Memo

To:	Carl Bach, Boeing	Project:	0088880080.0400
From:	Larry McGaughey	cc:	Ray Power, Boeing
Tel:	(206) 342-1760		Project File
Fax:	(206) 342-1761		
Date:	March 26, 2013		

Subject: **Soil Characterization for Building 5-50 Electrical Upgrade Excavation**
Boeing Renton Facility
Renton, Washington

INTRODUCTION

This memorandum summarizes soil characterization investigations conducted by The Boeing Company (Boeing) and AMEC Environment & Infrastructure, Inc. (AMEC), in the vicinity of Building 5-50 at the Boeing Renton Facility, Renton, Washington (Figure 1). Soil sampling was completed on the eastern side of Building 5-50 to characterize soil for waste classification and to confirm removal of contaminated soils in an area designated for trenching to be conducted for facility electrical upgrades.

SCOPE OF WORK

In anticipation of soil excavation related to facility electrical upgrades, AMEC completed two hand auger borings for waste characterization purposes on November 20, 2012. These borings are located on the east side of Building 5-50, as shown on Figure 2 (Hole 1 and Hole 2). Samples were collected from these borings at depths of 2 feet below ground surface (bgs). Deeper soil samples could not be collected from the borings due to refusal.

The two samples were analyzed for total metals (arsenic, silver, aluminum, barium, calcium, cadmium, cobalt, chromium, copper, iron, magnesium, molybdenum, nickel, lead, and zinc) by U.S. Environmental Protection Agency (EPA) SW-846 Methods 6010B and 7060A, volatile organic compounds by Method 8260B, and total petroleum hydrocarbons (TPH) as diesel and motor oil using Washington State Department of Ecology (Ecology) Method NWTPH-Dx. The TPH analyses were completed by Analytical Resources Inc. (ARI), a Washington State accredited laboratory located in Tukwila, Washington, and the other analyses were conducted at the Boeing laboratory. The analytical reports for these two waste characterization soil samples are included as Attachment A.

As shown in the Attachment A laboratory data, one of the soil samples contained lead at a concentration of 1,500 milligrams per kilogram (mg/kg), and both soil samples had detections of motor-oil-range TPH at concentrations greater than 2,000 mg/kg. These concentrations exceeded the applicable Model Toxics Control Act (MTCA) Method A cleanup levels of 1,000 mg/kg for lead and 2,000 mg/kg for TPH as motor oil for industrial properties. The sample with the high total lead result was also analyzed for TCLP lead. The TCLP lead concentration was 0.15 mg/L, below the hazardous waste criteria of 5 mg/L. Boeing notified Ecology of these results on November 29, 2012, before proceeding with facility upgrade construction. In the email notification, Boeing said that they would excavate the affected soil in the area and collect soil cleanup confirmation samples.

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The affected soil was subsequently excavated to a depth of approximately 4 feet bgs on December 10 and 11, 2012 by Glacier Environmental, under Boeing's oversight. The excavation had an irregular shape and a maximum length of approximately 33 feet along the eastern sidewall. The maximum width of the excavation was approximately 13 feet at the north-south center point of the excavation.

On December 11, 2012, AMEC sampled the excavation, collecting cleanup confirmation samples: two from the north and south parts of the floor of the excavation (FLOOR-01 and -01) and four from the sides of the excavation (WALL-01 through WALL-04). The sidewall samples were collected from the northern, southern and eastern excavation sidewalls at a depth of approximately 2 feet bgs. The approximate sample locations are shown on Figure 2. All of the cleanup confirmation samples were collected directly from the excavation using a decontaminated stainless steel spoon and the soil was placed directly into the sampling containers.

Boeing decided to conduct additional excavation to ensure affected soils had been removed. On December 17, 2012, Glacier Environmental excavated the southeastern sidewall of the excavation near the location of sample WALL-03 approximately two more feet. AMEC collected an additional soil confirmation sample (WALL-03A) from the extended sidewall at a depth of approximately 2 feet bgs (Figure 2).

The confirmation samples collected on December 11 and 17, 2012 were submitted to ARI for analysis of arsenic, cadmium, chromium, and lead by EPA Method 6010C and mercury by EPA Method 7471A, as well as TPH as diesel and motor oil with a silica gel and acid cleanup procedure. Confirmation soil analytical results and a data validation memo are presented in Attachment B.

All soil samples were collected in accordance with the Ecology-approved Remedial Investigation Work Plan for the site, as subsequently amended (Weston, 1998). This plan specifies field methods for sample collection, sample designation, equipment decontamination, and documentation.

RESULTS

Table 1 presents analytical results for the soil confirmation samples collected from the excavation, and compares these results to MTCA Method A industrial cleanup levels. While TPH and lead were detected in the waste characterization samples, arsenic was the only compound of concern detected in the confirmation samples at a concentration above the MTCA Method A industrial cleanup level (WALL-03A). In general, where the total concentration of an analyte divided by 20 is less than the hazardous waste criteria, TCLP analysis is not required. The total arsenic concentration divided by 20 is less than the hazardous waste criteria for arsenic of 5.0 mg/L; therefore TCLP analysis was not conducted on the sample. No TPH results exceeded MTCA Method A industrial soil cleanup levels for TPH in the cleanup confirmation samples. No other analytes were detected above their respective MTCA Method A cleanup levels in either the waste characterization or cleanup confirmation samples.

CONCLUSIONS

Arsenic was the only compound of concern detected above its respective MTCA Method A industrial cleanup level in the soil cleanup confirmation samples. Boeing proceded with the planned facility electrical upgrades, and based on the waste characterization sample results, the excavated soil was classified as non-dangerous waste and was disposed in a Subtitle D landfill in December 2012.

REFERENCES

Roy F. Weston, Inc. (Weston), 1998, Remedial Investigation Work Plan, Boeing-Renton Plant, Renton, Washington: Prepared for the Boeing Company, Seattle, Washington, November.

Attachments:
Table 1 - Building 5-50 Electrical Upgrade Soil Cleanup Confirmation Sample Analytical Results, December 2012
Figure 1 - Building 5-50 Location
Figure 2 - Building 5-50 Electrical Upgrade Excavation and Soil Sample Locations
Attachment A - Waste Characterization Soil Sample Analytical Data Packages
Attachment B - Confirmation Soil Results Data Validation Memo and Analytical Data

TABLE

TABLE 1

BUILDING 5-50 ELECTRICAL UPGRADE SOIL CLEANUP CONFIRMATION SAMPLE ANALYTICAL RESULTS, DECEMBER 2012 [1,2]

