



January 18, 2019

Greg Hamilton
Sr. Staff HSE Representative
Kerr-McGee Oil & Gas Onshore, LP
1099 18th Street, Suite 1800
Denver, Colorado 80202

Re: Sump Closure Summary Report
HSR-PAUL SCHMIDT #16-33 Tank Battery
Location ID: 330051
NWNW – Sec18 – T3N - R67W
COGCC Remediation Number 12301

Dear Mr. Hamilton:

Apex Companies, LLC (Apex) is providing Kerr-McGee Oil & Gas Onshore, LP (Kerr-McGee) with this Sump Closure Summary Report to document sampling activities and the results of environmental testing at the tank battery associated with the HSR-PAUL SCHMIDT #16-33 well. This form is being submitted to document the closure activities of two produced water sumps under Remediation Number 12301, as approved by the COGCC. Apex provided the environmental services at the site that included a collection of confirmation samples from the sump excavation and documentation of field activities, as described below.

Site Assessment Activities

The field activities described herein were performed on September 10, 2018, with the purpose of assessing potential hydrocarbon impacts at the site related to the closure of two partially buried produced water sumps. Soil sampling activities, laboratory analytical results, and conclusions are presented below. The general site layout and sample locations are provided in Figure 1.

The final extent of the northern excavation measured approximately 20 feet by 21 feet, at an approximate depth of 4 feet below ground surface (bgs). The final extent of the southern excavation measured approximately 27 feet by 20 feet, at an approximate depth of 4 feet below ground surface (bgs). Impacted soil and groundwater were not encountered in either excavation.

Confirmation soil samples were collected from the four sidewalls in each excavation area at approximately 3 feet bgs. A bentonite liner prohibited the collection of base samples from both excavations. Soil samples were field-screened using a calibrated photoionization detector. Based on the field screening, the sidewall (N-E01@3') of the northern excavation, and the sidewall (S-S01@3') of the southern excavation and submitted to Origins Laboratory in Denver, Colorado. The samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260, TPH – diesel range and residual range organics (DRO and RRO, respectively) by USEPA Method 8015, electrical conductivity (EC), and pH. Soil analytical data are summarized in Table 1 and the laboratory analytical report is provided in Attachment A.

Results

Analytical results from the confirmation soil samples (N-E01@3' and S-S01@3') collected from the final extent of both excavations indicate that BTEX, TPH, EC, and pH concentrations were in full compliance with COGCC Table 910-1 allowable levels. The remaining samples collected from the excavation area were not submitted for laboratory analysis, as analytical data from the submitted samples and field screened samples confirmed the absence of petroleum hydrocarbon impacts above COGCC Table 910-1 standards.

Conclusions

Analytical results described herein confirm BTEX and TPH impacts are not present at concentrations above applicable regulatory standards at the two former partially buried produced water sump locations. Consequently, no further site assessment or remedial activity is necessary. The two produced water sumps were removed, prior to site assessment activities. The excavation area was backfilled and contoured to match pre-existing conditions, and two new produced water sumps were installed.

Please contact me at (720) 501-5065 if you have any questions regarding this report or require additional information.

Sincerely,

Apex Companies, LLC

Maggie Graham

Maggie Graham
Senior Project Manager

Attachments:

Figure 1 – HSR-PAUL SCHMIDT#16-33- Facility Layout & Sample Locations
Table 1 – Soil Sample Analytical Results
Attachment A – Laboratory Analytical Report



For illustration purposes, spatial data in this diagram (e.g. sample points, excavation perimeter) is representative of field observations, and for illustration purposes may have been adjusted to align with aerial imagery and other pictured spatial data. Apex also collects spatial data using GPS units with real-time differential correction and sub-meter accuracy. Spatial data (e.g. ESRI shapefiles, Google Earth KMZ) provided separately from this diagram, may not be consistent with what is presented in this site diagram, due to adjustments made for illustrative purposes.



