



March 8, 2019

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

**Re: Sump Closure Summary Letter Report
Houston 17-2L Production Facility
API: 05-123-17563
Facility ID: 329584
Legal: NWE Sec 17-T3N-R67W
Remediation Project # 12507**

Dear Mr. Hamilton:

On behalf of Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee), Tasman Geosciences, Inc. (Tasman) has prepared this Sump Closure Summary Letter Report (Report) to document sampling activities and the results of environmental testing at the above-referenced site (Site). This Report is being submitted under Form 27 Site Investigation and Remediation Workplan Remediation # 12507. Tasman provided environmental services at the site that included collection of confirmation samples from the excavation, documentation of field activities, and review of analytical data as described below.

Site Assessment Activities

The field activities described herein were performed with the purpose of assessing potential hydrocarbon impacts at the Site related to the closure of the produced water sump. Soil sampling activities, laboratory analytical results, and conclusions are presented below.

Excavation activities were initiated on October 13, 2017 following removal of the produced water sump. The final extent of the excavation measured approximately 15 feet by 12 feet with an approximate depth of 4 feet below ground surface (bgs). Excavation material was not removed from the site during excavation and closure activities. A liner was not present at the location. Groundwater was not encountered in the excavation area.

Five (5) soil samples were collected from the sidewalls and base of the final extent of the sump excavation area at approximately 3 and 4 feet bgs, respectively. The soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Based on the field screening results, the excavation base soil sample (B01@4') was submitted to Origins Laboratory in Denver, Colorado, for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260C,

TPH – diesel range and oil range organics (DRO and ORO) by USEPA Method 8015, electrical conductivity (EC), and pH. The remaining samples were placed on hold pending base sample results.

The general Site layout, sample location and approximate final extent of the excavation are illustrated on Figure 1.

Results

Soil analytical results for base soil sample B01@4' indicated that constituent concentrations were in full compliance with State standards. Based on the results, the remaining soil samples were not analyzed. Soil analytical data are provided in Table 1. The laboratory analytical report is provided as Attachment A.

Conclusions

Analytical results described herein confirm that BTEX and TPH impacts are not present at concentrations above applicable regulatory standards at the former produced water sump location. Therefore, no further site assessment or remedial activity is recommended at this time. Following Site assessment activities, the produced water sump was removed and the excavation area was backfilled and contoured to match pre-existing conditions.

Please contact me at (303) 487-1228 if you have any questions regarding this report or require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'MJahn', written in a cursive style.

Mike Jahn, PG
Senior Geologist

Attachments:

Table 1 – Soil Sample Results Summary Table
Figure 1 – Sample Location Map
Attachment A – Laboratory Analytical Report

Table

TABLE 1
HOUSTON 17-2L PRODUCTION FACILITY
SOIL SAMPLE RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample ID	Date	Depth (ft. bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TVPH-GRO (mg/kg)	TEPH-DRO (mg/kg)	TEPH-ORO (mg/kg)	EC (mmhos/cm)	pH (units)
COGCC standards for soil (mg/kg) (1)			0.17	85	100	175	500			4 or 2x BG	6-9
B01@4'	10/13/17	4	<0.050	<0.050	<0.050	<0.050	7.57	<25	<100	0.268	8.40

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective February 1, 2014.

COGCC = Colorado Oil and Gas Conservation Commission

(<) = Analytical result is less than the indicated laboratory reporting limit.

TVPH - GRO = Total volatile petroleum hydrocarbons - gasoline range organics

TEPH - DRO = Total extractable petroleum hydrocarbons - diesel range organics

TEPH - ORO = Total extractable petroleum hydrocarbons - oil range organics

EC = Electrical conductivity

BG = Background

mmhos/cm = Millimhos per centimeter

mg/kg = Milligrams per kilogram.

ft. bgs = Feet below ground surface.

BOLD = Analytical result is in exceedance of COGCC Table 910-1 soil standards.

Figure



B01@4'
B < 0.050 mg/kg
TPH = 7.57 mg/kg

Legend

- Final excavation extent
- Earthen berm
- Soil sample location

Notes

All locations are approximate unless otherwise noted.

APC infrastructure shown on this map has been removed, and is illustrated for reference only.

