

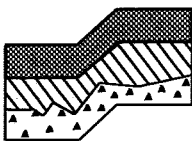
FSID: 30774595
CUSID: 8651
VCP: NW 3030

RECEIVED

JUL 14 2017

DEPT OF ECOLOGY
TCP - NWRO

MEMO



TERRA ASSOCIATES, Inc.

Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

TO: Ms. Heather Vick, WDOE NWRO

CC: Mr. Steve Cowman, HALCO Properties, LLC
Mr. Phil Suetens and Randi

FROM: Charles R. Lie, Terra Associates, Inc.

DATE: July 12, 2017

RE: Indoor Air Sampling
5221 Ballard Avenue NW
Terra Associates Project T-6552

Heather,

This memo is a supplement to our report dated October 21, 2015. Subsequent to that date, we returned to the site and obtained another round of indoor air samples. The test results are summarized on the next page. The sample methodology is the same as described in the October 21, 2015 report.

We have recalculated the proposed revision to the indoor air cleanup levels to reflect commercial exposure patterns. For the existing and projected uses of the basement areas, it is our opinion that the resulting cleanup values are conservative. Indoor air samples were taken due to the past contact of the capillary fringe on the base of the floor slabs and the results of radon sampling that showed an attenuation factor of 0.1 instead of 0.03 that is commonly used with the generic guidance. The basement walls are partially constructed with brick that does not provide the level of attenuation in contemporary concrete cast-in-place construction.

The supplemental samples were taken on March 10 and April 4, 2016.

Petroleum Hydrocarbon Vapor

A reasonable maximum exposure level for indoor vapors was calculated for two constituents that did not meet the published Method B residential cleanup level for sub slab vapor or indoor air. These reasonable maximum exposure levels are for the basement areas of the two adjacent buildings. The adjacent warehouse building is not continuously occupied, has large doors that are usually open to the ambient air, and forklifts powered by internal combustion engines are used in the warehouses. The remediation levels are based on commercial exposure scenario. The basements of 5221 and of 5227 are not used for residential purposes. It is unlikely that the basements would meet current or projected building codes to allow sleeping spaces to be installed.

est 1515

The current RfD for TPHv (C9-C12 aliphatic is 0.085 mg/kg-day). The modifications to equation 750-1 are shown below:

[Equation 750-1]		
Air cleanup level ($\mu\text{g}/\text{m}^3$)	=	$\frac{\text{RfD} \times \text{ABW} \times \text{UCF} \times \text{HQ} \times \text{AT}}{\text{BR} \times \text{ABS} \times \text{ED} \times \text{EF}}$
	MTCA Values	Commercial Exposure Values
Where		
RfD =	Reference dose as specified in WAC 173-340-708(7) (mg/kg-day)	Unchanged
ABW =	Average body weight over the exposure duration (16 kg)	70 kg (conservative adult weight)
UCF =	Unit conversion factor (1,000 $\mu\text{g}/\text{mg}$)	unchanged
BR =	Breathing rate (10 m^3/day)	6.66 m^3/day (8 hour work day)
ABS =	Inhalation absorption fraction (1.0) (unit less)	Unchanged
HQ =	Hazard quotient (1) (unit less)	Unchanged
AT =	Averaging time (6 years)	Unchanged
ED =	Exposure duration (6 years)	Unchanged
EF =	Exposure frequency (1.0) (unit less)	Unchanged

The modifications to equation 750-2 are shown below. The current Carcinogenic potency factor for benzene is 2.73E-02 kg-day/mg. The modifications to equation 750-2 are shown below:

[Equation 750-2]		
Air cleanup level ($\mu\text{g}/\text{m}^3$)	=	$\frac{\text{RISK} \times \text{ABW} \times \text{AT} \times \text{UCF}}{\text{CPF} \times \text{BR} \times \text{ABS} \times \text{ED} \times \text{EF}}$
	MTCA Values	Commercial Exposure values
Where:		
RISK =	Acceptable cancer risk level (1 in 1,000,000) (unitless)	Unchanged
ABW =	Average body weight over the exposure duration (70 kg)	Unchanged
AT =	Averaging time (75 years)	Unchanged
UCF =	Unit conversion factor (1,000 $\mu\text{g}/\text{mg}$)	Unchanged
CPF =	Carcinogenic potency factor as specified in WAC 173-340-708(8) (kg-day/mg)	Unchanged
BR =	Breathing rate (20 m^3/day)	6.66 (based on 8-hour day)
ABS =	Inhalation absorption fraction (1.0) (unit less)	Unchanged
ED =	Exposure duration (30 years)	Unchanged
EF =	Exposure frequency (1.0) (unit less)	Unchanged

