



August 12, 2016

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

**Re: Sump Closure Summary Letter Report
JELTS 16C-19HZ (Jelts 37C, 16N, 39C-19HZ)
API: 05-123-36568
Facility ID: 431353
Legal: NENE Sec 19-T1N-R67W
Remediation Project #8961**

Dear Mr. Mickelson:

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. This Report is being submitted under the Form 27 Management Plan for Closure of Produced Water Vessels, which has been assigned Remediation #8961 by the COGCC. Tasman provided environmental services at the site that included collection of confirmation soil samples from the excavation and documentation of field activities, 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 on June 16, 2016. Soil sampling activities, laboratory analytical results, and conclusions are presented below. The general site layout and sample locations are provided in the attached site map (Attachment A).

The final extent of the excavation measured approximately 15 feet by 15 feet with an approximate depth of 3 feet below ground surface (bgs). No impacted material was removed from the site during closure activities. A liner was present at the location, and groundwater was not encountered in the excavation.

Confirmation soil samples were collected from sidewalls of the excavation area at approximately 3 feet bgs. A soil sample was not collected from the base of the excavation due to the presence of a liner. The soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). The confirmation soil sample collected from the east sidewall of the excavation area 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. Soil analytical data is summarized in Table 1 and the laboratory analytical report is provided in Attachment B.

Results

Soil analytical results from the sample collected from the east sidewall of the final extent of the excavation area indicated that BTEX and TPH concentrations were below the applicable COGCC Table 910-1 standards. The remaining three soil samples collected from the remaining sidewalls of the excavation area were not submitted for laboratory analysis as analytical data confirmed the absence of petroleum hydrocarbon impacts above regulatory standards.

Conclusions

Analytical results described herein confirm BTEX and TPH impacts are not present at concentrations above applicable regulatory standards in the former sump location. Consequently, 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 site 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 blue ink, appearing to read 'Brock Nelson', written in a cursive style.

Brock Nelson
Project Geologist

Attachments:

Table 1 – Soil Sample Results Summary Table
Attachment A – Site Map
Attachment B – Laboratory Analytical Report

Table

TABLE 1
JELTS 16C-19HZ (Jelts 37C, 16N, 39C-19HZ)
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
E01 @3'	06/16/16	3	<0.050	<0.050	<0.050	0.058	14.1	<25.0	<100	0.169	8.49

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective March 16, 2016.

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 1



Legend

-  Excavation extent
-  Soil sample location

Notes

All locations are approximate unless otherwise noted.

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

0 ft. 10 ft. 20 ft.

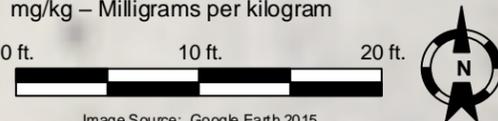


Image Source: Google Earth 2015

DATE:	August 1, 2016
DESIGNED BY:	K. Forsmark
DRAWN BY:	M. Petersen



Kerr-McGee Oil and Gas Onshore, LP
JELTS 16C-19HZ (Jelts 37C, 16N, 39C-19HZ)
 NENE, Section 19, Township 1 North, Range 67 West
 Weld County, Colorado

Sample Location
Map

FIGURE
1

Attachment A

June 17, 2016

Tasman Geosciences

Bob Cornez

6899 Pecos Street, Unit C

Denver CO 80211

Project Name - KMG - Jelts 37C, 16N,39C-19Hz Project Number - [none]

Attached are your analytical results for KMG - Jelts 37C, 16N,39C-19Hz received by Origins Laboratory, Inc. June 16, 2016. This project is associated with Origins project number X606213-03.

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 - Jelts 37C, 16N,39C-19Hz

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E01 @ 3'	X606213-03	Soil	June 16, 2016 13:05	06/16/2016 16:56

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 - Jelts 37C, 16N,39C-19Hz

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X606213

Client: Tasman

Client Project ID: Jelts 37C, 16N, 39C-19Hz

Checklist Completed by: Jeff Smith

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

Date/time completed: 6/16/12

Airbill #: NA

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

Cooler Number/Temperature: 1 / 5.8 °C 1 / °C 1 / °C (Describe) 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 ⁽¹⁾ ?	X			
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		✓		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		✓		
Were all samples received intact ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	X			PH
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	✓			
For volatiles in water — is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			✓	
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)			✓	
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.

