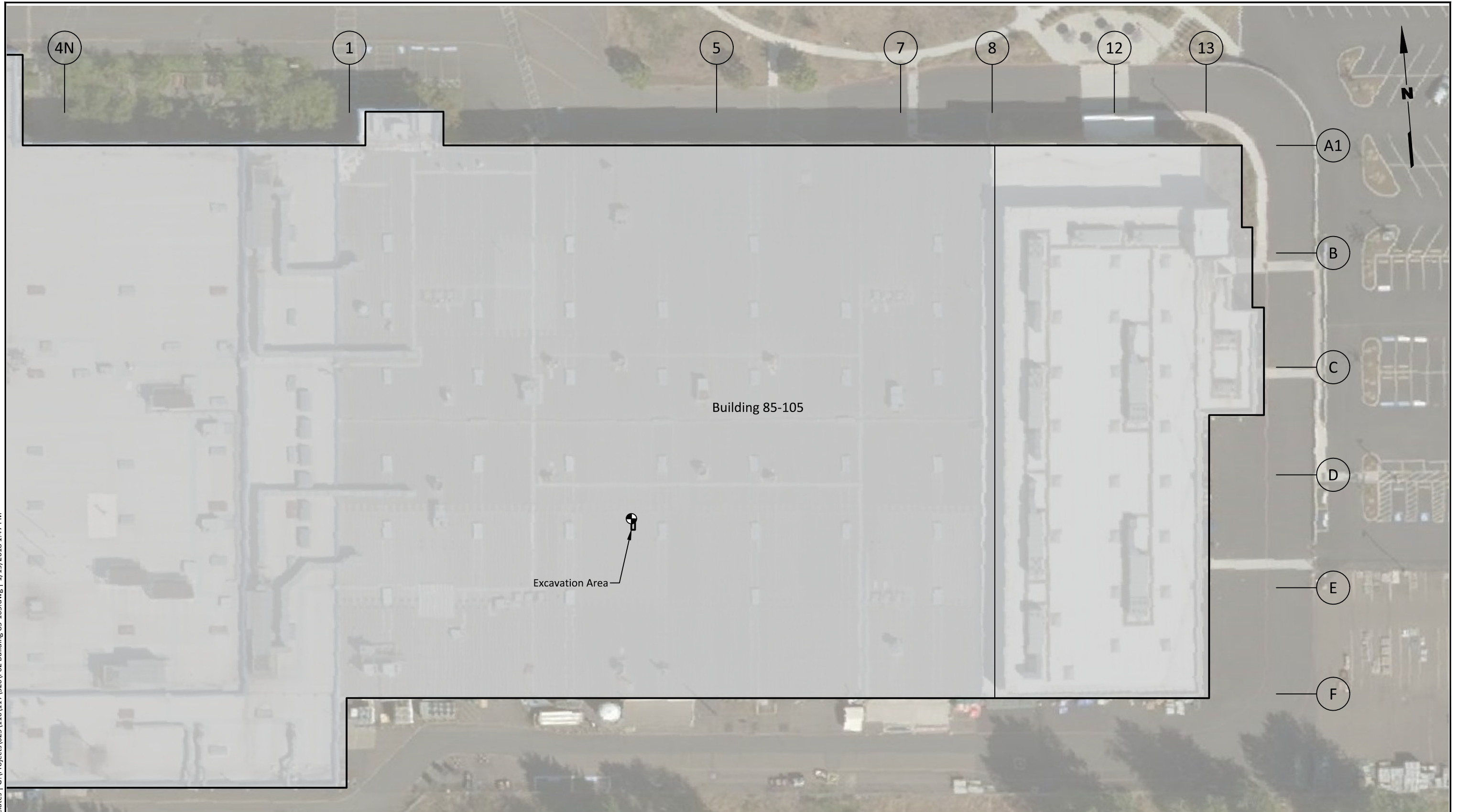
- Figure 1: Boeing Portland Site Map
- Figure 2: Building 85-105 Main Floor Plan and Column D4 Soil Samples
- Table 1: Column D4 Soil Excavation Disposal Characterization Building 85-105
- Attachment 1: Laboratory Analytical Results

References



- ODEQ. 2008. Order of Consent, DEQ No. LOSR-NWR-04-12(h). September 8.
- LAI. 2005. *Institutional Controls Plan, Troutdale Gravel Aquifer, Boeing Portland, Gresham, Oregon.* Prepared for The Boeing Company. December 20.



