



January 30, 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  
CAMENISCH 33-33 TANK BATTERY  
Location ID: 329899  
E2– Sec33 – T4N - 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 CAMENISCH 33-33 well. This form is being submitted to document the activities related to the closure of a produced water sump 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 removal and documentation of field activities as described below.

### **Site Assessment Activities**

Initial field activities described herein were performed on October 26, 2018, with the purpose of assessing potential hydrocarbon impacts at the site related to the closure and replacement of a partially buried produced water sump. Follow-up field activities were performed on January 29, 2019. 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 excavation measured approximately 12 feet by 12 feet, at an approximate depth of 5 feet below ground surface (bgs). Impacted soil or groundwater were not encountered within the excavation.

Confirmation soil samples were collected from the excavation in relation to the sump replacement. The decommissioned sump samples were collected from the base at approximately 5 feet bgs and from all four sidewalls at approximately 3 feet bgs. All soil samples were field-screened using a calibrated photoionization detector. Based on field screening results, the base (B01@5') was submitted to Origins Laboratory in Denver, Colorado. The sample was 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, and TPH – diesel range and residual range organics (DRO and RRO, respectively) by USEPA Method 8015. On January 29, 2019, one sample

(GB01) was collected from a location outside of the tank battery secondary containment and related liner. A hand auger was utilized to dig below the road base, then an additional three feet below ground surface, until native soil was discovered. The PID reading for this sample was very low. This sample was submitted to Origins Laboratory for analysis of specific conductance (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 (B01@5' and GB01) collected from the final extent of the excavation 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 sample and field screened samples confirmed the absence of petroleum hydrocarbon impacts above COGCC Table 910-1 standards.

## Conclusions

Analytical results described herein confirm BTEX, TPH, EC and pH impacts are not present at concentrations above applicable regulatory standards at the former partially buried produced water sump location. Consequently, no further site assessment or remedial activity is necessary, and a new produced water sump has been installed in the location of the former sump.

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 – CAMENISCH 33-33 Tank Battery - Facility Layout & Sample Locations  
Table 1 – Soil Sample Analytical Results  
Attachment A – Laboratory Analytical Report



**Figure 1**  
**Camenisch-64N67W**  
**33NWSE -**  
**Facility Layout &**  
**Sample Locations**

**Legend**

- Soil Sample (10/26/2018)
- Soil Sample (1/29/2019)
- Former Crude Oil Tank
- Former Produced Water Sump
- Former Secondary Containment
- Excavation Extent (10/26/2018)

**Sample Location**

B: benzene  
T: toluene  
E: ethylbenzene  
X: xylenes  
TPH: total petroleum hydrocarbons  
EC: specific conductance (mmhos/cm)

Bold values exceed COGCC Table  
910-1 allowable concentrations

**Site Characteristics**

**Legal Location:** E2, Sec 33, T4N R67W  
**County:** Weld  
**Land Use:** Cropland  
**Topography:** 3-9% Slopes  
**Run-Off Risk:** Not Available  
**Soil Type:** Nelson fine sandy loam

REVISED	BY	COMMENT
1/30/2019	BJB	Figure 1

Apex Companies, LLC  
beau.bergstrom@apexco.com  
M:\Projects\Anadarko\DJ\_Basin\Remediation\Camenisch-64N67W\_33NWSE\Camienisch-64N67W\_33NWSE\_Fig1.dwg 20181029.mxd

Cropland

**GB01**  
EC: 0.0806  
pH: 7.51

**B01@5'**  
B: <0.002 mg/kg  
T: <0.002 mg/kg  
E: <0.002 mg/kg  
X: <0.002 mg/kg  
TPH: <100 mg/kg

12-ft

12-ft

Access Road

0 7.5 15  
Feet

1 inch = 15 feet



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.