Jeff Smith
 Reviewed by (Project Manager)

6/16/12
 Date/Time Reviewed

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Jelts 37C, 16N,39C-19Hz

E01 @ 3'
6/16/2016 1:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X606213-03 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	25.0	mg/kg	1	B6F1601	06/16/2016	06/16/2016	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl 81.9 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	14.1	5.00	mg/kg	25	B6F1602	06/16/2016	06/16/2016	
Benzene	ND	0.050	"	"	"	"	"	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	0.058	0.050	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4 94.7 % 70-130 " " "
Surrogate: Toluene-d8 105 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 105 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.49		pH Units	1	B6F1603	06/16/2016	06/16/2016	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.169		mmhos/cm	"	B6F1604	06/16/2016	06/16/2016	
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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 - Jelts 37C, 16N,39C-19Hz

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 B6F1602 - EPA 5030 (soil)

Blank (B6F1602-BLK1)

Prepared: 06/16/2016 Analyzed: 06/16/2016

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		98.7	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	65		"	62.5		105	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 - Jelts 37C, 16N,39C-19Hz

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 B6F1602 - EPA 5030 (soil)

LCS (B6F1602-BS1)

Prepared: 06/16/2016 Analyzed: 06/16/2016

Benzene	0.100	0.002	mg/kg	0.100		99.5	77.1-124			
Toluene	0.101	0.002	"	0.100		101	74.5-128			
Ethylbenzene	0.106	0.002	"	0.100		106	66.4-127			
m,p-Xylene	0.221	0.004	"	0.200		111	76.6-124			
o-Xylene	0.108	0.002	"	0.100		108	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		ug/kg	62.5		96.4	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.9	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

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 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Jelts 37C, 16N,39C-19Hz

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 B6F1602 - EPA 5030 (soil)

Matrix Spike (B6F1602-MS1)	Source: X606201-01			Prepared: 06/16/2016 Analyzed: 06/16/2016						
Benzene	0.088	0.002	mg/kg	0.100	0.006	82.5	71.8-126			
Toluene	0.081	0.002	"	0.100	ND	80.5	65.1-130			
Ethylbenzene	0.079	0.002	"	0.100	ND	79.0	62.2-130			
m,p-Xylene	0.162	0.004	"	0.200	ND	80.9	46.5-137			
o-Xylene	0.082	0.002	"	0.100	ND	82.1	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.6	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		105	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 - Jelts 37C, 16N,39C-19Hz

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 B6F1602 - EPA 5030 (soil)										
Matrix Spike Dup (B6F1602-MSD1)			Source: X606201-01			Prepared: 06/16/2016 Analyzed: 06/16/2016				
Benzene	0.103	0.002	mg/kg	0.100	0.006	96.8	71.8-126	14.9	11.3	QR-02
Toluene	0.087	0.002	"	0.100	ND	87.4	65.1-130	8.15	15.4	
Ethylbenzene	0.087	0.002	"	0.100	ND	87.0	62.2-130	9.73	19.6	
m,p-Xylene	0.179	0.004	"	0.200	ND	89.5	46.5-137	10.0	19.2	
o-Xylene	0.089	0.002	"	0.100	ND	89.1	54.2-134	8.20	17.9	
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	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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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Jelts 37C, 16N,39C-19Hz

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 B6F1601 - EPA 3550B

Blank (B6F1601-BLK1)

Prepared: 06/16/2016 Analyzed: 06/16/2016

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			

LCS (B6F1601-BS1)

Prepared: 06/16/2016 Analyzed: 06/16/2016

Diesel (C10-C28)	878	50.0	mg/kg	1000		87.8	64-121			
Residual Range Organics (C28-C40)	908	200	"	1000		90.8	58-124			
Surrogate: o-Terphenyl	49		"	50.0		97.9	59-131			

Matrix Spike (B6F1601-MS1)

Source: X606201-01

Prepared: 06/16/2016 Analyzed: 06/16/2016

Diesel (C10-C28)	872	50.0	mg/kg	1000	15.0	85.7	53-125			
Residual Range Organics (C28-C40)	828	200	"	1000	17.8	81.0	47-133			
Surrogate: o-Terphenyl	47		"	50.0		93.8	59-131			

Matrix Spike Dup (B6F1601-MSD1)

Source: X606201-01

Prepared: 06/16/2016 Analyzed: 06/16/2016

Diesel (C10-C28)	845	50.0	mg/kg	1000	15.0	83.0	53-125	3.14	20	
Residual Range Organics (C28-C40)	808	200	"	1000	17.8	79.0	47-133	2.46	20	
Surrogate: o-Terphenyl	42		"	50.0		84.4	59-131			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Bob Cornez
 Project Number: [none]
 Project: KMG - Jelts 37C, 16N,39C-19Hz

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 B6F1603 - NO PREP										
Duplicate (B6F1603-DUP1)		Source: X606201-01			Prepared: 06/16/2016 Analyzed: 06/16/2016					
pH	7.61		pH Units		7.60			0.131	25	
Batch B6F1604 - NO PREP										
Blank (B6F1604-BLK1)		Prepared: 06/16/2016 Analyzed: 06/16/2016								
Specific Conductance (EC)	0.00250		mmhos/cm							
Duplicate (B6F1604-DUP1)		Source: X606201-01			Prepared: 06/16/2016 Analyzed: 06/16/2016					
Specific Conductance (EC)	0.543		mmhos/cm		0.538			0.925	25	

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Bob Cornez
Project Number: [none]
Project: KMG - Jelts 37C, 16N,39C-19Hz

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.



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