G:\Projects\025\116\117\520\F01\Map\Map_85105.mxd 1/2/2018



Legend

-  Soil Sample Location
-  Excavation Area



Source: Boeing, 2017

Boeing of Portland
Gresham, Oregon

**Building 85-105
Main Floor Plan and
Column D4 Soil Sample**

Figure
2

Table 1
Column D4 Soil Excavation-Disposal Characterization
Building 85-105
Boeing Portland

Analyte	Risk Based Concentrations (a)	Sample Location, Sample Date, Laboratory SDG and ID	
		Bldg105-D4 (NE-1) 11/28/2017 A7K0903 A7K0903-01	Bldg105-D4 (NE-2) 11/28/2017 A7K0903 A7K0903-02
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Gx/dx)			
Gasoline-Range Organics	9,700	6.48	5.31 U
Diesel-Range Organics	4,600	1,980 U	491 U
Oil-Range Organics	11,000	43,200	7,010
Volatile Organic Compounds (µg/kg; SW-846 8260C)			
Acetone	N/A	968 UJ	1,060 U
Benzene	37,000	9.68 U	10.6 U
Bromodichloromethane	N/A	48.4 U	53.1 U
Bromoform	260,000	96.8 U	106 U
Bromomethane	370,000	484 U	531 U
2-Butanone (MEK)	N/A	484 U	531 U
Carbon disulfide	N/A	484 U	531 U
Carbon tetrachloride	34,000	48.4 U	53.1 U
Chlorobenzene	4,700,000	24.2 U	26.5 U
Chloroethane	N/A	484 U	531 U
Chloroform	350,000	48.4 U	53.1 U
Chloromethane	25,000,000	242 U	265 U
Dibromochloromethane	N/A	96.8 U	106 U
1,2-Dibromo-3-chloropropane	N/A	242 U	265 U
1,1-Dichloroethane	260,000	24.2 U	26.5 U
1,2-Dichloroethane (EDC)	16,000	24.2 U	26.5 U
1,1-Dichloroethene	13,000,000	24.2 U	26.5 U
cis-1,2-Dichloroethene	710,000	24.2 U	26.5 U
trans-1,2-Dichloroethene	7,100,000	24.2 U	26.5 U
1,2-Dichloropropane	N/A	24.2 U	26.5 U
cis-1,3-Dichloropropene	N/A	48.4 U	53.1 U
trans-1,3-Dichloropropene	N/A	48.4 U	53.1 U
Ethylbenzene	150,000	24.2 U	26.5 U
2-Hexanone	N/A	484 U	531 U
Methylene chloride	N/A	242 U	265 U
4-Methyl-2-pentanone (MIBK)	1,100,000	484 U	531 U
Styrene	56,000,000	48.4 U	53.1 U
1,1,2,2-Tetrachloroethane	N/A	48.4 U	53.1 U
Tetrachloroethene (PCE)	1,000,000	24.2 U	26.5 U
Toluene	28,000,000	48.4 U	53.1 U
1,1,1-Trichloroethane	470,000,000	24.2 U	26.5 U
1,1,2-Trichloroethane	26,000	24.2 U	26.5 U
Trichloroethene (TCE)	51,000	24.2 U	26.5 U
Trichlorofluoromethane	69,000,000	96.8 U	106 U
Vinyl chloride	N/A	24.2 U	26.5 U
m,p-Xylene	20,000,000	48.4 U	53.1 U
o-Xylene	20,000,000	24.2 U	26.5 U
Metals (mg/kg; 6010/6020/7471)			
Arsenic	6.728 (b)	2.14	2.20 U
Barium	704.9 (b)	60.2	72.2
Cadmium	0.565 (b)	0.212 U	0.220 U
Chromium	63.050 (b)	11.8	9.88
Lead	56.220 (b)	7.46	3.43
Mercury	0.174 (b)	0.0846 U	0.0879 U
Selenium	0.612 (b)	1.06 U	1.10 U
Silver	0.653 (b)	0.212 U	0.220

Acronyms/Abbreviations:

ID = identification
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NWTPH = Northwest Total Petroleum Hydrocarbon
N/A = not applicable
RBC = Risk-Based Concentration
SDG = sample delivery group

Notes:

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
Bold text indicates detected analyte

- (a) Oregon Department of Environmental Quality RBC for protection of construction worker in an occupational setting.
(b) Oregon background metal concentrations

Green highlight indicate sample concentrations above the cleanup level.

Laboratory Analytical Results

Apex Labs

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

Thursday, November 30, 2017

Chris Kimmel
Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

RE: Boeing Portland / 25116.117.520

Enclosed are the results of analyses for work order A7K0903, which was received by the laboratory on 11/28/2017 at 1:30:00PM.