## Table 1 - Soil Laboratory Results

Kerr-McGee Oil and Gas Onshore LP  
 Location Name: Camenisch 33-33  
 Location ID: 329899  
 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)
B01@5'	10/26/18	5'	<0.200	<25.0	<100	<0.002	<0.002	<0.002	<0.002	N/A	N/A
GB01	01/29/19	3'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0806	7.51

**Notes:**

TPH Total Petroleum Hydrocarbons  
 GRO Gasoline Range Organics (C6-C10)  
 DRO Diesel Range Organics (C10-C28)  
 RRO Residual Range Organics (C28-C36)

bgs below ground surface  
 mg/kg milligrams per kilogram  
 mmhos/cm millimhos per centimeter  
 NA Not analyzed/ Not Applicable  
 COGCC Colorado Oil and Gas Conservation Commission

**Attachment A**

**Laboratory Analytical Report**



October 29, 2018

Apex Companies, LLC

Maggie Graham

4150 Darley Avenue, Suite 1

Boulder CO 80305

**Project Name - KMG - Camenisch 33-33**

**Project Number - COT0137**

Attached are your analytical results for KMG - Camenisch 33-33 received by Origins Laboratory, Inc. October 26, 2018. This project is associated with Origins project number Y810411-01.

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: COT0137

Project: KMG - Camenisch 33-33

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@5'	Y810411-01	Soil	October 26, 2018 14:45	10/26/2018 16:21

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.*



Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

<b>ORIGINS</b> LABORATORY, INC		www.originslaboratory.com	
Client: Apex Companies		Project Manager: Maggie Graham	
Address: 1746 Cole Blvd, Lakewood, CO 80401		Project Name: Camussein 33-33	
Telephone Number: 720-501-5065		Project Number: WO# 2010137 Greg Hamilton	
Email Address: Maggie.Graham@apexcos.com		Samples Collected By: Sage Hauer	

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix		Analysis					Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summary	Other	GTTEX	DRO/RRO	EC, pH	HOLD SAR	
B01A05'	10/20/18	1445	1	X						X	X	X	X			1
N01A03'		1448														2
F01A03'		1449														3
N01A03'		1451														4
S01A03'		1455														5
B01A05'		1458														6
																7
																8
																9
																10
Relinquished By: <i>David Paul</i>	Date: 10/26/18	Time: 1421	Received By: <i>[Signature]</i>	Date: 10/26/18	Time: 1201	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>										

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

Origins Laboratory, Inc.

Jeze Pellegrini

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Apex Companies, LLC

4150 Darley Avenue, Suite 1

Boulder CO 80305

Maggie Graham

Project Number: COT0137

Project: KMG - Camenisch 33-33

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: Y810411

Client: Apex

Client Project ID: KMG-Camenisch 33-33

Checklist Completed by: JG

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

Date/time completed: 10/26/2018

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_ (Describe)

Cooler Number/Temperature: 1 / 14.4 °C 1 / \_\_\_\_\_ °C 1 / \_\_\_\_\_ °C 1 / \_\_\_\_\_ °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 <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		<u>Same Day</u>
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" 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 checked="" type="checkbox"/>		
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

<sup>(1)</sup> 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)

10/26/18  
Date/Time Reviewed

Origins Laboratory, Inc.

*Jefe Pellegrini*

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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

B01@5'

10/26/2018 2:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
Y810411-01 (Soil)

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	ND	25.0	mg/kg	1	B8J2602	KDK	10/26/2018	10/28/2018	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	KDK	"	10/26/2018	U

Surrogate: o-Terphenyl 64.5 % 59-131 " " "

**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B8J2601	KDK	10/26/2018	10/26/2018	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 74.8 % 70-130 " " "  
Surrogate: Toluene-d8 110 % 70-130 " " "  
Surrogate: 4-Bromofluorobenzene 110 % 70-130 " " "

Origins Laboratory, Inc.



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4150 Darley Avenue, Suite 1  
Boulder CO 80305

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
<b>Batch B8J2601 - EPA 5030 (soil)</b>										
<b>Blank (B8J2601-BLK1)</b>					Prepared: 10/26/2018 Analyzed: 10/26/2018					
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	59		ug/kg	62.5		95.0	70-130			
Surrogate: Toluene-d8	67		"	62.5		107	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

Origins Laboratory, Inc.