Boeing Renton Facility
Renton, Washington

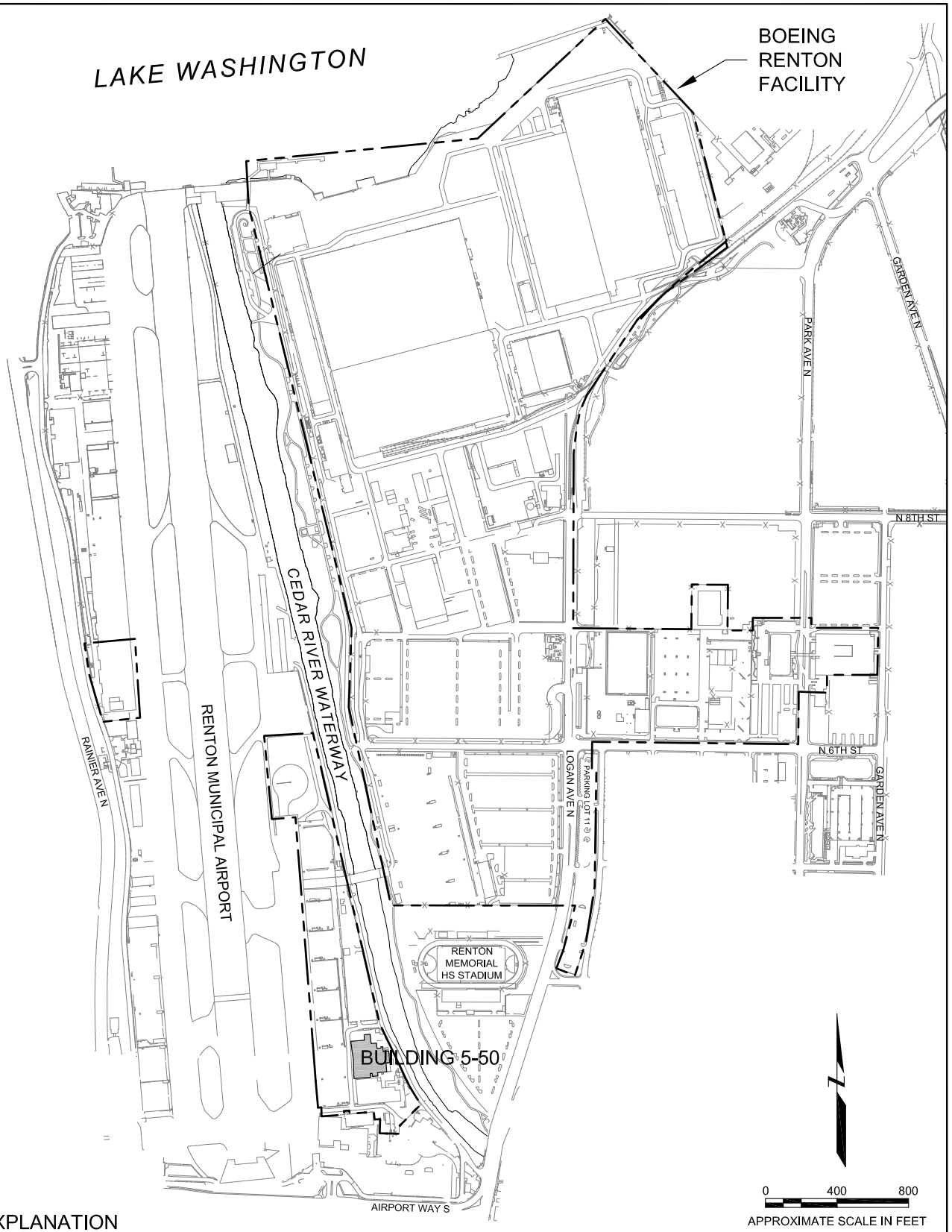
(all concentrations in milligrams per kilogram)

Soil Sample Location	MTCA Method A Cleanup Level (Industrial)[3]	RTN-5-50-APRONA						
Sample ID		FLOOR-01	FLOOR-02	WALL-01	WALL-02	WALL-03	WALL-04	WALL3A
Analytes / Sample Date		12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/17/2012
Metals								
Arsenic	20	6.4	3	3.4	3.9	7.4	5.8	30
Cadmium	2	1.1	0.5	0.2	0.5	1.7	1.4	1.6
Chromium	2,000 [4]	24.7	27.8	26	31.3	33.2	30.4	29
Lead	1,000	286	28.7	3.0	29.4	395	251	241
Mercury	2	0.08	0.05	0.03	0.05	0.22	0.16	1.57
Total Petroleum Hydrocarbons								
Diesel	2,000	33	6 U	5.3 U	5.6 U	5.8 U	9.6	7.7
Motor oil	2,000	40	12 U	55	11 U	29	36	32

Notes

1. Data qualifiers are as follows:
   U = not detected at reporting limit indicated
2. Results that exceed the MTCA Method A industrial cleanup level for soil are shaded.
3. MTCA Method A Industrial Cleanup Levels as shown in Table 745-1, Washington Administrative Code 173-340-900.
4. Value and cleanup level shown are for trivalent chromium.

FIGURES



EXPLANATION

BOEING RENTON FACILITY BOUNDARY

BUILDING 5-50 LOCATION
Renton Municipal Airport
Renton, Washington

By: APS	Date: 03/06/13	Project No. 8888
amec		Figure 1

BOEING

Plot Date: 03/06/13 - 3:35pm, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\065_BLDG 5-50_ElecUpgradeExcav\, Drawing Name: BoeingRenton_Bldg5-50_SiteLocation_010312.dwg

GW078

SWMU-168
(FORMER URE-31)

PRESSURE
INDICATOR
VALVES

GW079S

SHEET
PILE
WALL

CEDAR RIVER WATERWAY

GW136S

BUILDING 5-50

AOC-049
(FORMER URE-30)

GW080S

GW081S

EAST PERIMETER ROAD

GW083S

GW082S

GW226S

GW173S

GW153S

GW172S

GW152S

SWMU-174
(FORMER URE-73)

LIGHTPOLE
WALL-01
HOLE-1
FLOOR-01
WALL-02
HOLE-2
WALL-04
FLOOR-02
WALL-03
WALL-03A
(COLLECTED
ON 12/17/12)

DETAIL

0 5 10
APPROXIMATE SCALE IN FEET

0 15 30
APPROXIMATE SCALE IN FEET

LEGEND

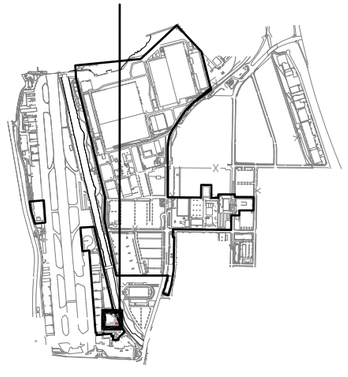
- GW081S — MONITORING WELL LOCATION
- FLOOR-01 — DISCRETE SOIL SAMPLE LOCATION
- HOLE-1 — APPROXIMATE LOCATION OF PRE-EXCAVATION HAND AUGER SOIL SAMPLES
- AREA OF ORIGINAL EXCAVATION COMPLETED 12/10/12 - 12/11/12
- AREA OF OVER EXCAVATION COMPLETED 12/17/12

MAXIMUM EXCAVATION DEPTH APPROXIMATELY 4 FEET BELOW GROUND SURFACE.

NOTES

1. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.

ELECTRICAL UPGRADE EXCAVATION LOCATION MAP



BOEING RENTON FACILITY MAP

BUILDING 5-50
ELECTRICAL UPGRADE EXCAVATION AND SOIL SAMPLE LOCATIONS
Boeing Renton Facility
Renton, Washington

By: APS	Date: 03/08/13	Project No. 8888
amec		Figure 2

BOEING

Plot Date: 03/08/13 - 11:31am, Plotted by: adam.stenberg
Drawing Path: S:\8888_2006\065_BLDG 5-50_ElecUpgradeExcav\, Drawing Name: Figure 2_Bldg5-50-ElectricalExcav_010313.dwg

ATTACHMENT A

Waste Characterization Soil Sample Analytical Data Packages

LABORATORY REPORT

ENVIRONMENTAL ANALYSIS LABORATORY
BOEING INTEGRATED DEFENSE SYSTEMS
18-61 BLDG. MC: 8Y-55 PHONE: (253) 657-0400

Report No.: 9-464C-LAB-23891

Report Date: 29-NOV-2012

To:	Fred Wallace	Orgn.:	G-1241	MC:	6Y-94
cc:	Carl Bach	Orgn.:	G-1241	MC:	1W-12
cc:	Blake Boling	Orgn.:	E-1370	MC:	67-74
cc:	Jennifer Parsons	Orgn.:	G-1241	MC:	6Y-94
cc:	Nancy E. Swenson	Orgn.:	66-CE-1370	MC:	67-74

Please find enclosed the set of analytical results for the 2 sample(s) listed below and submitted to the Environmental Analysis Laboratory on 20-NOV-2012 by Wallace.

EAL ID	Sample Description
144352	RTN 5-50 APRON A-HOLE 1-2FT
144353	RTN 5-50 APRON A-HOLE 2-2FT

All samples were received in good condition with proper paperwork, unless otherwise indicated.