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: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

DRAFT REPORT

The results provided in this report are PRELIMINARY and are subject to change based on subsequent analysis, QC validation or final data review. Please use these results with the understanding that they may have not been finalized by the laboratory

DRAFT REPORT, DATA SUBJECT TO CHANGE

Page 1 of 20

Landau Associates
1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing Portland**
Project Number: 25116.117.520
Project Manager: Chris Kimmel

Reported:
11/30/17 10:45

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Bldg105-D4 (NE-1)	A7K0903-01	Soil	11/28/17 12:40	11/28/17 13:30
Bldg105-D4 (NE-2)	A7K0903-02	Soil	11/28/17 12:30	11/28/17 13:30

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Landau Associates

1500 SW First Avenue Suite 1015
 Portland, OR 97201

Project: **Boeing Portland**

Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Bldg105-D4 (NE-1) (A7K0903-01RE1)			Matrix: Soil	Batch: 7111109				
Diesel	ND	---	1980	mg/kg dry	100	11/29/17 10:27	NWTPH-Dx	
Oil	43200	---	3960	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>	<i>Limits: 50-150 %</i>	"	"	"	<i>S-01</i>
Bldg105-D4 (NE-2) (A7K0903-02RE1)			Matrix: Soil	Batch: 7111114				
Diesel	ND	---	491	mg/kg dry	25	11/29/17 10:47	NWTPH-Dx	
Oil	7010	---	982	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>	<i>Limits: 50-150 %</i>	"	"	"	<i>S-01</i>

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Project: **Boeing Portland**

Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

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

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Bldg105-D4 (NE-1) (A7K0903-01RE1)			Matrix: Soil	Batch: 7111089				V-15
Gasoline Range Organics	6.48	---	4.84	mg/kg dry	50	11/28/17 18:51	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 116 %</i>	<i>Limits: 50-150 %</i>	1	"	"	
<i>1,4-Difluorobenzene (Sur)</i>			<i>99 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Bldg105-D4 (NE-2) (A7K0903-02RE1)			Matrix: Soil	Batch: 7111089				V-15
Gasoline Range Organics	ND	---	5.31	mg/kg dry	50	11/28/17 19:45	NWTPH-Gx (MS)	
<i>Surrogate: 4-Bromofluorobenzene (Sur)</i>			<i>Recovery: 112 %</i>	<i>Limits: 50-150 %</i>	1	"	"	
<i>1,4-Difluorobenzene (Sur)</i>			<i>99 %</i>	<i>Limits: 50-150 %</i>	"	"	"	

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Landau Associates
 1500 SW First Avenue Suite 1015
 Portland, OR 97201

Project: **Boeing Portland**
 Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg105-D4 (NE-1) (A7K0903-01RE1)			Matrix: Soil		Batch: 7111089			V-15
Acetone	ND	---	968	ug/kg dry	50	11/28/17 18:51	5035A/8260C	
Benzene	ND	---	9.68	"	"	"	"	
Bromodichloromethane	ND	---	48.4	"	"	"	"	
Bromoform	ND	---	96.8	"	"	"	"	
Bromomethane	ND	---	484	"	"	"	"	
2-Butanone (MEK)	ND	---	484	"	"	"	"	
Carbon disulfide	ND	---	484	"	"	"	"	
Carbon tetrachloride	ND	---	48.4	"	"	"	"	
Chlorobenzene	ND	---	24.2	"	"	"	"	
Chloroethane	ND	---	484	"	"	"	"	
Chloroform	ND	---	48.4	"	"	"	"	
Chloromethane	ND	---	242	"	"	"	"	
Dibromochloromethane	ND	---	96.8	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	242	"	"	"	"	
1,1-Dichloroethane	ND	---	24.2	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	24.2	"	"	"	"	
1,1-Dichloroethene	ND	---	24.2	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	24.2	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	24.2	"	"	"	"	
1,2-Dichloropropane	ND	---	24.2	"	"	"	"	
cis-1,3-Dichloropropene	ND	---	48.4	"	"	"	"	
trans-1,3-Dichloropropene	ND	---	48.4	"	"	"	"	
Ethylbenzene	ND	---	24.2	"	"	"	"	
2-Hexanone	ND	---	484	"	"	"	"	
Methylene chloride	ND	---	242	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	484	"	"	"	"	
Styrene	ND	---	48.4	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	48.4	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	24.2	"	"	"	"	
Toluene	ND	---	48.4	"	"	"	"	
1,1,1-Trichloroethane	ND	---	24.2	"	"	"	"	
1,1,2-Trichloroethane	ND	---	24.2	"	"	"	"	
Trichloroethene (TCE)	ND	---	24.2	"	"	"	"	
Trichlorofluoromethane	ND	---	96.8	"	"	"	"	
Vinyl chloride	ND	---	24.2	"	"	"	"	