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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
<b>Batch B8J2601 - EPA 5030 (soil)</b>										
<b>Blank (B8J2601-BLK2)</b>					Prepared: 10/26/2018 Analyzed: 10/26/2018					
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	61		ug/kg	62.5		96.9	70-130			
Surrogate: Toluene-d8	67		"	62.5		107	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

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Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
<b>Batch B8J2601 - EPA 5030 (soil)</b>										
<b>LCS (B8J2601-BS1)</b>					Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.101	0.002	mg/kg	0.100		101	77.1-124			
Toluene	0.108	0.002	"	0.100		108	74.5-128			
Ethylbenzene	0.103	0.002	"	0.100		103	66.4-127			
m,p-Xylene	0.213	0.004	"	0.200		106	76.6-124			
o-Xylene	0.103	0.002	"	0.100		103	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.4	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.6	70-130			

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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
<b>Batch B8J2601 - EPA 5030 (soil)</b>										
<b>LCS (B8J2601-BS2)</b>					Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.098	0.002	mg/kg	0.100		97.9	77.1-124			
Toluene	0.110	0.002	"	0.100		110	74.5-128			
Ethylbenzene	0.108	0.002	"	0.100		108	66.4-127			
m,p-Xylene	0.225	0.004	"	0.200		112	76.6-124			
o-Xylene	0.110	0.002	"	0.100		110	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		88.6	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.1	70-130			

Origins Laboratory, Inc.



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Boulder CO 80305

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
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**Batch B8J2601 - EPA 5030 (soil)**

Matrix Spike (B8J2601-MS1)		Source: Y810396-01			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.075	0.002	mg/kg	0.100	ND	74.7	71.8-126			
Toluene	0.077	0.002	"	0.100	ND	76.9	65.1-130			
Ethylbenzene	0.072	0.002	"	0.100	ND	72.4	62.2-130			
m,p-Xylene	0.150	0.004	"	0.200	0.001	74.1	46.5-137			
o-Xylene	0.072	0.002	"	0.100	0.0003	72.4	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.4	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

Origins Laboratory, Inc.



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4150 Darley Avenue, Suite 1  
Boulder CO 80305

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
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**Batch B8J2601 - EPA 5030 (soil)**

Matrix Spike (B8J2601-MS2)		Source: Y810404-01			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.087	0.002	mg/kg	0.100	ND	87.2	71.8-126			
Toluene	0.096	0.002	"	0.100	ND	95.6	65.1-130			
Ethylbenzene	0.096	0.002	"	0.100	ND	96.3	62.2-130			
m,p-Xylene	0.199	0.004	"	0.200	ND	99.5	46.5-137			
o-Xylene	0.095	0.002	"	0.100	ND	94.8	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	68		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	66		"	62.5		106	70-130			
Surrogate: 4-Bromofluorobenzene	67		"	62.5		108	70-130			

Origins Laboratory, Inc.



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Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
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**Batch B8J2601 - EPA 5030 (soil)**

Matrix Spike Dup (B8J2601-MSD1)		Source: Y810396-01			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.086	0.002	mg/kg	0.100	ND	85.7	71.8-126	13.7	11.3	QR-02
Toluene	0.086	0.002	"	0.100	ND	86.1	65.1-130	11.3	15.4	
Ethylbenzene	0.085	0.002	"	0.100	ND	85.2	62.2-130	16.3	19.6	
m,p-Xylene	0.175	0.004	"	0.200	0.001	86.9	46.5-137	15.7	19.2	
o-Xylene	0.087	0.002	"	0.100	0.0003	86.7	54.2-134	17.9	17.9	
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	61		"	62.5		98.3	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		104	70-130			

Origins Laboratory, Inc.