The samples indicated in this report will be discarded in 33 days. These samples may be held for longer periods upon request.

Method References

DRYWEIGHT:	SW-846 Method 1311 (Percent Solids Determination, section 7.1.1).
GFAA1:	EPA Method 206.2/7060A (Atomic Absorption, furnace technique). Digestion per SW-846 Method 3050/3051.
ICP1:	EPA Method 200.7/6010B (Inductively Coupled Plasma). Digestion by SW-846 Method 3050/3051.
TCLP-ICP:	EPA Method 200.7/6010B (Inductively Coupled Plasma). Extraction by SW-846 Method 1311 (TCLP).
VOA-M:	SW-846 Method 8260B
Z-TPH:	Analysis performed by outside laboratory.

All raw data and copies of results are kept on file in the Environmental Analysis Laboratory. Sample results are reported to 2 significant figures except where indicated. If you have any questions or require additional information, please contact the Environmental Analysis Laboratory on 253-657-0400.

Reviewed by:

Dale Meland
Orgn.: 7-14E1

EAL# 144352 Matrix: SOIL_SEDIM
Description : RTN 5-50 APRON A-HOLE 1-2FT
Sampling Site : Renton (BCAC) 5-50 Building
Sample Date : 20-NOV-2012 at 08:45
Received by lab: 20-NOV-2012 at 16:35 Status: Authorized

Test Name	Component Name	Result
DRYWEIGHT	Dry weight (%)	83.96 %
GFAA1	**Arsenic**	**5.0 mg/Kg**
ICP1	Silver	<0.056 mg/Kg
	Aluminum	**17000 mg/Kg**
	Barium	**340 mg/Kg**
	Calcium	**7300 mg/Kg**
	Cadmium	<0.028 mg/Kg
	Cobalt	**7.9 mg/Kg**
	Chromium	**29 mg/Kg**
	Copper	**68 mg/Kg**
	Iron	**22000 mg/Kg**
	Magnesium	**4400 mg/Kg**
	Molybdenum	<0.083 mg/Kg
	Nickel	**34 mg/Kg**
	Lead	**1500 mg/Kg**
	Zinc	**260 mg/Kg**
TCLP-ICP	**Lead**	**0.12 mg/L**
VOA-M	GC-MS results found at end of report	
Z-TPH	Report Received	26-NOV-2012 10:00

EAL# 144353 Matrix: SOIL_SEDIM
Description : RTN 5-50 APRON A-HOLE 2-2FT
Sampling Site : Renton (BCAC) 5-50 Building
Sample Date : 20-NOV-2012 at 09:20
Received by lab: 20-NOV-2012 at 16:36 Status: Authorized

Test Name	Component Name	Result
DRYWEIGHT	Dry weight (%)	78.13 %
GFAA1	**Arsenic**	**4.4 mg/Kg**
ICP1	Silver	<0.072 mg/Kg
	Aluminum	**20000 mg/Kg**
	Barium	**160 mg/Kg**
	Calcium	**7500 mg/Kg**
	Cadmium	<0.036 mg/Kg
	Cobalt	**10 mg/Kg**
	Chromium	**36 mg/Kg**
	Copper	**51 mg/Kg**
	Iron	**23000 mg/Kg**
	Magnesium	**7400 mg/Kg**
	Molybdenum	<0.11 mg/Kg
	Nickel	**43 mg/Kg**
	Lead	**76 mg/Kg**
	Zinc	**130 mg/Kg**
VOA-M	GC-MS results found at end of report	
Z-TPH	Report Received	26-NOV-2012 10:00

ORGANICS ANALYSIS

Methanol Extraction Blank Analysis ID: MB-VOA-M
Sample ID: Daily QC samples - Wednesday
Date Analyzed: 21-NOV-2012 pH = N/A Dilution: 1 in 1
Sample size: 5 ml Matrix: Methanol Extract Instrument: HP 5973N

COMPOUND	ug/Kg	
Dichlorodifluoromethane	40	U
Chloromethane	40	U
Vinyl Chloride	40	U
Bromomethane	40	U
Chloroethane	40	U
Acrolein	400	U
Trichlorofluoromethane	40	U
Ethyl Ether	40	U
Acetone (2-Propanone)	200	U
1,1-Dichloroethene	40	U
Acrylonitrile	400	U
Methylene Chloride	40	U
Carbon Disulfide	200	U
3-Chloro-1-Propene	40	U
trans-1,2-Dichloroethene	40	U
1,1-Dichloroethane	40	U
2-Butanone (MEK)	200	U
cis-1,2-Dichloroethene	40	U
Bromochloromethane	40	U
Chloroform	40	U
2,2-Dichloropropane	40	U
1,2-Dichloroethane	40	U
1,1,1-Trichloroethane	40	U
1,1-Dichloropropene	40	U
Carbon Tetrachloride	80	U
Benzene	40	U
Dibromomethane	40	U
1,2-Dichloropropane	40	U
Trichloroethene	40	U
Bromodichloromethane	40	U
2-Chloroethylvinyl Ether	200	U
cis-1,3-Dichloropropene	40	U
4-Methyl-2-Pentanone (MIBK)	200	U
trans-1,3-Dichloropropene	40	U
1,1,2-Trichloroethane	40	U
Toluene	40	U
1,3-Dichloropropane	40	U
2-Hexanone	200	U
Dibromochloromethane	40	U
1,2-Dibromoethane	40	U
Tetrachloroethene	40	U
1,1,1,2-Tetrachloroethane	40	U
Chlorobenzene	40	U
Ethylbenzene	40	U
Bromoform	40	U
Styrene	40	U

ORGANICS ANALYSIS (cont.)

EAL # 144359 Analysis ID: MB-VOA-M
Sample ID: Daily QC samples - Wednesday
Sample Date: 21-NOV-2012 at 07:27 Analyzed: 21-NOV-2012

COMPOUND	ug/Kg	
Xylene (Total)	120	U
1,2,3-Trichloropropane	40	U
Isopropylbenzene	40	U
Bromobenzene	40	U
n-Propylbenzene	40	U
2-Chlorotoluene	40	U
4-Chlorotoluene	40	U
1,3,5-Trimethylbenzene	40	U
tert-Butylbenzene	40	U
1,2,4-Trimethylbenzene	40	U
sec-Butylbenzene	40	U
1,3-Dichlorobenzene	40	U
1,4-Dichlorobenzene	40	U
4-Isopropyltoluene	40	U
1,2-Dichlorobenzene	40	U
n-Butylbenzene	40	U
1,2-Dibromo-3-Chloropropane	40	U
1,2,4-Trichlorobenzene	40	U
Naphthalene	40	U
Hexachlorobutadiene	40	U
1,2,3-Trichlorobenzene	40	U
1,1,2,2-Tetrachloroethane	40	U
2-Pentanone (MPK)	200	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	200	U

Surrogate Compound	% Recovery
Dibromofluoromethane	118.93
Toluene-d8	99.10
4-Bromofluorobenzene	90.40

ORGANICS ANALYSIS

EAL # 144352 Analysis ID: VOA-M
Sample ID: RTN 5-50 APRON A-HOLE 1-2FT
Sample Date: 20-NOV-2012 at 08:45 Analyzed: 21-NOV-2012
pH = N/A Sample Weight: 11.6221 Dilution: 1 in 1
Matrix: SOIL_SEDIM % Dry Weight: 83.96 Dry Sample Weight: 9.76
Instrument: HP 5973N