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Project: **Boeing Portland**
Project Number: 25116.117.520
Project Manager: Chris Kimmel

Reported:
11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg105-D4 (NE-1) (A7K0903-01RE1)			Matrix: Soil		Batch: 7111089			V-15
m,p-Xylene	ND	---	48.4	ug/kg dry	50	"	5035A/8260C	
o-Xylene	ND	---	24.2	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 111 %</i>	<i>Limits: 80-120 %</i>	1	"	"	
<i>Toluene-d8 (Surr)</i>			<i>95 %</i>	<i>Limits: 80-120 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>100 %</i>	<i>Limits: 80-120 %</i>	"	"	"	
Bldg105-D4 (NE-2) (A7K0903-02RE1)			Matrix: Soil		Batch: 7111089			V-15
Acetone	ND	---	1060	ug/kg dry	50	11/28/17 19:45	5035A/8260C	
Benzene	ND	---	10.6	"	"	"	"	
Bromodichloromethane	ND	---	53.1	"	"	"	"	
Bromoform	ND	---	106	"	"	"	"	
Bromomethane	ND	---	531	"	"	"	"	
2-Butanone (MEK)	ND	---	531	"	"	"	"	
Carbon disulfide	ND	---	531	"	"	"	"	
Carbon tetrachloride	ND	---	53.1	"	"	"	"	
Chlorobenzene	ND	---	26.5	"	"	"	"	
Chloroethane	ND	---	531	"	"	"	"	
Chloroform	ND	---	53.1	"	"	"	"	
Chloromethane	ND	---	265	"	"	"	"	
Dibromochloromethane	ND	---	106	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	265	"	"	"	"	
1,1-Dichloroethane	ND	---	26.5	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	26.5	"	"	"	"	
1,1-Dichloroethene	ND	---	26.5	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	26.5	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	26.5	"	"	"	"	
1,2-Dichloropropane	ND	---	26.5	"	"	"	"	
cis-1,3-Dichloropropene	ND	---	53.1	"	"	"	"	
trans-1,3-Dichloropropene	ND	---	53.1	"	"	"	"	
Ethylbenzene	ND	---	26.5	"	"	"	"	
2-Hexanone	ND	---	531	"	"	"	"	
Methylene chloride	ND	---	265	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	531	"	"	"	"	
Styrene	ND	---	53.1	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	53.1	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	26.5	"	"	"	"	

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Project: **Boeing Portland**

Project Number: 25116.117.520
 Project Manager: Chris Kimmel

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 11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg105-D4 (NE-2) (A7K0903-02RE1)			Matrix: Soil		Batch: 7111089			V-15
Toluene	ND	---	53.1	ug/kg dry	50	"	5035A/8260C	
1,1,1-Trichloroethane	ND	---	26.5	"	"	"	"	
1,1,2-Trichloroethane	ND	---	26.5	"	"	"	"	
Trichloroethene (TCE)	ND	---	26.5	"	"	"	"	
Trichlorofluoromethane	ND	---	106	"	"	"	"	
Vinyl chloride	ND	---	26.5	"	"	"	"	
m,p-Xylene	ND	---	53.1	"	"	"	"	
o-Xylene	ND	---	26.5	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 112 %</i>	<i>Limits: 80-120 %</i>	1	"	"	
<i>Toluene-d8 (Surr)</i>			<i>95 %</i>	<i>Limits: 80-120 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>98 %</i>	<i>Limits: 80-120 %</i>	"	"	"	

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 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020 (ICPMS)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Bldg105-D4 (NE-1) (A7K0903-01)			Matrix: Soil					
Batch: 7111130								
Arsenic	2.14	---	2.12	mg/kg dry	10	11/29/17 23:21	EPA 6020A	
Barium	60.2	---	1.06	"	"	"	"	B
Cadmium	ND	---	0.212	"	"	"	"	
Chromium	11.8	---	2.12	"	"	"	"	
Lead	7.46	---	0.212	"	"	"	"	
Mercury	ND	---	0.0846	"	"	"	"	
Selenium	ND	---	1.06	"	"	"	"	
Silver	ND	---	0.212	"	"	"	"	
Bldg105-D4 (NE-2) (A7K0903-02)			Matrix: Soil					
Batch: 7111130								
Arsenic	ND	---	2.20	mg/kg dry	10	11/29/17 23:25	EPA 6020A	
Barium	72.2	---	1.10	"	"	"	"	B
Cadmium	ND	---	0.220	"	"	"	"	
Chromium	9.88	---	2.20	"	"	"	"	
Lead	3.43	---	0.220	"	"	"	"	
Mercury	ND	---	0.0879	"	"	"	"	
Selenium	ND	---	1.10	"	"	"	"	
Silver	ND	---	0.220	"	"	"	"	