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Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

**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
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**Batch B8J2601 - EPA 5030 (soil)**

Matrix Spike Dup (B8J2601-MSD2)		Source: Y810404-01			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Benzene	0.080	0.002	mg/kg	0.100	ND	80.1	71.8-126	8.42	11.3	
Toluene	0.083	0.002	"	0.100	ND	83.0	65.1-130	14.1	15.4	
Ethylbenzene	0.082	0.002	"	0.100	ND	82.1	62.2-130	15.9	19.6	
m,p-Xylene	0.167	0.004	"	0.200	ND	83.4	46.5-137	17.6	19.2	
o-Xylene	0.080	0.002	"	0.100	ND	79.5	54.2-134	17.6	17.9	
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

Origins Laboratory, Inc.



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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

## 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
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## 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
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#### Batch B8J2602 - EPA 3550B

#### Blank (B8J2602-BLK1)

Prepared: 10/26/2018 Analyzed: 10/26/2018

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	35		"	50.0		70.1	59-131			

#### Blank (B8J2602-BLK2)

Prepared: 10/26/2018 Analyzed: 10/26/2018

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	34		"	50.0		67.5	59-131			

#### LCS (B8J2602-BS1)

Prepared: 10/26/2018 Analyzed: 10/26/2018

Diesel (C10-C28)	904	50.0	mg/kg	1000		90.4	64-121			
Residual Range Organics (C28-C40)	831	200	"	1000		83.1	58-124			
Surrogate: o-Terphenyl	41		"	50.0		81.7	59-131			

#### LCS (B8J2602-BS2)

Prepared: 10/26/2018 Analyzed: 10/26/2018

Diesel (C10-C28)	897	50.0	mg/kg	1000		89.7	64-121			
Residual Range Organics (C28-C40)	841	200	"	1000		84.1	58-124			
Surrogate: o-Terphenyl	39		"	50.0		78.1	59-131			

#### Matrix Spike (B8J2602-MS1)

Source: Y810396-01

Prepared: 10/26/2018 Analyzed: 10/26/2018

Diesel (C10-C28)	1200	50.0	mg/kg	1000	15.6	118	53-125			
Residual Range Organics (C28-C40)	1080	200	"	1000	46.1	103	47-133			

Origins Laboratory, Inc.



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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

## 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
<b>Batch B8J2602 - EPA 3550B</b>										
<b>Matrix Spike (B8J2602-MS1)</b>		<b>Source: Y810396-01</b>			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Surrogate: o-Terphenyl	53		mg/kg	50.0		107	59-131			
<b>Matrix Spike (B8J2602-MS2)</b>		<b>Source: Y810396-02</b>			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Diesel (C10-C28)	1240	50.0	mg/kg	1000	24.9	122	53-125			
Residual Range Organics (C28-C40)	1070	200	"	1000	44.1	102	47-133			
Surrogate: o-Terphenyl	54		"	50.0		109	59-131			
<b>Matrix Spike Dup (B8J2602-MSD1)</b>		<b>Source: Y810396-01</b>			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Diesel (C10-C28)	1120	50.0	mg/kg	1000	15.6	110	53-125	7.04	20	
Residual Range Organics (C28-C40)	1000	200	"	1000	46.1	95.5	47-133	7.64	20	
Surrogate: o-Terphenyl	47		"	50.0		94.9	59-131			
<b>Matrix Spike Dup (B8J2602-MSD2)</b>		<b>Source: Y810396-02</b>			Prepared: 10/26/2018 Analyzed: 10/26/2018					
Diesel (C10-C28)	966	50.0	mg/kg	1000	24.9	94.1	53-125	25.4	20	QR-02
Residual Range Organics (C28-C40)	849	200	"	1000	44.1	80.5	47-133	23.7	20	QR-02
Surrogate: o-Terphenyl	42		"	50.0		83.6	59-131			

Origins Laboratory, Inc.