COMPOUND	ug/Kg	
Dichlorodifluoromethane	41	U
Chloromethane	41	U
Vinyl Chloride	41	U
Bromomethane	41	U
Chloroethane	41	U
Acrolein	410	U
Trichlorofluoromethane	41	U
Ethyl Ether	41	U
Acetone (2-Propanone)	200	U
1,1-Dichloroethene	41	U
Acrylonitrile	410	U
Methylene Chloride	41	U
Carbon Disulfide	200	U
3-Chloro-1-Propene	41	U
trans-1,2-Dichloroethene	41	U
1,1-Dichloroethane	41	U
2-Butanone (MEK)	200	U
cis-1,2-Dichloroethene	41	U
Bromochloromethane	41	U
Chloroform	41	U
2,2-Dichloropropane	41	U
1,2-Dichloroethane	41	U
1,1,1-Trichloroethane	41	U
1,1-Dichloropropene	41	U
Carbon Tetrachloride	82	U
Benzene	41	U
Dibromomethane	41	U
1,2-Dichloropropane	41	U
Trichloroethene	41	U
Bromodichloromethane	41	U
2-Chloroethylvinyl Ether	200	U
cis-1,3-Dichloropropene	41	U
4-Methyl-2-Pentanone (MIBK)	200	U
trans-1,3-Dichloropropene	41	U
1,1,2-Trichloroethane	41	U
Toluene	41	U
1,3-Dichloropropane	41	U
2-Hexanone	200	U
Dibromochloromethane	41	U
1,2-Dibromoethane	41	U
Tetrachloroethene	41	U
1,1,1,2-Tetrachloroethane	41	U
Chlorobenzene	41	U
Ethylbenzene	41	U

ORGANICS ANALYSIS (cont.)

EAL # 144352 Analysis ID: VOA-M
Sample ID: RTN 5-50 APRON A-HOLE 1-2FT
Sample Date: 20-NOV-2012 at 08:45 Analyzed: 21-NOV-2012

COMPOUND	ug/Kg	
Bromoform	41	U
Styrene	41	U
Xylene (Total)	120	U
1,2,3-Trichloropropane	41	U
Isopropylbenzene	41	U
Bromobenzene	41	U
n-Propylbenzene	41	U
2-Chlorotoluene	41	U
4-Chlorotoluene	41	U
1,3,5-Trimethylbenzene	41	U
tert-Butylbenzene	41	U
1,2,4-Trimethylbenzene	41	U
sec-Butylbenzene	41	U
1,3-Dichlorobenzene	41	U
1,4-Dichlorobenzene	41	U
4-Isopropyltoluene	41	U
1,2-Dichlorobenzene	41	U
n-Butylbenzene	41	U
1,2-Dibromo-3-Chloropropane	41	U
1,2,4-Trichlorobenzene	41	U
Naphthalene	41	U
Hexachlorobutadiene	41	U
1,2,3-Trichlorobenzene	41	U
1,1,2,2-Tetrachloroethane	41	U
2-Pentanone (MPK)	200	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	200	U

Surrogate Compound	% Recovery
Dibromofluoromethane	100.23
Toluene-d8	107.40
4-Bromofluorobenzene	110.38

ORGANICS ANALYSIS

EAL # 144353 Analysis ID: VOA-M
Sample ID: RTN 5-50 APRON A-HOLE 2-2FT
Sample Date: 20-NOV-2012 at 09:20 Analyzed: 21-NOV-2012
pH = N/A Sample Weight: 12.4406 Dilution: 1 in 1
Matrix: SOIL_SEDIM % Dry Weight: 78.13 Dry Sample Weight: 9.72
Instrument: HP 5973N

COMPOUND	ug/Kg	
Dichlorodifluoromethane	41	U
Chloromethane	41	U
Vinyl Chloride	41	U
Bromomethane	41	U
Chloroethane	41	U
Acrolein	410	U
Trichlorofluoromethane	41	U
Ethyl Ether	41	U
Acetone (2-Propanone)	210	U
1,1-Dichloroethene	41	U
Acrylonitrile	410	U
Methylene Chloride	41	U
Carbon Disulfide	210	U
3-Chloro-1-Propene	41	U
trans-1,2-Dichloroethene	41	U
1,1-Dichloroethane	41	U
2-Butanone (MEK)	210	U
cis-1,2-Dichloroethene	41	U
Bromochloromethane	41	U
Chloroform	41	U
2,2-Dichloropropane	41	U
1,2-Dichloroethane	41	U
1,1,1-Trichloroethane	41	U
1,1-Dichloropropene	41	U
Carbon Tetrachloride	82	U
Benzene	41	U
Dibromomethane	41	U
1,2-Dichloropropane	41	U
Trichloroethene	41	U
Bromodichloromethane	41	U
2-Chloroethylvinyl Ether	210	U
cis-1,3-Dichloropropene	41	U
4-Methyl-2-Pentanone (MIBK)	210	U
trans-1,3-Dichloropropene	41	U
1,1,2-Trichloroethane	41	U
Toluene	41	U
1,3-Dichloropropane	41	U
2-Hexanone	210	U
Dibromochloromethane	41	U
1,2-Dibromoethane	41	U
Tetrachloroethene	41	U
1,1,1,2-Tetrachloroethane	41	U
Chlorobenzene	41	U
Ethylbenzene	41	U

ORGANICS ANALYSIS (cont.)

EAL # 144353 Analysis ID: VOA-M
Sample ID: RTN 5-50 APRON A-HOLE 2-2FT
Sample Date: 20-NOV-2012 at 09:20 Analyzed: 21-NOV-2012

COMPOUND	ug/Kg	
Bromoform	41	U
Styrene	41	U
Xylene (Total)	120	U
1,2,3-Trichloropropane	41	U
Isopropylbenzene	41	U
Bromobenzene	41	U
n-Propylbenzene	41	U
2-Chlorotoluene	41	U
4-Chlorotoluene	41	U
1,3,5-Trimethylbenzene	41	U
tert-Butylbenzene	41	U
1,2,4-Trimethylbenzene	41	U
sec-Butylbenzene	41	U
1,3-Dichlorobenzene	41	U
1,4-Dichlorobenzene	41	U
4-Isopropyltoluene	41	U
1,2-Dichlorobenzene	41	U
n-Butylbenzene	41	U
1,2-Dibromo-3-Chloropropane	41	U
1,2,4-Trichlorobenzene	41	U
Naphthalene	41	U
Hexachlorobutadiene	41	U
1,2,3-Trichlorobenzene	41	U
1,1,2,2-Tetrachloroethane	41	U
2-Pentanone (MPK)	210	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	210	U

Surrogate Compound	% Recovery
Dibromofluoromethane	121.75
Toluene-d8	109.18
4-Bromofluorobenzene	99.60

DATA REPORTING QUALIFIERS

Value	Indicates a result greater than or equal to the detection limit.
U	Indicates compound was analyzed for but not detected at the given method detection limit (MDL).
E	Indicates quantitated value falls above limits of calibration curve and dilutions should be run.
M	Indicates estimated value of analyte found, but with low spectral match parameters.
J	Indicates the associated value is an estimated quantity.
UJ	The analyte was analyzed for, but not detected. The associated value is an estimate and may be inaccurate or imprecise. (Analyte not detected at 10 times the indicated detection limit.)
D	Indicates the associated surrogate or analyte was not recoverable due to dilution.
I	Indicates the associated surrogate or analyte was not recoverable due to matrix interference.
N/A	This analyte was not analyzed for.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

November 26, 2012

Dale Meland
The Boeing Company
PO Box 3707
Seattle, WA 98124-2499

Project: A12208
ARI Job No.: VT59

Dear Mr. Meland:

Please find enclosed the original Chain of Custody record (COC), sample receipt documentation, and the final data for the project referenced above. Analytical Resources, Inc. (ARI) accepted two soil samples in good condition on November 21, 2012. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for NWTPH-Gx and NWTPH-Dx, as requested on the COC.

There were no irregularities with these analyses.

