



May 9, 2016

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

**Re: Sump Closure Summary Letter Report  
Vynckier W-62N66W29SWNE (Vynckier W 29-18)  
API: 05-123-30219  
Facility ID: 410160  
Legal: SWNE Sec 29-T2N-R66W  
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 September 2, 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 14 feet by 12 feet with an approximate depth of 5 feet below ground surface (bgs). No impacted material was removed from the site during closure activities. A liner was not present at the location, and groundwater was not encountered in the excavation.

Confirmation soil samples were collected from the base and sidewalls of the excavation area at approximately 5 feet and 4 feet bgs, respectively. Soil samples were field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). The confirmation soil sample collected from the base 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 base 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 four soil samples collected from the 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 'Daniel Wade', is positioned above the printed name.

Daniel Wade, P.G.  
Senior Geologist

## **Attachments:**

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

## **Table**

**TABLE 1**  
**VYNCKIER W-62N66W29SWNE (VYNCKIER W 29-18)**  
**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)
<b>COGCC standards for soil (mg/kg) <sup>(1)</sup></b>			<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>			<b>4 mmhos/cm or 2x BG</b>	<b>6-9</b>
B01@5'	09/02/15	5	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.0901	8.49

**Notes:**

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective January 1, 2015.

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**



DATE:	May 11, 2016
DESIGNED BY:	B. Nelson
DRAWN BY:	B. Nelson



**Kerr-McGee Oil and Gas Onshore, LP**  
**Vynckier W-62N66W29SWNE (Vynckier W 29-18)**  
 SWNE, Section 29, Township 2 North, Range 66 West  
 Weld County, Colorado

Sample Location  
 Map

**FIGURE**  
**1**

**Attachment B**

September 03, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver CO 80211

Project Name - KMG - Vynckier W 29-18

Project Number - [none]

Attached are your analytical results for KMG - Vynckier W 29-18 received by Origins Laboratory, Inc. September 02, 2015. This project is associated with Origins project number X509032-05.

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

Christine Wasko  
Project Number: [none]  
Project: KMG - Vynckier W 29-18

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 5'	X509032-05	Soil	September 2, 2015 15:36	09/02/2015 17:00

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 - Vynckier W 29-18

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: XS09032 Client: Tasman  
 Client Project ID: Vynckier W 29-18  
 Checklist Completed by: Jeff Smith Shipped Via: Pick Up  
 Date/time completed: 9/2/15 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Airbill #: NA  
 Matrix(s) Received: (Check all that apply):  Soil/Solid  Water  Other: \_\_\_\_\_  
 Cooler Number/Temperature: \_\_\_\_\_ / 4.4 °C \_\_\_\_\_ / \_\_\_\_\_ °C \_\_\_\_\_ / \_\_\_\_\_ °C (Describe)  
 Thermometer ID: 7003

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

Jeff Smith Reviewed by (Project Manager) 9/2/15 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 - Vynckier W 29-18

**B01 @ 5'**  
**9/2/2015 3:36:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X509032-05 (Soil)**

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	ND	50	mg/kg	1	5102010	09/02/2015	09/02/2015	
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"	

*Surrogate: o-Terphenyl* 86.8 % 59-131 " " "

**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5102013	09/02/2015	09/02/2015	
Benzene	ND	0.002	"	"	"	"	"	
Toluene	ND	0.002	"	"	"	"	"	
Ethylbenzene	ND	0.002	"	"	"	"	"	
Xylenes, total	ND	0.002	"	"	"	"	"	

*Surrogate: 1,2-Dichloroethane-d4* 117 % 70-130 " " "  
*Surrogate: Toluene-d8* 102 % 70-130 " " "  
*Surrogate: 4-Bromofluorobenzene* 104 % 70-130 " " "

**pH in Soil by EPA 9045D**

pH	8.49		pH Units	1	5102011	09/02/2015	09/02/2015	
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.0901		mmhos/cm	"	5102012	"	09/02/2015	
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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 - Vynckier W 29-18

**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 5102013 - EPA 5030 (soil)**

**Blank (5102013-BLK1)**

Prepared: 09/02/2015 Analyzed: 09/02/2015

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	68.9		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	62.6		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	64.0		"	62.5		102	70-130			

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 6899 Pecos Street, Unit C  
 Denver CO 80211

Christine Wasko  
 Project Number: [none]  
 Project: KMG - Vynckier W 29-18

**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 5102013 - EPA 5030 (soil)**

**LCS (5102013-BS1)**

Prepared: 09/02/2015 Analyzed: 09/02/2015

Benzene	0.104	0.002	mg/kg	0.100		104	77.1-124			
Toluene	0.105	0.002	"	0.100		105	74.5-128			
Ethylbenzene	0.101	0.002	"	0.100		101	66.4-127			
m,p-Xylene	0.196	0.004	"	0.200		98.2	76.6-124			
o-Xylene	0.099	0.002	"	0.100		98.8	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	68.0		ug/kg	62.5		109	70-130			
Surrogate: Toluene-d8	63.2		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	65.5		"	62.5		105	70-130			