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

Maggie Graham  
Project Number: COT0137  
Project: KMG - Camenisch 33-33

## Notes and Definitions

U Sample is Non-Detect.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

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.*



January 30, 2019

Apex Companies, LLC

Maggie Graham

4150 Darley Avenue, Suite 1

Boulder CO 80305

**Project Name - KMG - Camenisch 33-33**

**Project Number - 89584809**

Attached are your analytical results for KMG - Camenisch 33-33 received by Origins Laboratory, Inc. January 29, 2019. This project is associated with Origins project number Y901358-01.

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: 89584809

Project: KMG - Camenisch 33-33

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GB01	Y901358-01	Soil	January 29, 2019 10:00	01/29/2019 11:25

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.*

Jen Pellegrini For Noelle Doyle Mathis, President

Maggie Graham  
Project Number: 89584809  
Project: KMG - Camenisch 33-33

# ORIGINS

LABORATORY, INC

www.originslaboratory.com

1901359

page 1 of 1

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

Project Manager: Maggie Graham  
Project Name: Kampnisch 33-33  
Project Number: WO# 248409 Greg Hamilton  
Samples Collected By: Andrew Boushel  
Bill to Anadarko

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix				Analyte				Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	As Surrogate	Other	CBTEX	DRO/RRO	EC, pH	HOLD SAR		
640	1/29/19	10:00	1	X					X					X			1
																	2
																	3
																	4
																	5
																	6
																	7
																	8
																	9
																	10
Relinquished By: <i>Andrew Boushel</i>	Date: 1/29/19	Time: 11:05		Received By: <i>[Signature]</i>				Date: 1/29/19	Time: 11:25	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>							
Relinquished By:	Date:	Time:		Received By:				Date:	Time:								

Date Results Needed Next day, 7am

2.7

1725 Elk Place

Denver, CO 80211

Phone: 303.433.1322

Fax: 303.265.9645

Origins Laboratory, Inc.

Jeff Pellipini

*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: 89584809  
Project: KMG - Camenisch 33-33

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: Y901358

Client: Apex

Client Project ID: KMG - Camenisch 33-33

Checklist Completed by: JG

Shipped Via: HD

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 1/29/2019

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_

Cooler Number/Temperature: 1 12.7 °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C (Describe)

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 <sup>(1)</sup> ?	<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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<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 checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (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 <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with Na <sub>2</sub> CO <sub>3</sub> +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> 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) [Signature]

Date/Time Reviewed 1/29/19

Origins Laboratory, Inc.

[Signature]

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

Maggie Graham  
Project Number: 89584809  
Project: KMG - Camenisch 33-33

GB01

1/29/2019 10:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**Y901358-01 (Soil)**

**pH in Soil by EPA 9045D**

pH	7.51		pH Units	1	B9A2903	KDK	01/29/2019	01/29/2019	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0806	0.00500	mmhos/cm	"	B9A2904	KDK	"	"	
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Origins Laboratory, Inc.



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

Maggie Graham  
Project Number: 89584809  
Project: KMG - Camenisch 33-33

## Classical Chemistry Parameters - Quality Control Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch B9A2903 - NO PREP</b>										
<b>Duplicate (B9A2903-DUP1)</b>		<b>Source: Y901349-05</b>			Prepared: 01/29/2019 Analyzed: 01/29/2019					
pH	7.50		pH Units		7.60			1.32	25	
<b>Batch B9A2904 - NO PREP</b>										
<b>Blank (B9A2904-BLK1)</b>		Prepared: 01/29/2019 Analyzed: 01/29/2019								
Specific Conductance (EC)	0.00210	0.00500	mmhos/cm							
<b>Duplicate (B9A2904-DUP1)</b>		<b>Source: Y901349-05</b>			Prepared: 01/29/2019 Analyzed: 01/29/2019					
Specific Conductance (EC)	0.131	0.00508	mmhos/cm		0.125			4.84	25	

Origins Laboratory, Inc.



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4150 Darley Avenue, Suite 1  
Boulder CO 80305

Maggie Graham  
Project Number: 89584809  
Project: KMG - Camenisch 33-33

### Notes and Definitions

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.



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