Table 5.2.3 (revised)
Sub Slab Vapor Remediation/Cleanup Values

Compounds of Concern	MTCA Method B Cleanup Level Micro Grams per cubic meter ($\mu\text{g}/\text{M}^3$)	Site Specific Commercial Exposure Levels ($\mu\text{g}/\text{M}^3$)	Notes
TPHv (C5-C8) Aliphatic	27,000	NC	CLARC accessed June 30, 2017 was used for the Method B cleanup values.
TPHv (C9-C12) Aliphatic	1,400	901	
TPHv (C9-C10) Aromatic	1,800	NC	
Benzene	0.32	0.963	
Ethyl Benzene	4,600	NC	
Toluene	22,000	NC	
m,p Xylene	460	NC	
o-Xylene	460	NC	
Methylene Chloride	53	NC	

Notes: All units are $\mu\text{g}/\text{M}^3$.
 NC indicates that the commercial exposure level was not calculated for the individual compound.

Indoor Basement Air Samples
TPH Results

Sample Designation	Date Sampled	TPHv (C5-C8) Aliphatic	TPHv (C9-C12) Aliphatic	TPHv (C9-C10) Aromatic
5-3-1	5-3-15	170	290	100U
	4-8-16	250	170	100U
5-3-2	5-3-15	100U	150	100U
	4-8-16	200	210	100U
5-3-3	5-3-15	100U	100U	100U
	3-22-16	130	290	100U
5-3-4	5-3-15	290	120	100U
	3-22-16	160	420	100U
Method B Indoor Air Value		2,700	140	180
Commercial Indoor Air Value		NC	901	NC

**Indoor Basement Air Sample
BETX Results**

Sample Designation	Date Sampled	Benzene	Toluene	Ethyl Benzene	m,p-Xylene	o-Xylene
5-3-1	3-22-16	0.49	37	1.5	7.3	2.9
5-3-2	3-22-16	0.5	33	1.6	6.8	2.7
Method B Indoor Air Value		0.321	2,290	457	45.7	45.7
Commercial Indoor Air Value		0.963	NC	NC	NC	NC

Notes: All values are $\mu\text{g}/\text{m}^3$.

U indicates that the analyte was not present at the numerical reporting limit.

Cleanup levels for TPHv are from Ecology draft publication No. 09-09-047, dated October 2009.

Commercial exposure value based on using a value of 70 kg for body weight and 6.66 for breathing rate.

Shaded cells are samples that exceed the published Method B values for indoor air.

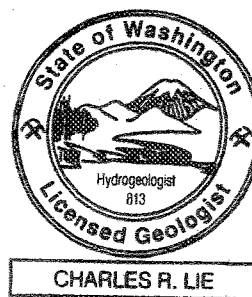
Note that none of the samples fail for the modified Method B for commercial exposure patterns.