Figure 1
HSR-Paul Schmidt
#16-33- Facility
Layout & Sample
Locations

Legend

- Soil Sample (9/10/2018)
- Former Crude Oil Tank
- Former Produced Water Sump
- Former Secondary Containment
- Excavation Extent (9/10/2018)

Sample Location

B: benzene
T: toluene
E: ethylbenzene
X: xylenes
TPH: total petroleum hydrocarbons

Bold values exceed COGCC Table
910-1 allowable concentrations

Site Characteristics

Legal Location: SESE, Sec 33, T3N R66W
County: Weld
Land Use: Non-cropland **Topography:** 1-3%
Slopes
Run-Off Risk: Low
Soil Type: Olney fine sandy loam

REVISED	BY	COMMENT
9/11/2018	BJB	Figure 1

Apex Companies, LLC
beau.bergstrom@apexcos.com
M:\Projects\Anadarko\DJ_Basin\Remediation\HSR-Paul_Schmidt-63N66W_33SESE\HSR-Paul_Schmidt-63N66W_33SESE_Fig1_dlg_20180911.mxd

Table 1 - Soil Laboratory Results

Kerr-McGee Oil and Gas Onshore LP
 Location Name: HSR-Paul Schmidt 16-33
 Location ID: 330051
 County: Weld

			Organics (mg/kg [ppm])								
COGCC Allowable Concentration (Soil) -->			500			0.17	85	100	175	4	(6-9)
Sample ID:	Sample Date:	Sample Depth:	TPH-GRO (C6-C10) Low Fraction	TPH-DRO (C10-C28) High Fraction	TPH-RRO (C28-C40) High Fraction	Benzene	Toluene	Ethylbenzene	Xylenes - total	EC (<4 mmhos/cm or 2x background)	pH (unit)
N-E01@3'	9/10/18	3'	1.32	<25.0	<100	0.004	<0.002	0.003	0.013	0.0729	8.35
S-S01@3'	9/10/18	3'	<0.200	<25.0	<100	<0.002	<0.002	<0.002	<0.002	0.0554	8.75

Notes:

TPH Total Petroleum Hydrocarbons
 GRO Gasoline Range Organics (C6-C10)
 DRO Diesel Range Organics (C10-C28)
 RRO Residual Range Organics (C28-C36)
Bold Indicates results exceeded COGCC Table 910-1 allowable concentration

bgs below ground surface
 mg/kg milligram per kilogram
 mmhos/cm millimhos per centimeter
 NA Not analyzed/ Not Applicable
 COGCC Colorado Oil and Gas Conservation Commission
 * Sample was collected below the designated root zone (>3' bgs)

Attachment A

Laboratory Analytical Report



September 11, 2018

Apex Companies, LLC

Maggie Graham

4150 Darley Avenue, Suite 1

Boulder CO 80305

Project Name - KMG - HSR Paul Schmidt 16-33

Project Number - COT0132

Attached are your analytical results for KMG - HSR Paul Schmidt 16-33 received by Origins Laboratory, Inc. September 10, 2018. This project is associated with Origins project number Y809100-04.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Apex Companies, LLC

4150 Darley Avenue, Suite 1

Boulder CO 80305

Maggie Graham


Project Number: COT0132

Project: KMG - HSR Paul Schmidt 16-33

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N-E01@3'	Y809100-04	Soil	September 10, 2018 13:00	09/10/2018 17:30
S-S01@3'	Y809100-08	Soil	September 10, 2018 13:30	09/10/2018 17:30

Origins Laboratory, Inc.



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

Jen Pellegrini For Noelle Doyle Mathis, President

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

www.originslaboratory.com

Y809100

page 1 of 1

Client: Apex Companies
Address: 1746 Cole Blvd, Lakewood, CO 80401
Telephone Number: 720-501-5065
Email Address: Maggie.Graham@apexcos.com

Project Manager: Maggie Graham
Project Name: HSR-Paul Schmidt 16-33
Project Number: WO#COT0132 Greg Hamilton
Samples Collected By: Caitlin Thomas
Bill to Anadarko