B – Benzene
 TPH – Total petroleum hydrocarbons
 mg/kg – Milligrams per kilogram



Image Source: Google Earth 2017

DATE:	August 7, 2018
DESIGNED BY:	M. Jahn
DRAWN BY:	M. Rianda



Kerr-McGee Oil and Gas Onshore LP
HOUSTON 17-2L – PRODUCTION FACILITY
 NWNE Sec. 17-T3N-R67W
 Weld County, Colorado

Sample Location
 Map

FIGURE
1

Attachment A

October 16, 2017

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver CO 80211

Project Name - KMG - Houston 17-2L Sump

Project Number - [none]

Attached are your analytical results for KMG - Houston 17-2L Sump received by Origins Laboratory, Inc. October 13, 2017. This project is associated with Origins project number Y710205-05.

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



Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Houston 17-2L Sump

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01@4'	Y710205-05	Soil	October 13, 2017 13:38	10/13/2017 16:16

Per the email from Mike on 10/16/17, the project name has been changed to Houston 17-2L Sump.

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.

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

www.originslaboratory.com
 1710205
 page 1 of 1
 Client: APL
 Project Manager: Bob Cornez
 Project Name: Houston 17-2L Sump
 Project Number: _____
 Address: _____
 Telephone Number: _____
 Email Address: Cornez@tasman-geo.com
 Samples Collected By: APL

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix		Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Groundwater	Soil	Air Summ		
N01e3'	10/13/17	1330	2					α		OR HOLD	1
S01e3'		1332	2					κ		ON HOLD	2
E01e3'		1334	2					κ		ON HOLD	3
W01e3'		1336	2					α		ON HOLD	4
B01e4'		1338	2					κ			5
B001e6'		1340	2					κ		ON HOLD	6
											7
											8
											9
											10

Relinquished By: APL Date: 10/13/17 Time: 1016
 Relinquished By: _____ Date: _____ Time: _____

Received By: _____ Date: _____ Time: _____
 Received By: _____ Date: 10/13/17 Time: 1016

Turnaround Time: 24 Hr 48 Hr 72 Hr
 Same Day Standard

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

Origins Laboratory, Inc.

Jefe 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.

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 7710205

Client: Tasman

Client Project ID: UMA - Houston 17-2L Sump

Checklist Completed by: Dea

Shipped Via: Hand Delivered

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

Date/time completed: 10-13-11 1723

Airbill #: NA

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

Cooler Number/Temperature: 1 / 3.3 °C 1 / _____ °C 1 / _____ °C (Describe) _____ °C

Thermometer ID: 1003

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"/>			
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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input checked="" type="checkbox"/>			pH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<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 ⁽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 HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)		<input checked="" 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) [Signature]

10-13-11 1723
 Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

B01@4'
10/13/2017 1:38:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y710205-05 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B7J1302	10/13/2017	10/13/2017	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 86.0 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	7.57	5.00	mg/kg	25	B7J1301	10/13/2017	10/13/2017	
Benzene	ND	0.050	"	"	"	"	"	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4 97.7 % 70-130 " " "
Surrogate: Toluene-d8 100 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 104 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.40		pH Units	1	B7J1303	10/13/2017	10/13/2017	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.268		mmhos/cm	"	B7J1304	10/13/2017	"	
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Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Blank (B7J1301-BLK1)

Prepared: 10/13/2017 Analyzed: 10/13/2017

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	62		ug/kg	62.5		99.5	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	70-130			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)										
Blank (B7J1301-BLK2)										
					Prepared: 10/13/2017 Analyzed: 10/13/2017					
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		90.5	70-130			
Surrogate: Toluene-d8	69		"	62.5		110	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.1	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Blank (B7J1301-BLK3)

Prepared: 10/13/2017 Analyzed: 10/13/2017

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	62		ug/kg	62.5		98.8	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.1	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.3	70-130			

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 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

LCS (B7J1301-BS1)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Benzene	0.096	0.002	mg/kg	0.100		96.3	77.1-124			
Toluene	0.096	0.002	"	0.100		95.6	74.5-128			
Ethylbenzene	0.108	0.002	"	0.100		108	66.4-127			
m,p-Xylene	0.193	0.004	"	0.200		96.7	76.6-124			
o-Xylene	0.101	0.002	"	0.100		101	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		96.0	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		95.8	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