An electronic copy of this report and all supporting raw data will be kept on file at ARI. Should you have any questions or concerns, please feel free to call me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

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

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

VT59

BOEING

CHAIN OF CUSTODY RECORD / LABORATORY ANALYSIS REQUEST (IDS)

ENVIRONMENTAL ANALYSIS LABORATORY
Integrated Defense Systems
Kent Space Center, Bldg. 18-61.2, Door 27R2
PO BOX 3707 MC 8Y-55
Seattle, WA 98124-2207 Phone: 253-~~773-8934~~ 657-0400

REPORT TO:			CC:		
BEMSID	NAME: Dale Meland		BEMSID	NAME: Teresa Dunn	
ORGN.	MC: 8Y-55	PHONE: 253 657-8721	ORGN.	MC: 8Y-55	PHONE: 253 657-8720
CHARGELINE: A12208			SAMPLERS: Jefferson		

SAMPLE DESCRIPTION AND LOCATION (INCLUDE PLANT, BLDG, SITE, SAMPLE #, ETC.)	SAMPLE DATE	SAMPLE TIME	MATX	COLL. TYPE	NO. CONT	LAB ID (LAB USE ONLY)	METRO METALS (7) / METHOD 200.7	TOTAL METALS (14 / METHOD 200.7)	MTCA METALS (5) - TOTAL	PRI. POLL. METALS (13) - TOTAL	RCRA METALS (8) - TOTAL	TCLP-ICP METALS (5)	TCLP-GFAA / CVAA METALS (3)	SELECTED METALS	VOA / METHOD 8260 / 624	SEMI-VOA / METHOD 8270 / 625	NWTPH-Dx / WDOE METHOD	NWTPH-G / WDOE METHOD	PCB / METHOD 8082	TOTAL CYANIDE	AMENABLE CYANIDE	HEM (FOG), TOTAL	HEM (FOG), NON-POLAR	pH	TOTAL SUSPENDED SOLIDS	SETTLEABLE SOLIDS	OTHER		
144352 RTNS-50 Apron A Hole 1-2FT	11/20/12	0845	S	G	1												X	X											
144353 RTNS-50 Apron A-Hole 2-2FT	↓	0920	S	G	1												X	X											

NEED RESULTS BY: 1 week TAT	RELINQUISHED BY SIGNATURE	RELINQUISHED BY SIGNATURE	RELINQUISHED BY SIGNATURE
COMMENTS / SPECIAL INSTRUCTIONS	PRINTED NAME: Teresa Dunn	PRINTED NAME	PRINTED NAME
	COMPANY: Boeing	COMPANY	COMPANY
	DATE: 11/21/12 TIME: 0900	DATE / TIME	DATE / TIME
	RECEIVED BY SIGNATURE	RECEIVED BY SIGNATURE	RECEIVED BY SIGNATURE
	PRINTED NAME: Mark D. Hanes	PRINTED NAME	PRINTED NAME
	COMPANY: AEI	COMPANY	COMPANY
	DATE: 11/21/12 TIME: 0900	DATE / TIME	DATE / TIME

(LAB USE ONLY) JOB ID: COC. 23891 CUSTODY SEALS: ☐ PRESENT ☐ INTACT PAGE _____ OF _____

BOEING is a trademark of Boeing Management Company.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: BOEING Project Name: A12208

COC No(s): 23891 NA Delivered by Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: VT59 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry) 3.4°		
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID# 12241 12224	

Cooler Accepted by: Mike Hazley Date: 11/21/12 Time: 0900

Complete custody forms and attach all shipping documents

Log-In Phase:

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

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

Samples Logged by: AV Date: 11/21/12 Time: 1650

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

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

Additional Notes, Discrepancies, & Resolutions:
JARS REMOVED FROM COOLER BY SAMPLER/COURIER / PACED ON BENCH -

By: MA Date: 11/21/12

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

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

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VT59
Client: The Boeing Company
Project Event: COC.23891
Project Name: A12208

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	EAL#144352	VT59A	12-23441	Solid	11/20/12 08:45	11/21/12 09:00
2.	EAL#144353	VT59B	12-23442	Solid	11/20/12 09:20	11/21/12 09:00

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: VT59-The Boeing Company
Project: A12208
COC.23891

Matrix: Solid

Date Received: 11/21/12

Data Release Authorized: MW
Reported: 11/26/12

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	RL	Result
MB-112112	Method Blank	11/21/12	11/23/12	1.00	Diesel Range	5.0	< 5.0 U
12-23441	HC ID: ---		FID4A	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		107%
VT59A	EAL#144352	11/21/12	11/23/12	5.00	**Diesel Range**	**300**	**480**
12-23441	HC ID: **DRO/MOTOR OIL**		FID4A	10	**Motor Oil Range**	**600**	**2,900**
					o-Terphenyl		D
VT59B	EAL#144353	11/21/12	11/23/12	5.00	**Diesel Range**	**260**	**530**
12-23442	HC ID: **DRO/MOTOR OIL**		FID4A	10	**Motor Oil Range**	**530**	**3,700**
					o-Terphenyl		D

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Solid

QC Report No: VT59-The Boeing Company
Project: A12208
COC.23891

Client ID	OTER	TOT OUT
112112MBS	107%	0
112112LCS	102%	0
112112LCSD	101%	0
EAL#144352	D	0
EAL#144353	D	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 12-23441 to 12-23442

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-112112
LCS/LCSD

Lab Sample ID: LCS-112112
LIMS ID: 12-23441
Matrix: Solid
Data Release Authorized: MW
Reported: 11/26/12

QC Report No: VT59-The Boeing Company
Project: A12208
COC.23891
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 11/21/12
Date Analyzed LCS: 11/23/12 14:14
LCSD: 11/23/12 14:37
Instrument/Analyst LCS: FID4A/VTS
LCSD: FID4A/VTS

Sample Amount LCS: 10.0 g-dry-wt
LCSD: 10.0 g-dry-wt
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	147	150	98.0%	145	150	96.7%	1.4%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	102%	101%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: VT59
Matrix: Solid — Project: A12208
Date Received: 11/21/12 — COC.23891

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
12-23441-112112MB1	Method Blank	10.0 g	1.00 mL	-	11/21/12
12-23441-112112LCS1	Lab Control	10.0 g	1.00 mL	-	11/21/12
12-23441-112112LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	11/21/12
12-23441-VT59A	EAL#144352	8.32 g	5.00 mL	D	11/21/12
12-23442-VT59B	EAL#144353	9.42 g	5.00 mL	D	11/21/12

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Solid

Data Release Authorized:
Reported: 11/26/12

QC Report No: VT59-The Boeing Company
Project: A12208
Event: COC.23891
Date Sampled: 11/20/12
Date Received: 11/21/12

ARI ID	Client ID	Analysis Date	Basis	Range	Result
MB-112112	Method Blank	11/21/12	Dry	Gasoline	< 5.0 U
12-23441		PID1		HC ID	---
				Trifluorotoluene	99.1%
				Bromobenzene	102%
VT59A	EAL#144352	11/21/12	Dry	Gasoline	< 8.0 U
12-23441		PID1		HC ID	---
				Trifluorotoluene	101%
				Bromobenzene	100%
VT59B	EAL#144353	11/21/12	Dry	Gasoline	< 5.7 U
12-23442		PID1		HC ID	---
				Trifluorotoluene	97.7%
				Bromobenzene	98.2%

Gasoline values reported in mg/kg (ppm)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: VT59
Matrix: Solid

QC Report No: VT59-The Boeing Company
Project: A12208
Event: COC.23891

Client ID	BFB	TFT	BBZ	TOT OUT
MB-112112	NA	99.1%	102%	0
LCS-112112	NA	104%	102%	0
LCSD-112112	NA	101%	99.3%	0
EAL#144352	NA	101%	100%	0
EAL#144353	NA	97.7%	98.2%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(65-128)
(BBZ) = Bromobenzene	(80-120)	(52-149)

Log Number Range: 12-23441 to 12-23442

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-112112
LAB CONTROL SAMPLE

Lab Sample ID: LCS-112112
LIMS ID: 12-23441
Matrix: Solid
Data Release Authorized:
Reported: 11/26/12