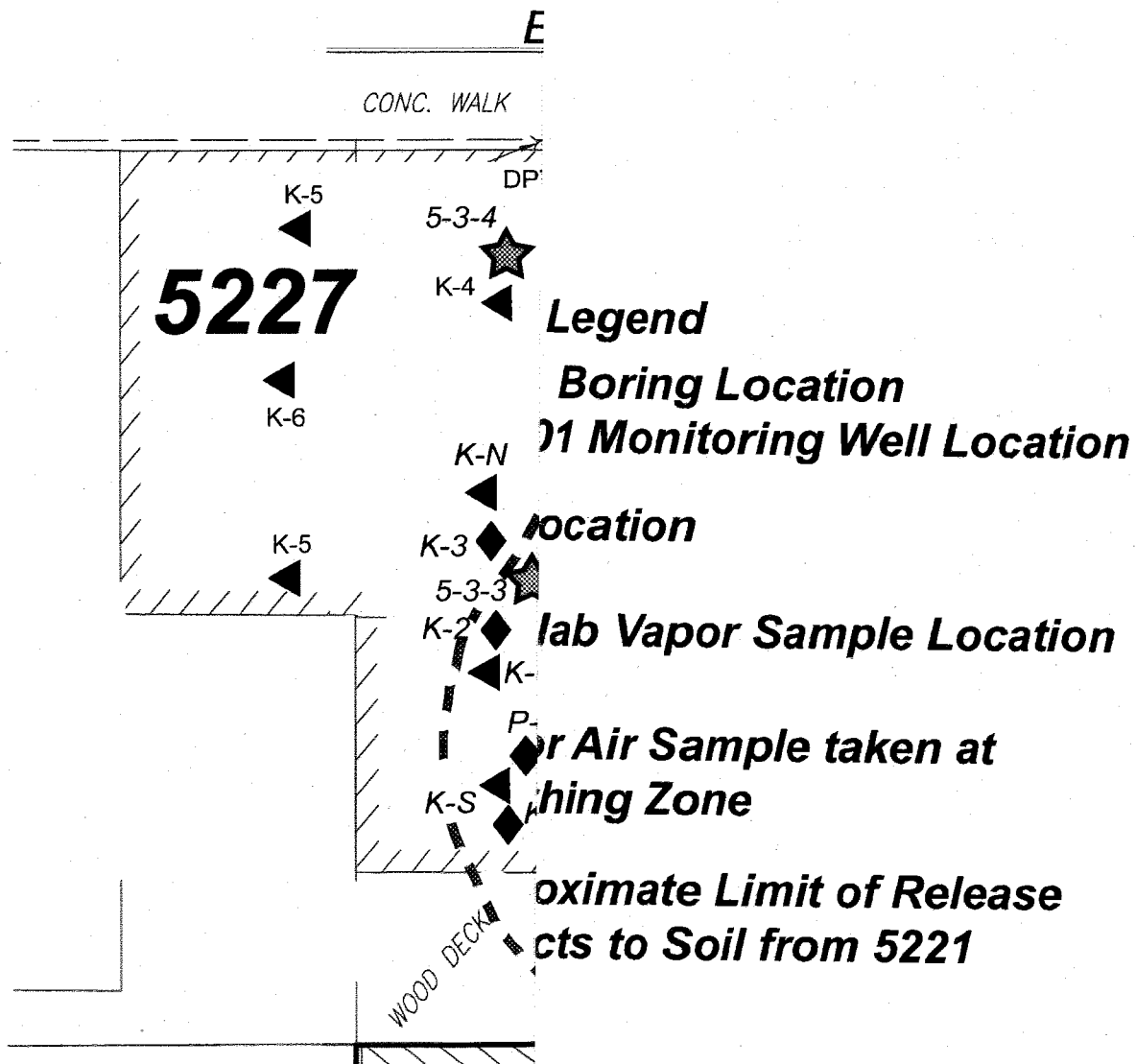
NC indicates that the commercial exposure value was not calculated for the individual analyte.

Terra Associates, Inc.


Charles R. Lie, L.H.G.
Project Manager

Attachment: Sample Location Plan
Lab Reports for 2016 Sampling





Soil Exploration 5221 Ballard Ave NW
 5221 Ballard Ave NW
 Seattle, Washington

Proj. No. T-6552

Date July 2017

Figure 1

22 March 2016

Mr. Charles R. Lie
Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034



H&P Project: MC031616-12
Client Project: 6552 / Seattle, WA

Dear Mr. Charles R. Lie:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 16-Mar-16 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

A handwritten signature in cursive script that reads "Janis Villarreal".

Janis Villarreal
Laboratory Director

H&P Mobile Geochemistry, Inc. is certified under the California ELAP, the National Environmental Laboratory Accreditation Conference (NELAC) and the Department of Defense Accreditation Programs.