DRAFT REPORT

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Landau Associates 1500 SW First Avenue Suite 1015 Portland, OR 97201	Project: Boeing Portland Project Number: 25116.117.520 Project Manager: Chris Kimmel	Reported: 11/30/17 10:45
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ANALYTICAL SAMPLE RESULTS

Percent Dry Weight								
--------------------	--	--	--	--	--	--	--	--

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Bldg105-D4 (NE-1) (A7K0903-01)			Matrix: Soil		Batch: 7111118			
% Solids	96.7	---	1.00	% by Weight	1	11/29/17 07:51	EPA 8000C	
Bldg105-D4 (NE-2) (A7K0903-02)			Matrix: Soil		Batch: 7111118			
% Solids	96.2	---	1.00	% by Weight	1	11/29/17 07:51	EPA 8000C	

DRAFT REPORT

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 1500 SW First Avenue Suite 1015
 Portland, OR 97201

Project: **Boeing Portland**
 Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

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 7111109 - EPA 3546 (Fuels)						Soil							
Blank (7111109-BLK1)						Prepared: 11/28/17 13:37 Analyzed: 11/28/17 20:39							
NWTPH-Dx													
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	---	
Oil	ND	---	50.0	"	"	---	---	---	---	---	---	---	
Mineral Oil	ND	---	36.4	"	"	---	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 92 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
LCS (7111109-BS1)						Prepared: 11/28/17 13:37 Analyzed: 11/28/17 20:59							
NWTPH-Dx													
Diesel	111	---	25.0	mg/kg wet	1	125	---	89	76-115%	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 98 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
Batch 7111114 - EPA 3546 (Fuels)						Soil							
Blank (7111114-BLK1)						Prepared: 11/28/17 13:57 Analyzed: 11/28/17 20:39							
NWTPH-Dx													
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	---	
Oil	ND	---	50.0	"	"	---	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 98 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
LCS (7111114-BS1)						Prepared: 11/28/17 13:57 Analyzed: 11/28/17 20:59							
NWTPH-Dx													
Diesel	110	---	25.0	mg/kg wet	1	125	---	88	76-115%	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 96 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
Duplicate (7111114-DUP3)						Prepared: 11/28/17 13:57 Analyzed: 11/29/17 11:07							
QC Source Sample: Bldg105-D4 (NE-2) (A7K0903-02RE1)													
NWTPH-Dx													
Diesel	ND	---	491	mg/kg dry	25	---	ND	---	---	---	30%	---	
Oil	8160	---	982	"	"	---	7010	---	---	15	30%	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 25x</i>				S-01

DRAFT REPORT

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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 7111089 - EPA 5035A						Soil						
Blank (7111089-BLK1)						Prepared: 11/28/17 09:00 Analyzed: 11/28/17 13:18						
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	3.33	mg/kg wet	50	---	---	---	---	---	---	---
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 111 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>101 %</i>		<i>50-150 %</i>		<i>"</i>						
LCS (7111089-BS3)						Prepared: 11/17/17 10:05 Analyzed: 11/28/17 12:51						
NWTPH-Gx (MS)												
Gasoline Range Organics	26.0	---	5.00	mg/kg wet	50	25.0	---	104	80-120%	---	---	---
<i>Surr: 4-Bromofluorobenzene (Sur)</i>		<i>Recovery: 110 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
<i>1,4-Difluorobenzene (Sur)</i>		<i>102 %</i>		<i>50-150 %</i>		<i>"</i>						

DRAFT REPORT

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 1500 SW First Avenue Suite 1015
 Portland, OR 97201