QC Report No: VT59-The Boeing Company
Project: A12208
Event: COC.23891
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 11/21/12 13:25
LCSD: 11/21/12 13:54
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	58.1	50.0	116%	54.8	50.0	110%	5.8%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	104%	101%
Bromobenzene	102%	99.3%

ATTACHMENT B

Confirmation Soil Results Data Validation Memo and Analytical Data

Memo

To:	Dave Haddock, Project Manager	Project:	0088880080.0040
From:	Crystal Neirby	cc:	Project File
Tel:	(206) 342-1760		
Fax:	(206) 342-1761		
Date:	January 3, 2013		

Subject: Summary Data Quality Review
Building 5-50 Characterization – Boeing Renton Soil Sampling
ARI SDGs: VW00 and VW77

This memorandum presents the summary data quality review for analyses of six primary soil samples collected on December 11, 2012 and an additional soil sample collected on December 17, 2012. The samples were submitted to Analytical Resources, Inc. (ARI), a laboratory accredited by the Washington State Department of Ecology (Ecology) and located in Tukwila, Washington. The samples were selectively analyzed for:

- Total petroleum hydrocarbons (TPH) as diesel (TPH-D) and motor oil (TPH-O) by Ecology Method NWTPH-Dx with silica gel and acid cleanup; and
- Total metals (arsenic, cadmium, chromium, and lead) by U.S. Environmental Protection Agency (EPA) Method 6010C and 200.8, and mercury by EPA Method 7471A.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Date Collected	Laboratory Sample ID	Requested Analyses
RTN-5-50-APRONA-WALL-01	12/11/2012	VW00A	all
RTN-5-50-APRONA-WALL-02	12/11/2012	VW00B	all
RTN-5-50-APRONA-WALL-03	12/11/2012	VW00C	all
RTN-5-50-APRONA-WALL-04	12/11/2012	VW00D	all
RTN-5-50-APRONA-FLOOR-01	12/11/2012	VW00E	all
RTN-5-50-APRONA-FLOOR-02	12/11/2012	VW00F	all
RTN-5-50-APRONA-WALL3A	12/17/2012	VW77A	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Draft Quality Assurance Project Plan (QAPP) (AMEC, 2012). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

AMEC Environment & Infrastructure
600 University Street, Suite 600
Seattle, Washington
USA 98101-4107
Tel (206) 342-1760
Fax (206) 342-1761
www.amec.com

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), blank spike samples, matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidance documents (EPA, 2008 and 2010).

Samples were received by ARI each day that sampling was complete. The temperatures of the coolers were recorded upon receipt and were higher than the maximum acceptable temperature of 6°C at 6.8°C for samples VW00A through VW00F and 14.9°C for sample VW77A. Since the samples were submitted within eight hours of sample collection, the cooler temperatures did not have adequate time to equilibrate and sample quality is not affected; therefore, sample results are not qualified.

Samples were analyzed for the methods identified in the introduction of this memo. Laboratory data were evaluated for the following parameters.

1. Preservation and Holding Times – Acceptable.

2. Blanks – Acceptable.

3. Surrogates – Acceptable.

4. LCS/LCSD – Acceptable.

5. MS/MSD – Additional sample volume was not submitted for project-specific analysis of MS/MSD analyses. Samples are evaluated based on LCS/LCSD recoveries.

6. Field Duplicates – Acceptable.

   Field duplicates were not collected as part of the Building 5-50 soil characterization field sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable.

OVERALL ASSESSMENT OF DATA

The completeness of SDGs VW00 and VW77 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Analyte
RTN-5-50-APRONA-WALL-01	none
RTN-5-50-APRONA-WALL-02	none
RTN-5-50-APRONA-WALL-03	none
RTN-5-50-APRONA-WALL-04	none
RTN-5-50-APRONA-FLOOR-01	none
RTN-5-50-APRONA-FLOOR-01	none
RTN-5-50-APRONA-WALL3A	none

REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC), 2012, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2008, US EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-08-01, June.

EPA, 2010, US EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-10-011, January.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

C E&E
Received
DEC 19 2012
SEATTLE

September 13, 2011

Larry McGaughey
AMEC GeoMatrix
One Union Square
600 University Street, Suite 600
Seattle, WA 98101

RE: Project: Boeing Renton 5-50
ARI Job: VW00

Dear Mr. McGaughey,

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and analytical results for the project referenced above. Analytical Resources, Inc. (ARI) accepted six soil samples in good condition on December 11, 2012. There were no discrepancies between the COC and the sample container labels.

The samples were analyzed for NWTPH-Dx and Total Metals, as requested on the COC.

There were no anomalies associated with the samples.

Quality control analysis results are included for your review. An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

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

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

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: VW00	Turn-around Requested: 24-hour RUSH!	Page: 1	of 1
ARI Client Company: Boeing	Phone: (206)930-0461	Date: 12/11/12	Ice Present? N
Client Contact: Fred Wallace		No. of Coolers: 1	Cooler Temps: 6.8
Client Project Name:			
Client Project #:	Samplers: AMEC		

Sample ID	Date	Time	Matrix	No. Containers	TPH-D Cleaned	~~Metals(14)~~ MTCA Metals	~~Arsenic~~	Dup 3D 12/11/12					Notes/Comments
RTN S-SO-APRON A-WALL-01	12/11/12	1153	S	2	X	X	X						
RTN S-SO-APRON A-WALL-02	↓	1200	S	↓	X	X	X						
RTN S-SO-APRON A-WALL-03	↓	1205	S	↓	X	X	X						
RTN S-SO-APRON A-WALL-04	↓	1210	↓	↓	X	X	X						
RTN S-SO-APRON A-FLOOR-01	↓	1215	↓	↓	X	X	X						
RTN S-SO-APRON A-FLOOR-02	↓	1220	↓	↓	X	X	X						

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Chelsea Jefferson	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: AMEC	Company: ARI	Company:	Company:
	Date & Time: 12/11/12 1302	Date & Time: 12/11/12 1302	Date & Time:	Date & Time:

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

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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: _____

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

Assigned ARI Job No: VWCC Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 1.0 ____ ____ ____ ____ ____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 12241224

Cooler Accepted by: AV Date: 12/11/12 Time: 1302

Complete custody forms and attach all shipping documents

Log-In Phase:

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

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

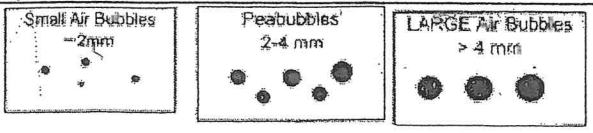
Samples Logged by: AV Date: 12/11/12 Time: 1405

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

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

Additional Notes, Discrepancies, & Resolutions:

By: Date:



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

VWCC : 00000

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

VWCC)

Cooler#: 1 Temperature(°C): 6.8

Sample ID	Bottle Count	Bottle Type
All samples received above 6°C.		