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative			Matrix			Analysis					Sample Instructions		
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa Container #	Other	GETEX	DRO/RRO	EC, pH			HOLD SAR
N-SØ1@3'	9/10/18	1245	1	✓					✓						✓	HOLD	1
N-WØ1@3'		1250	1	✓					✓						✓	↓	2
N-NØ1@3'		1255	1	✓					✓						✓	↓	3
N-EØ1@3'		1300	1	✓					✓		✓	✓	✓			Run	4
S-WØ1@3'		1315	1	✓					✓						✓	HOLD	5
S-NØ1@3'		1320	1	✓					✓						✓	↓	6
S-EØ1@3'		1325	1	✓					✓						✓	↓	7
S-SØ1@3'		1330	1	✓					✓		✓	✓	✓			Run	8
BGØ1@0.5'		1350	1	✓					✓						✓	HOLD	9
S-EØ2@2'	↓	1435	1	✓					✓						✓	↓	10
Relinquished By: <i>Caitlin Thomas</i>	Date: 9/10/18	Time: 1557	Received By: <i>[Signature]</i>	Date: 9/10/18	Time: 1557	Turnaround Time:			Same Day <input checked="" type="checkbox"/>			24 Hr <input type="checkbox"/>					
Relinquished By:	Date:	Time:	Received By: <i>[Signature]</i>	Date: 9/10/18	Time: 1730				48 Hr <input type="checkbox"/>			72 Hr <input type="checkbox"/>					
									Standard <input type="checkbox"/>								

5.3

Date Results Needed Next day, 7am

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Origins Laboratory, Inc.

Jen Pellegrini

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

Jen Pellegrini For Noelle Doyle Mathis, President

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Origins Laboratory

F-012207-01-R1
Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: Y409100

Client: Apex

Client Project ID: KMG - HSR Paul Schmidt 16-33

Checklist Completed by: JG

Shipped Via: HD
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 9/10/2018

Airbill #: N/A

Matrix(s) Received: (Check all that apply): X Soil/Solid Water Other: (Describe)

Cooler Number/Temperature: 1 / 5.3 °C / °C / °C / °C

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) JG

9/10/18
Date/Time Reviewed

Origins Laboratory, Inc.

Jen Pellegrini

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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

N-E01@3'
9/10/2018 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

Origins Laboratory, Inc.
Y809100-04 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B811001	KDK	09/10/2018	09/10/2018	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl 64.6 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	1.32	0.200	mg/kg	1	B811002	KDK	09/10/2018	09/10/2018	
Benzene	0.004	0.002	"	"	"	KDK	"	"	
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	0.003	0.002	"	"	"	KDK	"	"	
Xylenes, total	0.013	0.002	"	"	"	KDK	"	"	

Surrogate: 1,2-Dichloroethane-d4 95.7 % 70-130 " " "
Surrogate: Toluene-d8 97.9 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 99.3 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.35		pH Units	1	B811008	JTD	09/10/2018	09/10/2018	
----	------	--	----------	---	---------	-----	------------	------------	--

Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0729	0.00500	mmhos/cm	"	B811009	JTD	09/10/2018	"	
---------------------------	--------	---------	----------	---	---------	-----	------------	---	--

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

S-S01@3'
9/10/2018 1:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

Origins Laboratory, Inc.
Y809100-08 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B8I1001	KDK	09/10/2018	09/10/2018	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl 61.7 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B8I1002	KDK	09/10/2018	09/11/2018	U
Benzene	ND	0.002	"	"	"	KDK	"	"	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4 96.3 % 70-130 " " "
Surrogate: Toluene-d8 98.0 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 94.4 % 70-130 " " "


pH in Soil by EPA 9045D

pH	8.75		pH Units	1	B8I1008	JTD	09/10/2018	09/10/2018	
----	------	--	----------	---	---------	-----	------------	------------	--

Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0554	0.00500	mmhos/cm	"	B8I1009	JTD	09/10/2018	"	
---------------------------	--------	---------	----------	---	---------	-----	------------	---	--

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1002 - EPA 5030 (soil)										
Blank (B8I1002-BLK1)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		87.8	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	58		"	62.5		93.6	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1002 - EPA 5030 (soil)										
Blank (B8I1002-BLK2)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.3	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.9	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.7	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1002 - EPA 5030 (soil)										
LCS (B8I1002-BS1)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.110	0.002	mg/kg	0.100		110	77.1-124			
Toluene	0.106	0.002	"	0.100		106	74.5-128			
Ethylbenzene	0.107	0.002	"	0.100		107	66.4-127			
m,p-Xylene	0.219	0.004	"	0.200		110	76.6-124			
o-Xylene	0.110	0.002	"	0.100		110	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		90.5	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1002 - EPA 5030 (soil)										
LCS (B8I1002-BS2)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.100	0.002	mg/kg	0.100		99.9	77.1-124			
Toluene	0.100	0.002	"	0.100		99.9	74.5-128			
Ethylbenzene	0.091	0.002	"	0.100		91.4	66.4-127			
m,p-Xylene	0.191	0.004	"	0.200		95.4	76.6-124			
o-Xylene	0.096	0.002	"	0.100		96.4	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.6	70-130			
Surrogate: Toluene-d8	67		"	62.5		107	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		105	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33


Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I1002 - EPA 5030 (soil)

Matrix Spike (B8I1002-MS1)		Source: Y809077-01			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.102	0.002	mg/kg	0.100	ND	102	71.8-126			
Toluene	0.098	0.002	"	0.100	ND	97.6	65.1-130			
Ethylbenzene	0.095	0.002	"	0.100	ND	94.9	62.2-130			
m,p-Xylene	0.198	0.004	"	0.200	ND	99.2	46.5-137			
o-Xylene	0.099	0.002	"	0.100	ND	99.2	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		96.5	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.3	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		102	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I1002 - EPA 5030 (soil)

Matrix Spike (B8I1002-MS2)		Source: Y809077-04			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.103	0.002	mg/kg	0.100	ND	103	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	98.6	65.1-130			
Ethylbenzene	0.097	0.002	"	0.100	ND	96.9	62.2-130			
m,p-Xylene	0.201	0.004	"	0.200	ND	101	46.5-137			
o-Xylene	0.105	0.002	"	0.100	ND	105	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.4	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.4	70-130			
Surrogate: 4-Bromofluorobenzene	68		"	62.5		109	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I1002 - EPA 5030 (soil)

Matrix Spike Dup (B8I1002-MSD1)		Source: Y809077-01			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.095	0.002	mg/kg	0.100	ND	95.3	71.8-126	6.63	11.3	
Toluene	0.091	0.002	"	0.100	ND	90.5	65.1-130	7.53	15.4	
Ethylbenzene	0.086	0.002	"	0.100	ND	86.2	62.2-130	9.58	19.6	
m,p-Xylene	0.181	0.004	"	0.200	ND	90.5	46.5-137	9.26	19.2	
o-Xylene	0.091	0.002	"	0.100	ND	90.9	54.2-134	8.67	17.9	
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		96.4	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.6	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I1002 - EPA 5030 (soil)

Matrix Spike Dup (B8I1002-MSD2)		Source: Y809077-04			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Benzene	0.108	0.002	mg/kg	0.100	ND	108	71.8-126	5.61	11.3	
Toluene	0.102	0.002	"	0.100	ND	102	65.1-130	3.49	15.4	
Ethylbenzene	0.099	0.002	"	0.100	ND	98.7	62.2-130	1.84	19.6	
m,p-Xylene	0.206	0.004	"	0.200	ND	103	46.5-137	2.31	19.2	
o-Xylene	0.105	0.002	"	0.100	ND	105	54.2-134	0.343	17.9	
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.6	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.1	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	70-130			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I1001 - EPA 3550B

Blank (B8I1001-BLK1)

Prepared: 09/10/2018 Analyzed: 09/10/2018

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	41		"	50.0		82.5	59-131			

Blank (B8I1001-BLK2)

Prepared: 09/10/2018 Analyzed: 09/10/2018

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	36		"	50.0		71.5	59-131			

Blank (B8I1001-BLK3)

Prepared: 09/10/2018 Analyzed: 09/10/2018

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	37		"	50.0		73.1	59-131			

LCS (B8I1001-BS1)

Prepared: 09/10/2018 Analyzed: 09/10/2018

Diesel (C10-C28)	754	50.0	mg/kg	1000		75.4	64-121			
Residual Range Organics (C28-C40)	795	200	"	1000		79.5	58-124			
Surrogate: o-Terphenyl	37		"	50.0		74.2	59-131			

LCS (B8I1001-BS2)