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
760-804-9159 Fax

Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Project: MC031616-12
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
22-Mar-16 14:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5-3-4	E603071-01	Vapor	10-Mar-16	16-Mar-16
5-3-3	E603071-02	Vapor	10-Mar-16	16-Mar-16
OA	E603071-03	Vapor	10-Mar-16	16-Mar-16

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Terra Associates, Inc. 12220 113th Avenue NE, Suite 130 Kirkland, WA 98034	Project: MC031616-12 Project Number: 6552 / Seattle, WA Project Manager: Mr. Charles R. Lie	Reported: 22-Mar-16 14:18
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Petroleum Hydrocarbon Analysis

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
5-3-4 (E603071-01) Vapor Sampled: 10-Mar-16 Received: 16-Mar-16									
TPHv (C5 - C8) aliphatic	160	100	ug/m3	1	EC62209	21-Mar-16	21-Mar-16	EPA TO-15	
TPHv (C9 - C12) aliphatic	420	100	"	"	"	"	"	"	
TPHv (C9 - C10) aromatic	ND	100	"	"	"	"	"	"	
5-3-3 (E603071-02) Vapor Sampled: 10-Mar-16 Received: 16-Mar-16									
TPHv (C5 - C8) aliphatic	130	100	ug/m3	1	EC62209	21-Mar-16	21-Mar-16	EPA TO-15	
TPHv (C9 - C12) aliphatic	290	100	"	"	"	"	"	"	
TPHv (C9 - C10) aromatic	ND	100	"	"	"	"	"	"	
OA (E603071-03) Vapor Sampled: 10-Mar-16 Received: 16-Mar-16									
TPHv (C5 - C8) aliphatic	ND	100	ug/m3	1	EC62209	21-Mar-16	21-Mar-16	EPA TO-15	
TPHv (C9 - C12) aliphatic	ND	100	"	"	"	"	"	"	
TPHv (C9 - C10) aromatic	ND	100	"	"	"	"	"	"	

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Terra Associates, Inc. 12220 113th Avenue NE, Suite 130 Kirkland, WA 98034	Project: MC031616-12 Project Number: 6552 / Seattle, WA Project Manager: Mr. Charles R. Lie	Reported: 22-Mar-16 14:18
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Petroleum Hydrocarbon Analysis - Quality Control
H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch EC62209 - TO-15

Blank (EC62209-BLK1)

Prepared & Analyzed: 21-Mar-16

TPHv (C5 - C8) aliphatic	ND	100	ug/m3
TPHv (C9 - C12) aliphatic	ND	100	"
TPHv (C9 - C10) aromatic	ND	100	"

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Kirkland, WA 98034

Project: MC031616-12
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
22-Mar-16 14:18

Notes and Definitions

LCC	Leak Check Compound
ND	Analyte NOT DETECTED at or above the reporting limit
MDL	Method Detection Limit
%REC	Percent Recovery
RPD	Relative Percent Difference

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP and the ISO 17025 programs, certification number L11-175.

H&P is approved by the State of Arizona as an Environmental Testing Laboratory and Mobile Laboratory, certification numbers AZM758 and AZ0779.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743, 2744, 2745, 2754 & 2930.

H&P is approved by the State of Florida Department of Health under the National Environmental Laboratory Accreditation Conference (NELAC) certification number E871100.

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.

VAPOR / AIR Chain of Custody

DATE: 3/10/16
Page 1 of 1

Lab Client and Project Information			
Lab Client/Consultant:	Terra Associates Inc		Project Name / #:
Lab Client Project Manager:	Chuck Lie		Project Location:
Lab Client Address:	12220 113 th Ave Suite 130		Report E-Mail(s):
Lab Client City, State, Zip:	Kirkland, WA		CLie@terra-associates.com
Phone Number:	425 821-7777		NHoffman@terra-associates.com
Reporting Requirements		Turnaround Time	
<input checked="" type="checkbox"/> Standard Report <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/> Excel EDD <input type="checkbox"/> Other EDD: _____ <input type="checkbox"/> CA Geotracker Global ID: _____		<input checked="" type="checkbox"/> 5-7 day Std <input type="checkbox"/> 24-Hr Rush <input type="checkbox"/> 3-day Rush <input type="checkbox"/> Mobile Lab <input type="checkbox"/> 48-Hr Rush <input type="checkbox"/> Other: _____	
Sampler Information			
Sampler(s): <u>Nicolas R. Hoffman</u> Signature: <u>[Signature]</u> Date: <u>3/10/16</u>			

Sample Receipt (Lab Use Only)	
Date Rec'd:	Control #:
<u>3/10/16</u>	<u>160146.01</u>
H&P Project # <u>MC031616-12</u>	
Lab Work Order # <u>E603071</u>	
Sample Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Notes Below	
Receipt Gauge ID:	Temp:
<u>1076084</u>	<u>RT</u>
Outside Lab:	
Receipt Notes/Tracking #:	
<u>1293TT61905074 6090</u>	
<u>1293TT61905190 5308</u>	
Lab PM Initials: <u>Kim</u>	