LCS (B7J1301-BS2)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Benzene	0.098	0.002	mg/kg	0.100		97.8	77.1-124			
Toluene	0.104	0.002	"	0.100		104	74.5-128			
Ethylbenzene	0.096	0.002	"	0.100		95.5	66.4-127			
m,p-Xylene	0.172	0.004	"	0.200		86.2	76.6-124			
o-Xylene	0.091	0.002	"	0.100		91.5	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		87.9	70-130			
Surrogate: Toluene-d8	69		"	62.5		110	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.9	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

LCS (B7J1301-BS3)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Benzene	0.108	0.002	mg/kg	0.100		108	77.1-124			
Toluene	0.111	0.002	"	0.100		111	74.5-128			
Ethylbenzene	0.108	0.002	"	0.100		108	66.4-127			
m,p-Xylene	0.229	0.004	"	0.200		114	76.6-124			
o-Xylene	0.108	0.002	"	0.100		108	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.8	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Matrix Spike (B7J1301-MS1)	Source: Y710135-01			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.101	0.002	mg/kg	0.100	ND	101	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	99.1	65.1-130			
Ethylbenzene	0.104	0.002	"	0.100	ND	104	62.2-130			
m,p-Xylene	0.205	0.004	"	0.200	ND	103	46.5-137			
o-Xylene	0.099	0.002	"	0.100	ND	99.0	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	55		ug/kg	62.5		87.6	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		96.7	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Matrix Spike (B7J1301-MS2)	Source: Y710135-02			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.093	0.002	mg/kg	0.100	ND	93.0	71.8-126			
Toluene	0.091	0.002	"	0.100	ND	90.6	65.1-130			
Ethylbenzene	0.091	0.002	"	0.100	ND	91.1	62.2-130			
m,p-Xylene	0.176	0.004	"	0.200	ND	88.2	46.5-137			
o-Xylene	0.088	0.002	"	0.100	ND	87.8	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	58		ug/kg	62.5		92.7	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	59		"	62.5		94.9	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Matrix Spike (B7J1301-MS3)	Source: Y710206-04			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.112	0.002	mg/kg	0.100	ND	112	71.8-126			
Toluene	0.112	0.002	"	0.100	ND	112	65.1-130			
Ethylbenzene	0.113	0.002	"	0.100	ND	113	62.2-130			
m,p-Xylene	0.239	0.004	"	0.200	ND	119	46.5-137			
o-Xylene	0.112	0.002	"	0.100	ND	112	54.2-134			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	70		<i>ug/kg</i>	62.5		112	70-130			
<i>Surrogate: Toluene-d8</i>	61		"	62.5		97.8	70-130			
<i>Surrogate: 4-Bromofluorobenzene</i>	63		"	62.5		101	70-130			

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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Houston 17-2L Sump

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 B7J1301 - EPA 5030 (soil)

Matrix Spike Dup (B7J1301-MSD1)	Source: Y710135-01			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.095	0.002	mg/kg	0.100	ND	95.2	71.8-126	6.23	11.3	
Toluene	0.093	0.002	"	0.100	ND	93.3	65.1-130	6.03	15.4	
Ethylbenzene	0.097	0.002	"	0.100	ND	97.0	62.2-130	6.83	19.6	
m,p-Xylene	0.193	0.004	"	0.200	ND	96.3	46.5-137	6.37	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	94.6	54.2-134	4.55	17.9	
Surrogate: 1,2-Dichloroethane-d4	56		ug/kg	62.5		88.9	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.1	70-130			

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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 B7J1301 - EPA 5030 (soil)

Matrix Spike Dup (B7J1301-MSD2)	Source: Y710135-02			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.097	0.002	mg/kg	0.100	ND	97.0	71.8-126	4.15	11.3	
Toluene	0.095	0.002	"	0.100	ND	95.3	65.1-130	5.03	15.4	
Ethylbenzene	0.097	0.002	"	0.100	ND	96.7	62.2-130	6.03	19.6	
m,p-Xylene	0.189	0.004	"	0.200	ND	94.4	46.5-137	6.77	19.2	
o-Xylene	0.095	0.002	"	0.100	ND	94.7	54.2-134	7.52	17.9	
Surrogate: 1,2-Dichloroethane-d4	57		ug/kg	62.5		91.2	70-130			
Surrogate: Toluene-d8	64		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		96.8	70-130			

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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 B7J1301 - EPA 5030 (soil)

