



November 16, 2015

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

**Re: Sump Replacement Summary Letter Report
Thomason 6-16
API: 05-123-33480
Facility ID: 329312
Legal: NESW Sec 16-T2N-R65W
Remediation Project #8961**

Dear Mr. LaRue:

On behalf of Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee), Tasman Geosciences, Inc. (Tasman) has prepared this Sump Replacement 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/Replacement 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 replacement of the produced water sump on June 15, 2015. 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 18 feet by 18 feet with an approximate depth of 3 feet below ground surface (bgs). No impacted material was removed during the replacement of the produced water sump at this location. A liner was present at the location, and groundwater was not encountered in the excavation.

Confirmation soil samples were collected from the sidewalls of the excavation area at approximately 3 feet bgs. No soil sample was collected from the base of the excavation area due to the presence of a liner. Soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). The confirmation soil sample collected from the west 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 laboratory analytical reports are provided in Attachment B.

Results

Soil analytical results from the sample collected from the west 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 east, south, and north 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 replaced and the excavation area was backfilled and contoured to match pre-existing site conditions. The production facility remains operational.

Please contact me at (720) 409-8791 if you have any questions regarding this report or require additional information.

Sincerely,

A handwritten signature in blue ink that reads 'Christine Wasko'.

Christine Wasko
Project Scientist

Attachments:

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

Table

TABLE 1
THOMASON 6-16
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
W01@3'	06/15/15	3.0	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0661	8.35

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.

Attachment A



W01@3'
 B <0.002 mg/kg
 TPH <200 mg/kg

18 ft.

18 ft.

SUMP

AST

AST

AST

AST

Legend

- Excavation Extent
- Steel Berm
- Soil Sample Location
- Existing Infrastructure

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:	November 16, 2015
DESIGNED BY:	B. Nelson
DRAWN BY:	B. Nelson



Kerr-McGee Oil and Gas Onshore, LP
Thomason 6-16
 NESW, Section 16, Township 2 North, Range 65 West
 Weld County, Colorado

Sample Location
 Map

FIGURE
 1

Attachment B

June 16, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - Thomason 6 -16

Project Number - [none]

Attached are your analytical results for KMG - Thomason 6 -16 received by Origins Laboratory, Inc. June 15, 2015. This project is associated with Origins project number X506181-01.

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



Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - Thomason 6 -16

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
W01 @ 3'	X506181-01	Soil	June 15, 2015 14:58	06/15/2015 16:35

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

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XS06181

Client: Tasman

Client Project ID: Thomason 6-16

Checklist Completed by: Jeff Smith

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

Date/time completed: 6/15/15

Airbill #: 325

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

Cooler Number/Temperature: 1 / 4.1 °C 1 °C 1 °C (Describe)

Thermometer ID: T203

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"/>			
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 HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +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.

Jeff Smith
 Reviewed by (Project Manager)

6/15/15
 Date/Time Reviewed

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

W01 @ 3'
6/15/2015 2:58:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506181-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5F15010	06/15/2015	06/15/2015	
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"	

Surrogate: o-Terphenyl 89.2 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5F15007	06/15/2015	06/15/2015	
Benzene	ND	0.002	"	"	"	"	"	
Toluene	ND	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	
Xylenes, total	ND	0.002	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4 98.3 % 70-130 " " "
Surrogate: Toluene-d8 98.9 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 101 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.35		pH Units	1	5F15011	06/15/2015	06/15/2015	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0661		mmhos/cm	"	5F15012	"	06/15/2015	
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Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15007 - EPA 5030 (soil)

Blank (5F15007-BLK1)

Prepared: 06/15/2015 Analyzed: 06/15/2015

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							
Benzene	ND	0.002	"							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	66.1		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	56.5		"	62.5		90.4	70-130			
Surrogate: 4-Bromofluorobenzene	62.2		"	62.5		99.5	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.

Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15007 - EPA 5030 (soil)

LCS (5F15007-BS1)

Prepared: 06/15/2015 Analyzed: 06/15/2015

Benzene	0.097	0.002	mg/kg	0.100		97.4	77.1-124			
Toluene	0.087	0.002	"	0.100		87.2	74.5-128			
Ethylbenzene	0.087	0.002	"	0.100		86.8	66.4-127			
m,p-Xylene	0.175	0.004	"	0.200		87.5	76.6-124			
o-Xylene	0.090	0.002	"	0.100		90.1	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60.6		ug/kg	62.5		97.0	70-130			
Surrogate: Toluene-d8	58.0		"	62.5		92.8	70-130			
Surrogate: 4-Bromofluorobenzene	62.2		"	62.5		99.5	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15007 - EPA 5030 (soil)

Matrix Spike (5F15007-MS1)	Source: X506152-01			Prepared: 06/15/2015 Analyzed: 06/15/2015						
Benzene	0.106	0.002	mg/kg	0.100	ND	106	71.8-126			
Toluene	0.089	0.002	"	0.100	ND	88.8	65.1-130			
Ethylbenzene	0.086	0.002	"	0.100	ND	86.0	62.2-130			
m,p-Xylene	0.174	0.004	"	0.200	ND	87.1	46.5-137			
o-Xylene	0.091	0.002	"	0.100	ND	90.7	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	63.7		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	56.9		"	62.5		91.1	70-130			
Surrogate: 4-Bromofluorobenzene	62.7		"	62.5		100	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15007 - EPA 5030 (soil)

Matrix Spike Dup (5F15007-MSD1)	Source: X506152-01			Prepared: 06/15/2015 Analyzed: 06/15/2015						
Benzene	0.108	0.002	mg/kg	0.100	ND	108	71.8-126	2.56	11.3	
Toluene	0.093	0.002	"	0.100	ND	93.1	65.1-130	4.73	15.4	
Ethylbenzene	0.088	0.002	"	0.100	ND	88.0	62.2-130	2.28	19.6	
m,p-Xylene	0.178	0.004	"	0.200	ND	89.0	46.5-137	2.25	19.2	
o-Xylene	0.093	0.002	"	0.100	ND	92.8	54.2-134	2.27	17.9	
Surrogate: 1,2-Dichloroethane-d4	63.8		ug/kg	62.5		102	70-130			
Surrogate: Toluene-d8	57.8		"	62.5		92.5	70-130			
Surrogate: 4-Bromofluorobenzene	61.5		"	62.5		98.5	70-130			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15010 - EPA 3580

Blank (5F15010-BLK1)

Prepared: 06/15/2015 Analyzed: 06/15/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	42		"	50.0		84.1	59-131			

LCS (5F15010-BS1)

Prepared: 06/15/2015 Analyzed: 06/15/2015

Diesel (C10-C28)	880	50	mg/kg	1000		87.7	64-121			
Residual Range Organics (C28-C36)	1100	200	"	1000		111	58-124			
Surrogate: o-Terphenyl	48		"	50.0		96.5	59-131			

Matrix Spike (5F15010-MS1)

Source: X506175-01

Prepared: 06/15/2015 Analyzed: 06/15/2015

Diesel (C10-C28)	900	50	mg/kg	1000	21	87.7	53-125			
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	110	47-133			
Surrogate: o-Terphenyl	47		"	50.0		94.8	59-131			

Matrix Spike Dup (5F15010-MSD1)

Source: X506175-01

Prepared: 06/15/2015 Analyzed: 06/15/2015

Diesel (C10-C28)	940	50	mg/kg	1000	21	91.9	53-125	4.61	20	
Residual Range Organics (C28-C36)	1100	200	"	1000	ND	114	47-133	3.68	20	
Surrogate: o-Terphenyl	49		"	50.0		97.5	59-131			

Origins Laboratory, Inc.



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Tasman Geosciences
 6899 Pecos Street, Unit C
 Denver CO 80211

Christine Wasko
 Project Number: [none]
 Project: KMG - Thomason 6 -16

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 5F15011 - NO PREP										
Duplicate (5F15011-DUP1)		Source: X506172-01			Prepared: 06/15/2015 Analyzed: 06/15/2015					
pH	8.37		pH Units		8.55			2.13	25	
Batch 5F15012 - NO PREP										
Blank (5F15012-BLK1)		Prepared: 06/15/2015 Analyzed: 06/15/2015								
Specific Conductance (EC)	0.00260		mmhos/cm							
Duplicate (5F15012-DUP1)		Source: X506172-01			Prepared: 06/15/2015 Analyzed: 06/15/2015					
Specific Conductance (EC)	0.239		mmhos/cm		0.214			11.0	25	

Origins Laboratory, Inc.



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Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - Thomason 6 -16

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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Jen Pellegrini For Noelle Doyle Mathis, President