Project: **Boeing Portland**
 Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7111089 - EPA 5035A						Soil						
Blank (7111089-BLK1)						Prepared: 11/28/17 09:00 Analyzed: 11/28/17 13:18						
5035A/8260C												
Acetone	ND	---	667	ug/kg wet	50	---	---	---	---	---	---	---
Benzene	ND	---	6.67	"	"	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
Bromoform	ND	---	66.7	"	"	---	---	---	---	---	---	---
Bromomethane	ND	---	333	"	"	---	---	---	---	---	---	---
2-Butanone (MEK)	ND	---	333	"	"	---	---	---	---	---	---	---
Carbon disulfide	ND	---	333	"	"	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Chloroethane	ND	---	333	"	"	---	---	---	---	---	---	---
Chloroform	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chloromethane	ND	---	167	"	"	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	167	"	"	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	16.7	"	"	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	---
Ethylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
2-Hexanone	ND	---	333	"	"	---	---	---	---	---	---	---
Methylene chloride	ND	---	167	"	"	---	---	---	---	---	---	---
4-Methyl-2-pentanone (MiBK)	ND	---	333	"	"	---	---	---	---	---	---	---
Styrene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	16.7	"	"	---	---	---	---	---	---	---
Toluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	16.7	"	"	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---

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 1500 SW First Avenue Suite 1015
 Portland, OR 97201

Project: **Boeing Portland**
 Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7111089 - EPA 5035A						Soil						
Blank (7111089-BLK1)						Prepared: 11/28/17 09:00 Analyzed: 11/28/17 13:18						
5035A/8260C												
Vinyl chloride	ND	---	16.7	ug/kg wet	"	---	---	---	---	---	---	
m,p-Xylene	ND	---	33.3	"	"	---	---	---	---	---	---	
o-Xylene	ND	---	16.7	"	"	---	---	---	---	---	---	
<i>Surr: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 112 %</i>	<i>Limits: 80-120 %</i>		<i>Dilution: 1x</i>						
<i>Toluene-d8 (Surr)</i>			<i>97 %</i>	<i>80-120 %</i>		<i>"</i>						
<i>4-Bromofluorobenzene (Surr)</i>			<i>98 %</i>	<i>80-120 %</i>		<i>"</i>						
LCS (7111089-BS2)						Prepared: 11/28/17 09:00 Analyzed: 11/28/17 12:11						
5035A/8260C												
Acetone	1520	---	1000	ug/kg wet	50	2000	---	76	80-120%	---	---	Q-55
Benzene	1110	---	10.0	"	"	1000	---	111	"	---	---	
Bromodichloromethane	1180	---	50.0	"	"	"	---	118	"	---	---	
Bromoform	1130	---	100	"	"	"	---	113	"	---	---	
Bromomethane	2060	---	500	"	"	"	---	206	"	---	---	Q-56
2-Butanone (MEK)	1910	---	500	"	"	2000	---	95	"	---	---	
Carbon disulfide	1200	---	500	"	"	1000	---	120	"	---	---	
Carbon tetrachloride	1120	---	50.0	"	"	"	---	112	"	---	---	
Chlorobenzene	928	---	25.0	"	"	"	---	93	"	---	---	
Chloroethane	1000	---	500	"	"	"	---	100	"	---	---	
Chloroform	1060	---	50.0	"	"	"	---	106	"	---	---	
Chloromethane	936	---	250	"	"	"	---	94	"	---	---	
Dibromochloromethane	1050	---	100	"	"	"	---	105	"	---	---	
1,2-Dibromo-3-chloropropane	966	---	250	"	"	"	---	97	"	---	---	
1,1-Dichloroethane	996	---	25.0	"	"	"	---	100	"	---	---	
1,2-Dichloroethane (EDC)	1020	---	25.0	"	"	"	---	102	"	---	---	
1,1-Dichloroethene	1010	---	25.0	"	"	"	---	101	"	---	---	
cis-1,2-Dichloroethene	979	---	25.0	"	"	"	---	98	"	---	---	
trans-1,2-Dichloroethene	987	---	25.0	"	"	"	---	99	"	---	---	
1,2-Dichloropropane	1050	---	25.0	"	"	"	---	105	"	---	---	
cis-1,3-Dichloropropene	925	---	50.0	"	"	"	---	92	"	---	---	
trans-1,3-Dichloropropene	966	---	50.0	"	"	"	---	97	"	---	---	
Ethylbenzene	958	---	25.0	"	"	"	---	96	"	---	---	
2-Hexanone	1640	---	500	"	"	2000	---	82	"	---	---	
Methylene chloride	1040	---	250	"	"	1000	---	104	"	---	---	
4-Methyl-2-pentanone (MiBK)	1760	---	500	"	"	2000	---	88	"	---	---	

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Project: **Boeing Portland**
 Project Number: 25116.117.520
 Project Manager: Chris Kimmel