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ Temperature(°C): _____

Sample ID	Bottle Count	Bottle Type

Completed by: AV Date: 12/11/12 Time: 1405

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VW00
Client: The Boeing Company
Project Event: N/A
Project Name: N/A

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	RTN-5-50-APRONA-WALL-01	VW00A	12-24502	Soil	12/11/12 11:53	12/11/12 13:02
2.	RTN-5-50-APRONA-WALL-02	VW00B	12-24503	Soil	12/11/12 12:00	12/11/12 13:02
3.	RTN-5-50-APRONA-WALL-03	VW00C	12-24504	Soil	12/11/12 12:05	12/11/12 13:02
4.	RTN-5-50-APRONA-WALL-04	VW00D	12-24505	Soil	12/11/12 12:10	12/11/12 13:02
5.	RTN-5-50-APRONA-FLOOR-01	VW00E	12-24506	Soil	12/11/12 12:15	12/11/12 13:02
6.	RTN-5-50-APRONA-FLOOR-02	VW00F	12-24507	Soil	12/11/12 12:20	12/11/12 13:02

VW00:000005

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-WALL-01
SAMPLE

Lab Sample ID: VW00A
LIMS ID: 12-24502
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 93.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**3.4**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**0.2**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.5	**26.0**	
3050B	12/12/12	200.8	12/12/12	**7439-92-1**	**Lead**	0.1	**3.0**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.02	**0.03**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00006

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: RTN-5-50-APRONA-WALL-02
SAMPLE

Lab Sample ID: VW00B
LIMS ID: 12-24503
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 83.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**3.9**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**0.5**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.6	**31.3**	
3050B	12/12/12	200.8	12/12/12	**7439-92-1**	**Lead**	0.1	**29.4**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.02	**0.05**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00007

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: RTN-5-50-APRONA-WALL-03
SAMPLE

Lab Sample ID: VW00C
LIMS ID: 12-24504
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 86.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**7.4**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**1.7**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.6	**33.2**	
3050B	12/12/12	200.8	12/13/12	**7439-92-1**	**Lead**	0.6	**395**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.03	**0.22**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00000

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-WALL-04
SAMPLE

Lab Sample ID: VW00D
LIMS ID: 12-24505
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 84.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**5.8**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**1.4**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.6	**30.4**	
3050B	12/12/12	200.8	12/12/12	**7439-92-1**	**Lead**	0.1	**251**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.03	**0.16**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00009

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: RTN-5-50-APRONA-FLOOR-01
SAMPLE

Lab Sample ID: VW00E
LIMS ID: 12-24506
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 85.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**6.4**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**1.1**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.5	**24.7**	
3050B	12/12/12	200.8	12/12/12	**7439-92-1**	**Lead**	0.1	**286**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.02	**0.08**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00019

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-FLOOR-02
SAMPLE

Lab Sample ID: VW00F
LIMS ID: 12-24507
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

Percent Total Solids: 77.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	**7440-38-2**	**Arsenic**	0.2	**3.0**	
3050B	12/12/12	6010C	12/13/12	**7440-43-9**	**Cadmium**	0.2	**0.5**	
3050B	12/12/12	6010C	12/13/12	**7440-47-3**	**Chromium**	0.6	**27.8**	
3050B	12/12/12	200.8	12/12/12	**7439-92-1**	**Lead**	0.1	**28.7**	
CLP	12/12/12	7471A	12/12/12	**7439-97-6**	**Mercury**	0.03	**0.05**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00 : 00011

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-WALL-01
DUPLICATE

Lab Sample ID: VW00A
LIMS ID: 12-24502
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	3.4	3.6	5.7%	+/- 20%	
Cadmium	6010C	0.2	0.2	0.0%	+/- 0.2	L
Chromium	6010C	26.0	24.6	5.5%	+/- 20%	
Lead	200.8	3.0	3.2	6.5%	+/- 20%	
Mercury	7471A	0.03	0.04	28.6%	+/- 0.02	L

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

VW00:00012

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-WALL-01
MATRIX SPIKE

Lab Sample ID: VW00A
LIMS ID: 12-24502
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: 12/11/12
Date Received: 12/11/12

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	3.4	28.3	24.9	100%	
Cadmium	6010C	0.2	50.5	49.1	102%	
Chromium	6010C	26.0	82.4	49.1	115%	
Lead	200.8	3.0	28.0	24.9	100%	
Mercury	7471A	0.03	0.26	0.205	112%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

VW00 : 00013

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: LAB CONTROL**

Lab Sample ID: VW00LCS
LIMS ID: 12-24503
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	26.9	25.0	108%	
Cadmium	6010C	50.5	50.0	101%	
Chromium	6010C	49.6	50.0	99.2%	
Lead	200.8	26.3	25.0	105%	
Mercury	7471A	0.50	0.50	100%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

VW00:00014

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: VW00MB
LIMS ID: 12-24503
Matrix: Soil
Data Release Authorized:
Reported: 12/14/12

QC Report No: VW00-The Boeing Company
Project:

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/12/12	200.8	12/12/12	7440-38-2	Arsenic	0.2	0.2	U
3050B	12/12/12	6010C	12/13/12	7440-43-9	Cadmium	0.2	0.2	U
3050B	12/12/12	6010C	12/13/12	7440-47-3	Chromium	0.5	0.5	U
3050B	12/12/12	200.8	12/12/12	7439-92-1	Lead	0.1	0.1	U
CLP	12/12/12	7471A	12/12/12	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

VW00:00015

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method: SW3546

QC Report No: VW00-The Boeing Company
Project:

Matrix: Soil
Data Release Authorized: MW
Reported: 12/12/12

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	RL	Result
MB-121112	Method Blank	12/11/12	12/11/12	1.00	Diesel Range	5.0	< 5.0 U
12-24502	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		93.6%
VW00A	RTN-5-50-APRONA-WALL-	12/11/12	12/12/12	1.00	Diesel Range	5.3	< 5.3 U
12-24502	HC ID: **MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**10**	**55**
					o-Terphenyl		92.4%
VW00B	RTN-5-50-APRONA-WALL-	12/11/12	12/12/12	1.00	Diesel Range	5.6	< 5.6 U
12-24503	HC ID: ---		FID3B	1.0	Motor Oil Range	11	< 11 U
					o-Terphenyl		89.2%
VW00C	RTN-5-50-APRONA-WALL-	12/11/12	12/12/12	1.00	Diesel Range	5.8	< 5.8 U
12-24504	HC ID: **MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**12**	**29**
					o-Terphenyl		91.6%
VW00D	RTN-5-50-APRONA-WALL-	12/11/12	12/12/12	1.00	**Diesel Range**	**5.7**	**9.6**
12-24505	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**12**	**36**
					o-Terphenyl		82.1%
VW00E	RTN-5-50-APRONA-FLOOR	12/11/12	12/12/12	1.00	**Diesel Range**	**5.7**	**33**
12-24506	HC ID: **DRO/MOTOR OIL**		FID3B	1.0	**Motor Oil Range**	**11**	**40**
					o-Terphenyl		97.5%
VW00F	RTN-5-50-APRONA-FLOOR	12/11/12	12/12/12	1.00	Diesel Range	6.0	< 6.0 U
12-24507	HC ID: ---		FID3B	1.0	Motor Oil Range	12	< 12 U
					o-Terphenyl		90.0%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

VW00 : 00016

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VW00-The Boeing Company
Project:

Client ID	OTER	TOT OUT
MB-121112	93.6%	0
LCS-121112	95.6%	0
LCSD-121112	91.3%	0
RTN-5-50-APRONA-WA	92.4%	0
RTN-5-50-APRONA-WA	89.2%	0
RTN-5-50-APRONA-WA	91.6%	0
RTN-5-50-APRONA-WA	82.1%	0
RTN-5-50-APRONA-FL	97.5%	0
RTN-5-50-APRONA-FL	90.0%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 12-24502 to 12-24507

VW00 : 20017

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-121112**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-121112 QC Report No: VW00-The Boeing Company
LIMS ID: 12-24502 Project:
Matrix: Soil
Data Release Authorized: MW Date Sampled: 12/11/12
Reported: 12/12/12 Date Received: 12/11/12

Date Extracted LCS/LCSD: 12/11/12 Sample Amount LCS: 10.0 g
LCSD: 10.0 g
Date Analyzed LCS: 12/12/12 00:20 Final Extract Volume LCS: 1.0 mL
LCSD: 12/12/12 00:41 LCSD: 1.0 mL
Instrument/Analyst LCS: FID/JGR Dilution Factor LCS: 1.0
LCSD: FID/JGR LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	124	150	82.7%	121	150	80.7%	2.4%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	95.6%	91.3%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

VW00 : 00018

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: VW00
Matrix: Soil
Project:
Date Received: 12/11/12