Prepared: 09/10/2018 Analyzed: 09/10/2018

Diesel (C10-C28)	749	50.0	mg/kg	1000		74.9	64-121			
Residual Range Organics (C28-C40)	784	200	"	1000		78.4	58-124			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Extractable Petroleum Hydrocarbons by 8015C - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1001 - EPA 3550B										
LCS (B8I1001-BS2)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Surrogate: o-Terphenyl	38		mg/kg	50.0		76.4	59-131			
LCS (B8I1001-BS3)					Prepared: 09/10/2018 Analyzed: 09/10/2018					
Diesel (C10-C28)	790	50.0	mg/kg	1000		79.0	64-121			
Residual Range Organics (C28-C40)	822	200	"	1000		82.2	58-124			
Surrogate: o-Terphenyl	39		"	50.0		77.9	59-131			
Matrix Spike (B8I1001-MS1)					Source: Y809076-01		Prepared: 09/10/2018 Analyzed: 09/10/2018			
Diesel (C10-C28)	1180	50.0	mg/kg	1000	279	90.6	53-125			
Residual Range Organics (C28-C40)	875	200	"	1000	25.0	85.0	47-133			
Surrogate: o-Terphenyl	41		"	50.0		81.0	59-131			
Matrix Spike (B8I1001-MS2)					Source: Y809076-02		Prepared: 09/10/2018 Analyzed: 09/10/2018			
Diesel (C10-C28)	757	50.0	mg/kg	1000	16.4	74.1	53-125			
Residual Range Organics (C28-C40)	806	200	"	1000	45.8	76.0	47-133			
Surrogate: o-Terphenyl	36		"	50.0		71.8	59-131			
Matrix Spike (B8I1001-MS3)					Source: Y809096-01		Prepared: 09/10/2018 Analyzed: 09/10/2018			
Diesel (C10-C28)	792	50.0	mg/kg	1000	ND	79.2	53-125			
Residual Range Organics (C28-C40)	857	200	"	1000	8.86	84.8	47-133			
Surrogate: o-Terphenyl	38		"	50.0		75.8	59-131			
Matrix Spike Dup (B8I1001-MSD1)					Source: Y809076-01		Prepared: 09/10/2018 Analyzed: 09/10/2018			
Diesel (C10-C28)	1110	50.0	mg/kg	1000	279	83.4	53-125	8.21	20	
Residual Range Organics (C28-C40)	797	200	"	1000	25.0	77.2	47-133	9.66	20	
Surrogate: o-Terphenyl	40		"	50.0		80.5	59-131			
Matrix Spike Dup (B8I1001-MSD2)					Source: Y809076-02		Prepared: 09/10/2018 Analyzed: 09/10/2018			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Extractable Petroleum Hydrocarbons by 8015C - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1001 - EPA 3550B										
Matrix Spike Dup (B8I1001-MSD2)		Source: Y809076-02			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Diesel (C10-C28)	746	50.0	mg/kg	1000	16.4	73.0	53-125	1.53	20	
Residual Range Organics (C28-C40)	783	200	"	1000	45.8	73.7	47-133	3.05	20	
Surrogate: o-Terphenyl	37		"	50.0		73.7	59-131			
Matrix Spike Dup (B8I1001-MSD3)		Source: Y809096-01			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Diesel (C10-C28)	821	50.0	mg/kg	1000	ND	82.1	53-125	3.56	20	
Residual Range Organics (C28-C40)	853	200	"	1000	8.86	84.4	47-133	0.483	20	
Surrogate: o-Terphenyl	40		"	50.0		79.6	59-131			

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Classical Chemistry Parameters - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B8I1008 - NO PREP										
Duplicate (B8I1008-DUP1)		Source: Y809096-01			Prepared: 09/10/2018 Analyzed: 09/10/2018					
pH	8.03		pH Units		7.99			0.499	25	
Batch B8I1009 - NO PREP										
Blank (B8I1009-BLK1)		Prepared: 09/10/2018 Analyzed: 09/10/2018								
Specific Conductance (EC)	0.00210	0.00500	mmhos/cm							
Duplicate (B8I1009-DUP1)		Source: Y809096-01			Prepared: 09/10/2018 Analyzed: 09/10/2018					
Specific Conductance (EC)	0.0405	0.00500	mmhos/cm		0.0410			1.23	25	

Origins Laboratory, Inc.



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

Apex Companies, LLC
4150 Darley Avenue, Suite 1
Boulder CO 80305

Maggie Graham
Project Number: COT0132
Project: KMG - HSR Paul Schmidt 16-33

Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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

Jen Pellegrini For Noelle Doyle Mathis, President