Reported:
 11/30/17 10:45

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 5035A/8260C

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7111089 - EPA 5035A						Soil						
LCS (7111089-BS2)						Prepared: 11/28/17 09:00 Analyzed: 11/28/17 12:11						
5035A/8260C												
Styrene	1030	---	50.0	ug/kg wet	"	1000	---	103	"	---	---	
1,1,2,2-Tetrachloroethane	956	---	50.0	"	"	"	---	96	"	---	---	
Tetrachloroethene (PCE)	960	---	25.0	"	"	"	---	96	"	---	---	
Toluene	945	---	50.0	"	"	"	---	94	"	---	---	
1,1,1-Trichloroethane	1180	---	25.0	"	"	"	---	118	"	---	---	
1,1,2-Trichloroethane	962	---	25.0	"	"	"	---	96	"	---	---	
Trichloroethene (TCE)	1140	---	25.0	"	"	"	---	114	"	---	---	
Trichlorofluoromethane	902	---	100	"	"	"	---	90	"	---	---	
Vinyl chloride	1520	---	25.0	"	"	"	---	152	"	---	---	Q-56
m,p-Xylene	1980	---	50.0	"	"	2000	---	99	"	---	---	
o-Xylene	972	---	25.0	"	"	1000	---	97	"	---	---	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 111 % Limits: 80-120 % Dilution: 1x
 Toluene-d8 (Surr) 96 % 80-120 % "
 4-Bromofluorobenzene (Surr) 94 % 80-120 % "

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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 7111130 - EPA 3051A												
Soil												
Blank (7111130-BLK1)			Prepared: 11/29/17 09:25 Analyzed: 11/29/17 22:34									
EPA 6020A												
Arsenic	ND	---	1.92	mg/kg wet	10	---	---	---	---	---	---	
Barium	1.12	---	0.962	"	"	---	---	---	---	---	---	B
Cadmium	ND	---	0.192	"	"	---	---	---	---	---	---	
Chromium	ND	---	1.92	"	"	---	---	---	---	---	---	
Lead	ND	---	0.192	"	"	---	---	---	---	---	---	
Mercury	ND	---	0.0769	"	"	---	---	---	---	---	---	
Selenium	ND	---	0.962	"	"	---	---	---	---	---	---	
Silver	ND	---	0.192	"	"	---	---	---	---	---	---	
LCS (7111130-BS1)			Prepared: 11/29/17 09:25 Analyzed: 11/29/17 22:39									
EPA 6020A												
Arsenic	52.1	---	2.00	mg/kg wet	10	50.0	---	104	80-120%	---	---	
Barium	49.6	---	1.00	"	"	"	---	99	"	---	---	B
Cadmium	47.6	---	0.200	"	"	"	---	95	"	---	---	
Chromium	52.6	---	2.00	"	"	"	---	105	"	---	---	
Lead	48.0	---	0.200	"	"	"	---	96	"	---	---	
Mercury	0.937	---	0.0800	"	"	1.00	---	94	"	---	---	
Selenium	25.2	---	1.00	"	"	25.0	---	101	"	---	---	
Silver	23.7	---	0.200	"	"	"	---	95	"	---	---	

DRAFT REPORT

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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 7111118 - Total Solids (Dry Weight)						Soil						

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

DRAFT REPORT

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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: 7111109							
A7K0903-01RE1	Soil	NWTPH-Dx	11/28/17 12:40	11/28/17 13:57	10.45g/5mL	10g/5mL	0.96
Batch: 7111114							
A7K0903-02RE1	Soil	NWTPH-Dx	11/28/17 12:30	11/28/17 13:57	10.59g/5mL	10g/5mL	0.94

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: 7111089							
A7K0903-01RE1	Soil	NWTPH-Gx (MS)	11/28/17 12:40	11/28/17 14:00	5.54g/5mL	5g/5mL	0.90
A7K0903-02RE1	Soil	NWTPH-Gx (MS)	11/28/17 12:30	11/28/17 14:00	5.09g/5mL	5g/5mL	0.98

Volatile Organic Compounds by EPA 5035A/8260C

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7111089							
A7K0903-01RE1	Soil	5035A/8260C	11/28/17 12:40	11/28/17 14:00	5.54g/5mL	5g/5mL	0.90
A7K0903-02RE1	Soil	5035A/8260C	11/28/17 12:30	11/28/17 14:00	5.09g/5mL	5g/5mL	0.98

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: 7111130							
A7K0903-01	Soil	EPA 6020A	11/28/17 12:40	11/29/17 09:25	0.489g/50mL	0.5g/50mL	1.02
A7K0903-02	Soil	EPA 6020A	11/28/17 12:30	11/29/17 09:25	0.473g/50mL	0.5g/50mL	1.06