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
12-24502-121112MB1	Method Blank	10.0 g	1.00 mL	-	12/11/12
12-24502-121112LCS1	Lab Control	10.0 g	1.00 mL	-	12/11/12
12-24502-121112LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	12/11/12
12-24502-VW00A	RTN-5-50-APRONA-WAL	9.48 g	1.00 mL	D	12/11/12
12-24503-VW00B	RTN-5-50-APRONA-WAL	8.99 g	1.00 mL	D	12/11/12
12-24504-VW00C	RTN-5-50-APRONA-WAL	8.57 g	1.00 mL	D	12/11/12
12-24505-VW00D	RTN-5-50-APRONA-WAL	8.73 g	1.00 mL	D	12/11/12
12-24506-VW00E	RTN-5-50-APRONA-FLO	8.751g	1.00 mL	D	12/11/12
12-24507-VW00F	RTN-5-50-APRONA-FLO	8.342g	1.00 mL	D	12/11/12

Basis: D=Dry Weight W=As Received

VW00 : 00013

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 20, 2012

Larry McGaughey
AMEC GeoMatrix
One Union Square
600 University Street, Suite 600
Seattle, WA 98101

RE: Project: Boeing Renton 5-50
ARI Job: VW77

Dear Mr. McGaughey,

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and analytical results for the project referenced above. Analytical Resources, Inc. (ARI) accepted one soil sample in good condition on December 17, 2012. There were no discrepancies between the COC and the sample container labels.

The sample was analyzed for NWTPH-Dx and Total Metals, as requested on the COC.

There were no anomalies associated with the samples.

Quality control analysis results are included for your review. An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

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

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

Chain of Custody Record & Laboratory Analysis Request

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

ARI Assigned Number: VW77	Turn-around Requested: 24-hour	Page: 1	of 1
ARI Client Company: Boeing	Phone: (206) 930-0401	Date: 12/17/12	Ice Present?
Client Contact: Fred Wallace		No. of Coolers:	Cooler Temps:
Client Project Name: RTN-5-50-APRON A			
Client Project #:	Samplers: AMEC		

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-Dx	MTCA Metals ~~Metals (2+)~~	~~Arsenic~~ kelly 12/20/12					Notes/Comments
RTN-5-50-APRONA-WALL3A	12/17/12	0930	S	2	X	X	X					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by	Received by
* Client knows 24hr TAT may not be met. AV 12/17/12 CJ 12/17/12	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Chelsea Jefferson	Printed Name: A. Volgardsen	Printed Name:	Printed Name
	Company: AMEC	Company: ARI	Company:	Company
	Date & Time: 12/17/12 1445	Date & Time: 12/17/12 1445	Date & Time:	Date & Time

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

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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
Project Name: RTN-5-50-Approna
COC No(s): (NA)
Delivered by: Fed-Ex UPS Courier Hand Delivered Other
Assigned ARI Job No.: VW77
Tracking No.: (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 14.9		
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#: 90077952	

Cooler Accepted by: AV Date: 12/17/12 Time: 1445

Complete custody forms and attach all shipping documents

Log-In Phase:

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

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

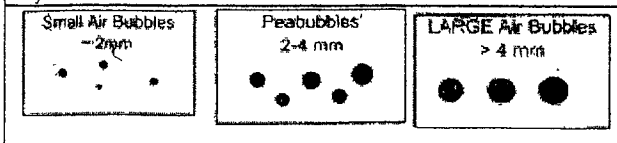
Samples Logged by: IS Date: 12-17-12 Time: 1021

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

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

Additional Notes, Discrepancies, & Resolutions:

By: Date:



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

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: VW77
Client: The Boeing Company
Project Event: N/A
Project Name: RTN-5-50-APRONA

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	RTN-S-50-APRONA-WALL3A	VW77A	12-25060	Soil	12/17/12 09:30	12/17/12 14:45

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method: SW3546
Page 1 of 1

QC Report No: VW77-The Boeing Company
Project: RTN-5-50-APRONA

Matrix: Soil
Data Release Authorized: MW
Reported: 12/20/12

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	RL	Result
MB-121812	Method Blank	12/18/12	12/18/12	1.00	Diesel Range	5.0	< 5.0 U
12-25060	HC ID: ---		FID4A	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		95.0%
VW77A	RTN-5-50-APRONA-WALL3	12/18/12	12/19/12	1.00	**Diesel Range**	**6.0**	**7.7**
12-25060	HC ID: **DRO/MOTOR OIL**		FID4A	1.0	**Motor Oil Range**	**12**	**32**
					o-Terphenyl		82.6%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: VW77-The Boeing Company
Project: RTN-5-50-APRONA

Client ID	OTER	TOT OUT
MB-121812	95.0%	0
LCS-121812	90.2%	0
LCSD-121812	87.2%	0
RTN-5-50-APRONA-WA	82.6%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 12-25060 to 12-25060

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-121812**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-121812 QC Report No: VW77-The Boeing Company
LIMS ID: 12-25060 Project: RTN-5-50-APRONA
Matrix: Soil
Data Release Authorized:
Reported: 12/20/12 Date Received: 12/17/12

Date Extracted LCS/LCSD: 12/18/12 Sample Amount LCS: 10.0 g
LCSD: 10.0 g
Date Analyzed LCS: 12/18/12 23:55 Final Extract Volume LCS: 1.0 mL
LCSD: 12/19/12 00:15 LCSD: 1.0 mL
Instrument/Analyst LCS: FID/JGR Dilution Factor LCS: 1.0
LCSD: FID/JGR LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	126	150	84.0%	124	150	82.7%	1.6%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	90.2%	87.2%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: VW77
Matrix: Soil Project: RTN-5-50-APRONA
Date Received: 12/17/12

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
12-25060-121812MB1	Method Blank	10.0 g	1.00 mL	-	12/18/12
12-25060-121812LCS1	Lab Control	10.0 g	1.00 mL	-	12/18/12
12-25060-121812LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	12/18/12
12-25060-VW77A	RTN-5-50-APRONA-WAL	8.32 g	1.00 mL	D	12/18/12

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: RTN-5-50-APRONA-WALL3A
SAMPLE

Lab Sample ID: VW77A
LIMS ID: 12-25060
Matrix: Soil
Data Release Authorized:
Reported: 12/20/12

QC Report No: VW77-The Boeing Company
Project: RTN-5-50-APRONA

Date Sampled: 12/17/12
Date Received: 12/17/12

Percent Total Solids: 61.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/18/12	6010C	12/19/12	**7440-38-2**	**Arsenic**	20	**30**	
3050B	12/18/12	6010C	12/19/12	**7440-43-9**	**Cadmium**	0.8	**1.6**	
3050B	12/18/12	6010C	12/19/12	**7440-47-3**	**Chromium**	2	**29**	
3050B	12/18/12	6010C	12/19/12	**7439-92-1**	**Lead**	8	**241**	
CLP	12/18/12	7471A	12/19/12	**7439-97-6**	**Mercury**	0.03	**1.57**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: VW77MB
LIMS ID: 12-25060
Matrix: Soil
Data Release Authorized:
Reported: 12/20/12

QC Report No: VW77-The Boeing Company
Project: RTN-5-50-APRONA

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	12/18/12	6010C	12/19/12	7440-38-2	Arsenic	5	5	U
3050B	12/18/12	6010C	12/19/12	7440-43-9	Cadmium	0.2	0.2	U
3050B	12/18/12	6010C	12/19/12	7440-47-3	Chromium	0.5	0.5	U
3050B	12/18/12	6010C	12/19/12	7439-92-1	Lead	2	2	U
CLP	12/18/12	7471A	12/19/12	7439-97-6	Mercury	0.02	0.02	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: VW77LCS
LIMS ID: 12-25060
Matrix: Soil
Data Release Authorized:
Reported: 12/20/12

QC Report No: VW77-The Boeing Company
Project: RTN-5-50-APRONA

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010C	199	200	99.5%	
Cadmium	6010C	50.9	50.0	102%	
Chromium	6010C	50.8	50.0	102%	
Lead	6010C	194	200	97.0%	
Mercury	7471A	0.52	0.50	104%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%