Additional Instructions to Laboratory:

☐ Check if Project Analyte List is Attached

* Preferred VOC units (please choose one):

☐ µg/L ☒ µg/m³ ☐ ppbv ☐ ppmv

SAMPLE NAME	FIELD POINT NAME (if applicable)	DATE mm/dd/yy	TIME 24hr clock	SAMPLE TYPE Indoor Air (IA); Ambient Air (AA); Subslab (SS); Soil Vapor (SV)	CONTAINER SIZE & TYPE 400mL/1L/6L Summa or Tedlar or Tube	CONTAINER ID (###)	Lab use only: Receipt Vac	VOCs Standard Full List <input type="checkbox"/> 8260SV <input type="checkbox"/> TO-15	VOCs Short List / Project List <input type="checkbox"/> 8260SV <input type="checkbox"/> TO-15	Oxygenates <input type="checkbox"/> 8260SV <input type="checkbox"/> TO-15	Naphthalene <input type="checkbox"/> 8260SV <input type="checkbox"/> TO-15 <input type="checkbox"/> TO-17m	TPHv as Gas <input type="checkbox"/> 8260SV/m <input type="checkbox"/> TO-15m	TPHv as Diesel (sorber tube) <input type="checkbox"/> TO-17m	Aromatic/Aliphatic Fractions <input type="checkbox"/> 8260SV/m <input checked="" type="checkbox"/> TO-15m	Leak Check Compound <input type="checkbox"/> DFA <input type="checkbox"/> IPA <input type="checkbox"/> He	Methane by EPA 8015m	Fixed Gases by ASTM D1945 <input type="checkbox"/> CO2 <input type="checkbox"/> O2 <input type="checkbox"/> N2			
S-3-4		3/10/16	17:00	IA	6L	446	-7.10							X						
S-3-3		3/10/16	17:00	IA	6L	344	-7.23							X						
OA		3/10/16	17:05	AA	6L	502	-7.43							X						

Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
<u>[Signature]</u>	<u>TAI</u>	<u>3/10/16</u>	<u>12:30</u>	<u>[Signature]</u>	<u>H&P</u>	<u>3/10/16</u>	<u>12:00</u>
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:
Approved/Relinquished by:	Company:	Date:	Time:	Received by:	Company:	Date:	Time:

19 April 2016

Mr. Charles R. Lie
Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034



H&P Project: MC040816-10
Client Project: 6552 / Seattle, WA

Dear Mr. Charles R. Lie:

Enclosed is the analytical report for the above referenced project. The data herein applies to samples as received by H&P Mobile Geochemistry, Inc. on 08-Apr-16 which were analyzed in accordance with the attached Chain of Custody record(s).

The results for all sample analyses and required QA/QC analyses are presented in the following sections and summarized in the documents:

- Sample Summary
- Case Narrative (if applicable)
- Sample Results
- Quality Control Summary
- Notes and Definitions / Appendix
- Chain of Custody
- Sampling Logs (if applicable)

Unless otherwise noted, I certify that all analyses were performed and reviewed in compliance with our Quality Systems Manual and Standard Operating Procedures. This report shall not be reproduced, except in full, without the written approval of H&P Mobile Geochemistry, Inc.

We at H&P Mobile Geochemistry, Inc. sincerely appreciate the opportunity to provide analytical services to you on this project. If you have any questions or concerns regarding this analytical report, please contact me at your convenience at 760-804-9678.

Sincerely,

A handwritten signature in cursive script, reading "Janis Villarreal".