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7111118							
A7K0903-01	Soil	EPA 8000C	11/28/17 12:40	11/28/17 16:05	1N/A/1N/A	1N/A/1N/A	NA
A7K0903-02	Soil	EPA 8000C	11/28/17 12:30	11/28/17 16:05	1N/A/1N/A	1N/A/1N/A	NA

DRAFT REPORT

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Landau Associates

1500 SW First Avenue Suite 1015
Portland, OR 97201

Project: **Boeing Portland**

Project Number: 25116.117.520
Project Manager: Chris Kimmel

Reported:

11/30/17 10:45

Notes and Definitions

Qualifiers:

- B Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.)
- Q-55 Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260C, however there is adequate sensitivity to ensure detection at the reporting level.
- Q-56 Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260C
- 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 Unless specifically requested, this report contains only results for Batch QC derived from client samples included in this report. All analyses were performed with the appropriate Batch QC (including Sample Duplicates, Matrix Spikes and/or Matrix Spike Duplicates) in order to meet or exceed method and regulatory requirements. Any exceptions to this will be qualified in this report. Complete Batch QC results are available upon request. 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 1/2 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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11/30/17 10:45

A7K0903
Date 11/28/17
Page 1 of 1

Chain-of-Custody Record

LA LANDAU ASSOCIATES
 Seattle/Edmonds (425) 778-0907
 Tacoma (253) 926-2493
 Spokane (509) 327-9737
 Portland (503) 542-1080

Project Name **Boeing Portland** Project No. **25116.117.520**
 Project Location/Event **Bldg 85-105 Excavation**
 Sampler's Name **Sierra Mott**
 Project Contact **Chris Kimmel**
 Send Results To **Chris Kimmel, John Rusoff**

Sample I.D.	Date	Time	Matrix	No. of Containers	Testing Parameters	Turnaround Time	Observations/Comments
Bldg 105-D4 (NE-1)	11/28/17	1240	Soil	3		Standard	X Allow water samples to settle, collect aliquot from clear portion
Bldg 105-D4 (NE-2)	11/28/17	1230	Soil	3		Accelerated	NWTPH-Dx - run acid wash silica gel cleanup

Standard
 Accelerated
 ASAP

Analyze for EPA if no specific product identified
 VOC/BTEX/VPH (soil):
 non-preserved
 preserved w/methanol
 preserved w/sodium bisulfate
 Freeze upon receipt
 Dissolved metal water samples field filtered
 Other

Special Shipment/Handling or Storage Requirements: **Cooler on ice**

Relinquished by	Received by	Relinquished by	Received by
Signature: <i>Sierra Mott</i>	Signature: <i>Chris Kimmel</i>	Signature: _____	Signature: _____
Printed Name: Sierra Mott	Printed Name: Chris Kimmel	Printed Name: _____	Printed Name: _____
Company: LA	Company: Apex	Company: _____	Company: _____
Date: 11/28/17 Time: 1330	Date: 11/28/17 Time: 1330	Date: _____ Time: _____	Date: _____ Time: _____

Method of Shipment: **drop off**
 Method of Shipment: _____
 Method of Shipment: _____
 Method of Shipment: _____

DRAFT REPORT

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Landau Associates 1500 SW First Avenue Suite 1015 Portland, OR 97201	Project: Boeing Portland Project Number: 25116.117.520 Project Manager: Chris Kimmel	Reported: 11/30/17 10:45
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APEX LABS COOLER RECEIPT FORM

Client: Landau Element WO#: A7 V0903

Project/Project #: Boeing Portland

Delivery info:

Date/Time Received: 11/28/17 @ 1330 By: CM
 Delivered by: Apex Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Inspected by: CM : 11/28/17 @ 1330

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)	<u>1.9</u>						
Received on Ice? (Y/N)	<u>(Y)</u>						
Temp. Blanks? (Y/N)	<u>(N)</u>						
Ice Type: (Gel/Rea/Other)	<u>(G)</u>						
Condition:							

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 (NA)

Samples Inspection: Inspected by: CM : 11/28/17 @ 1345

All Samples Intact? Yes No Comments: _____
 Bottle Labels/COCs agree? Yes No Comments: Conts - IDs missing 'NE'

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

Do VOA Vials have Visible Headspace? Yes No NA
 Comments: _____

Water Samples: pH Checked and Appropriate (except VOAs): Yes No NA
 Comments: _____

Additional Information: _____

Labeled by: CM Witness: AKC Cooler Inspected by: CM See Project Contact Form: Y