Matrix Spike Dup (B7J1301-MSD3)	Source: Y710206-04			Prepared: 10/13/2017 Analyzed: 10/13/2017						
Benzene	0.109	0.002	mg/kg	0.100	ND	109	71.8-126	3.01	11.3	
Toluene	0.113	0.002	"	0.100	ND	113	65.1-130	0.851	15.4	
Ethylbenzene	0.111	0.002	"	0.100	ND	111	62.2-130	1.89	19.6	
m,p-Xylene	0.237	0.004	"	0.200	ND	119	46.5-137	0.554	19.2	
o-Xylene	0.112	0.002	"	0.100	ND	112	54.2-134	0.107	17.9	
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.7	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	70-130			

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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 B7J1302 - EPA 3550B

Blank (B7J1302-BLK1)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	41		"	50.0		82.4	59-131			

Blank (B7J1302-BLK2)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Diesel (C10-C28)	ND	50.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	200	"							U
Surrogate: o-Terphenyl	45		"	50.0		89.5	59-131			

LCS (B7J1302-BS1)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Diesel (C10-C28)	985	50.0	mg/kg	1000		98.5	64-121			
Residual Range Organics (C28-C40)	974	200	"	1000		97.4	58-124			
Surrogate: o-Terphenyl	52		"	50.0		104	59-131			

LCS (B7J1302-BS2)

Prepared: 10/13/2017 Analyzed: 10/13/2017

Diesel (C10-C28)	1020	50.0	mg/kg	1000		102	64-121			
Residual Range Organics (C28-C40)	1020	200	"	1000		102	58-124			
Surrogate: o-Terphenyl	52		"	50.0		104	59-131			

Matrix Spike (B7J1302-MS1)

Source: Y710170-02

Prepared: 10/13/2017 Analyzed: 10/13/2017

Diesel (C10-C28)	931	50.0	mg/kg	1000	ND	93.1	53-125			
Residual Range Organics (C28-C40)	860	200	"	1000	ND	86.0	47-133			

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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
Batch B7J1302 - EPA 3550B										
Matrix Spike (B7J1302-MS1)			Source: Y710170-02		Prepared: 10/13/2017 Analyzed: 10/13/2017					
Surrogate: o-Terphenyl	51		mg/kg	50.0		103	59-131			
Matrix Spike (B7J1302-MS2)			Source: Y710206-04		Prepared: 10/13/2017 Analyzed: 10/13/2017					
Diesel (C10-C28)	897	50.0	mg/kg	1000	ND	89.7	53-125			
Residual Range Organics (C28-C40)	809	200	"	1000	ND	80.9	47-133			
Surrogate: o-Terphenyl	46		"	50.0		91.3	59-131			
Matrix Spike Dup (B7J1302-MSD1)			Source: Y710170-02		Prepared: 10/13/2017 Analyzed: 10/13/2017					
Diesel (C10-C28)	913	50.0	mg/kg	1000	ND	91.3	53-125	1.98	20	
Residual Range Organics (C28-C40)	837	200	"	1000	ND	83.7	47-133	2.66	20	
Surrogate: o-Terphenyl	49		"	50.0		97.5	59-131			
Matrix Spike Dup (B7J1302-MSD2)			Source: Y710206-04		Prepared: 10/13/2017 Analyzed: 10/13/2017					
Diesel (C10-C28)	918	50.0	mg/kg	1000	ND	91.8	53-125	2.27	20	
Residual Range Organics (C28-C40)	856	200	"	1000	ND	85.6	47-133	5.67	20	
Surrogate: o-Terphenyl	45		"	50.0		91.0	59-131			

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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 B7J1303 - NO PREP										
Duplicate (B7J1303-DUP1)		Source: Y710170-02			Prepared: 10/13/2017 Analyzed: 10/13/2017					
pH	7.05		pH Units		7.12			0.988	25	
Batch B7J1304 - NO PREP										
Blank (B7J1304-BLK1)		Prepared: 10/12/2017 Analyzed: 10/12/2017								
Specific Conductance (EC)	0.00290		mmhos/cm							
Duplicate (B7J1304-DUP1)		Source: Y710170-02			Prepared: 10/13/2017 Analyzed: 10/13/2017					
Specific Conductance (EC)	0.0228		mmhos/cm		0.0181			23.0	25	

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Bob Cornez
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Project: KMG - Houston 17-2L Sump

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.

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