Janis Villarreal
Laboratory Director

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Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Project: MC040816-10
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
19-Apr-16 09:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5-3-2	E604037-01	Vapor	04-Apr-16	08-Apr-16
5-3-1	E604037-02	Vapor	04-Apr-16	08-Apr-16

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Terra Associates, Inc. 12220 113th Avenue NE, Suite 130 Kirkland, WA 98034	Project: MC040816-10 Project Number: 6552 / Seattle, WA Project Manager: Mr. Charles R. Lie	Reported: 19-Apr-16 09:20
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Volatile Organic Compounds by EPA TO-15

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
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5-3-2 (E604037-01) Vapor Sampled: 04-Apr-16 Received: 08-Apr-16

Benzene	0.49	0.16	ug/m3	1	ED61211	12-Apr-16	12-Apr-16	EPA TO-15	
Toluene	37	0.76	"	"	"	"	"	"	
Ethylbenzene	1.5	0.44	"	"	"	"	"	"	
m,p-Xylene	7.3	0.44	"	"	"	"	"	"	
o-Xylene	2.9	0.44	"	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>		112 %	76-134	"	"	"	"	"	
<i>Surrogate: Toluene-d8</i>		105 %	78-125	"	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		91.3 %	77-127	"	"	"	"	"	

5-3-1 (E604037-02) Vapor Sampled: 04-Apr-16 Received: 08-Apr-16

Benzene	0.50	0.16	ug/m3	1	ED61211	12-Apr-16	12-Apr-16	EPA TO-15	
Toluene	33	0.76	"	"	"	"	"	"	
Ethylbenzene	1.6	0.44	"	"	"	"	"	"	
m,p-Xylene	6.8	0.44	"	"	"	"	"	"	
o-Xylene	2.7	0.44	"	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	76-134	"	"	"	"	"	
<i>Surrogate: Toluene-d8</i>		106 %	78-125	"	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.2 %	77-127	"	"	"	"	"	

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Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Project: MC040816-10
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
19-Apr-16 09:20

Petroleum Hydrocarbon Analysis

H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
5-3-2 (E604037-01) Vapor Sampled: 04-Apr-16 Received: 08-Apr-16									
TPHv (C5 - C8) aliphatic	200	100	ug/m3	1	ED61211	12-Apr-16	12-Apr-16	EPA TO-15	
TPHv (C9 - C12) aliphatic	210	100	"	"	"	"	"	"	
TPHv (C9 - C10) aromatic	ND	100	"	"	"	"	"	"	
5-3-1 (E604037-02) Vapor Sampled: 04-Apr-16 Received: 08-Apr-16									
TPHv (C5 - C8) aliphatic	250	100	ug/m3	1	ED61211	12-Apr-16	12-Apr-16	EPA TO-15	
TPHv (C9 - C12) aliphatic	170	100	"	"	"	"	"	"	
TPHv (C9 - C10) aromatic	ND	100	"	"	"	"	"	"	

H&P Mobile
Geochemistry Inc.

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Terra Associates, Inc.
12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Project: MC040816-10
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
19-Apr-16 09:20

Volatile Organic Compounds by EPA TO-15 - Quality Control
H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch ED61211 - TO-15

Blank (ED61211-BLK1)

Prepared & Analyzed: 12-Apr-16

Benzene	ND	0.16	ug/m3							
Toluene	ND	0.76	"							
Ethylbenzene	ND	0.44	"							
m,p-Xylene	ND	0.44	"							
o-Xylene	ND	0.44	"							

Surrogate: 1,2-Dichloroethane-d4	48.6		"	42.9		113	76-134			
Surrogate: Toluene-d8	44.3		"	41.4		107	78-125			
Surrogate: 4-Bromofluorobenzene	56.7		"	72.9		77.8	77-127			

LCS (ED61211-BS1)

Prepared & Analyzed: 12-Apr-16

Benzene	15	0.16	ug/m3	13.0		115	69-119			
Toluene	15	0.76	"	15.4		101	66-119			
Ethylbenzene	16	0.44	"	17.7		92.9	70-124			
m,p-Xylene	15	0.44	"	17.7		86.6	61-134			
o-Xylene	16	0.44	"	17.7		89.3	67-125			

Surrogate: 1,2-Dichloroethane-d4	45.6		"	42.9		106	76-134			
Surrogate: Toluene-d8	43.1		"	41.4		104	78-125			
Surrogate: 4-Bromofluorobenzene	67.7		"	72.9		92.9	77-127			

LCS Dup (ED61211-BSD1)

Prepared: 12-Apr-16 Analyzed: 13-Apr-16

Benzene	13	0.16	ug/m3	13.0		104	69-119	10.2	25	
Toluene	14	0.76	"	15.4		91.7	66-119	9.39	25	
Ethylbenzene	14	0.44	"	17.7		80.7	70-124	14.0	25	
m,p-Xylene	14	0.44	"	17.7		78.5	61-134	9.82	25	
o-Xylene	14	0.44	"	17.7		77.6	67-125	14.0	25	

Surrogate: 1,2-Dichloroethane-d4	45.1		"	42.9		105	76-134			
Surrogate: Toluene-d8	43.6		"	41.4		105	78-125			
Surrogate: 4-Bromofluorobenzene	67.4		"	72.9		92.4	77-127			

H&P Mobile
Geochemistry Inc.