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Christine Wasko  
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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 5102013 - EPA 5030 (soil)

Matrix Spike (5102013-MS1)	Source: X509032-05			Prepared: 09/02/2015 Analyzed: 09/02/2015						
Benzene	0.095	0.002	mg/kg	0.100	ND	94.7	71.8-126			
Toluene	0.095	0.002	"	0.100	ND	94.6	65.1-130			
Ethylbenzene	0.091	0.002	"	0.100	ND	91.3	62.2-130			
m,p-Xylene	0.184	0.004	"	0.200	ND	92.0	46.5-137			
o-Xylene	0.092	0.002	"	0.100	ND	92.1	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	68.6		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	61.6		"	62.5		98.5	70-130			
Surrogate: 4-Bromofluorobenzene	63.0		"	62.5		101	70-130			

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Tasman Geosciences  
 6899 Pecos Street, Unit C  
 Denver CO 80211

Christine Wasko  
 Project Number: [none]  
 Project: KMG - Vynckier W 29-18

**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 5102013 - EPA 5030 (soil)

Matrix Spike Dup (5102013-MSD1)	Source: X509032-05			Prepared: 09/02/2015 Analyzed: 09/02/2015						
Benzene	0.100	0.002	mg/kg	0.100	ND	99.9	71.8-126	5.38	11.3	
Toluene	0.101	0.002	"	0.100	ND	101	65.1-130	6.21	15.4	
Ethylbenzene	0.100	0.002	"	0.100	ND	100	62.2-130	9.51	19.6	
m,p-Xylene	0.190	0.004	"	0.200	ND	94.8	46.5-137	3.02	19.2	
o-Xylene	0.098	0.002	"	0.100	ND	98.2	54.2-134	6.43	17.9	
Surrogate: 1,2-Dichloroethane-d4	69.5		ug/kg	62.5		111	70-130			
Surrogate: Toluene-d8	63.3		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	65.7		"	62.5		105	70-130			

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 6899 Pecos Street, Unit C  
 Denver CO 80211

Christine Wasko  
 Project Number: [none]  
 Project: KMG - Vynckier W 29-18

**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 5102010 - EPA 3580**

**Blank (5102010-BLK1)**

Prepared: 09/02/2015 Analyzed: 09/02/2015

Diesel (C10-C28)	ND	50	mg/kg							
Residual Range Organics (C28-C36)	ND	200	"							
Surrogate: o-Terphenyl	36		"	50.0		72.3	59-131			

**LCS (5102010-BS1)**

Prepared: 09/02/2015 Analyzed: 09/02/2015

Diesel (C10-C28)	780	50	mg/kg	1000		77.7	64-121			
Residual Range Organics (C28-C36)	720	200	"	1000		72.4	58-124			
Surrogate: o-Terphenyl	40		"	50.0		80.5	59-131			

**Matrix Spike (5102010-MS1)**

**Source: X509032-05**

Prepared: 09/02/2015 Analyzed: 09/02/2015

Diesel (C10-C28)	830	50	mg/kg	1000	ND	82.9	53-125			
Residual Range Organics (C28-C36)	780	200	"	1000	19	75.7	47-133			
Surrogate: o-Terphenyl	37		"	50.0		73.8	59-131			

**Matrix Spike Dup (5102010-MSD1)**

**Source: X509032-05**

Prepared: 09/02/2015 Analyzed: 09/02/2015

Diesel (C10-C28)	790	50	mg/kg	1000	ND	78.9	53-125	4.92	20	
Residual Range Organics (C28-C36)	770	200	"	1000	19	75.0	47-133	0.904	20	
Surrogate: o-Terphenyl	39		"	50.0		78.9	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 - Vynckier W 29-18

**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 5I02011 - NO PREP</b>										
<b>Duplicate (5I02011-DUP1)</b>		<b>Source: X509032-05</b>			Prepared: 09/02/2015 Analyzed: 09/02/2015					
pH	9.37		pH Units		8.49			9.85	25	
<b>Batch 5I02012 - NO PREP</b>										
<b>Blank (5I02012-BLK1)</b>		Prepared: 09/02/2015 Analyzed: 09/02/2015								
Specific Conductance (EC)	0.00310		mmhos/cm							
<b>Duplicate (5I02012-DUP1)</b>		<b>Source: X509032-05</b>			Prepared: 09/02/2015 Analyzed: 09/02/2015					
Specific Conductance (EC)	0.0833		mmhos/cm		0.0901			7.84	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 - Vynckier W 29-18

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### 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