2470 Impala Drive
Carlsbad, CA 92010
760-804-9678 Phone
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Terra Associates, Inc. 12220 113th Avenue NE, Suite 130 Kirkland, WA 98034	Project: MC040816-10 Project Number: 6552 / Seattle, WA Project Manager: Mr. Charles R. Lie	Reported: 19-Apr-16 09:20
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Petroleum Hydrocarbon Analysis - Quality Control
H&P Mobile Geochemistry, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch ED61211 - TO-15

Blank (ED61211-BLK1)

Prepared & Analyzed: 12-Apr-16

TPH _v (C5 - C8) aliphatic	ND	100	ug/m3
TPH _v (C9 - C12) aliphatic	ND	100	"
TPH _v (C9 - C10) aromatic	ND	100	"

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12220 113th Avenue NE, Suite 130
Kirkland, WA 98034

Project: MC040816-10
Project Number: 6552 / Seattle, WA
Project Manager: Mr. Charles R. Lie

Reported:
19-Apr-16 09:20

Notes and Definitions

LCC	Leak Check Compound
ND	Analyte NOT DETECTED at or above the reporting limit
MDL	Method Detection Limit
%REC	Percent Recovery
RPD	Relative Percent Difference

Appendix

H&P Mobile Geochemistry, Inc. is approved as an Environmental Testing Laboratory and Mobile Laboratory in accordance with the DoD-ELAP and the ISO 17025 programs, certification number L11-175.

H&P is approved by the State of Arizona as an Environmental Testing Laboratory and Mobile Laboratory, certification numbers AZM758 and AZ0779.

H&P is approved by the State of California as an Environmental Laboratory and Mobile Laboratory in conformance with the Environmental Laboratory Accreditation Program (ELAP) for the category of Volatile and Semi-Volatile Organic Chemistry of Hazardous Waste, certification numbers 2740, 2741, 2743, 2744, 2745, 2754 & 2930.

H&P is approved by the State of Florida Department of Health under the National Environmental Laboratory Accreditation Conference (NELAC) certification number E871100.

The complete list of stationary and mobile laboratory certifications along with the fields of testing (FOTs) and analyte lists are available at www.handpmg.com/about/certifications.



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VAPOR / AIR Chain of Custody

DATE: 4/5/16
Page 1 of 1

Lab Client and Project Information		
Lab Client/Consultant: Charles R. Lie	Project Name / #: 655Z	
Lab Client Project Manager: Terra Associates Inc	Project Location: Seattle, WA	
Lab Client Address: 12220 113th Ave NE Suite 130	Report E-Mail(s): CLie@terra-associates.com	
Lab Client City, State, Zip: Kirkland, WA, 98034	NHoffman@terra-associates.com	
Phone Number: 425 821-7777		
Reporting Requirements	Turnaround Time	Sampler Information
<input checked="" type="checkbox"/> Standard Report <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input checked="" type="checkbox"/> Excel EDD <input type="checkbox"/> Other EDD: _____ <input type="checkbox"/> CA Geotracker Global ID: _____	<input checked="" type="checkbox"/> 5-7 day Std <input type="checkbox"/> 24-Hr Rush <input type="checkbox"/> 3-day Rush <input type="checkbox"/> Mobile Lab <input type="checkbox"/> 48-Hr Rush <input type="checkbox"/> Other: _____	Sampler(s): Nicolas R. Hoffman Signature: <i>N. Hoffman</i> Date: 4/4/16

Sample Receipt (Lab Use Only)		
Date Rec'd: 4/8/16	Control #: 160321.01	
H&P Project # MC040816-ID		
Lab Work Order # E406 E604037		
Sample Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Notes Below		
Receipt Gauge ID: 1076084	Temp: RT	
Outside Lab:		
Receipt Notes/Tracking #: 12931TG19051817645		
Lab PM Initials: KM		

[illegible]