



September 15, 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
Brotemarkle 29C-13HZ (Brotemarkle 3N-13HZ)
API: 05-123-36399
Facility ID: 327093
Legal: SESW Sec 13-T3N-R66W
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 17, 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 25 feet by 21 feet with an approximate depth of 4 feet below ground surface (bgs). No impacted material was removed from the site during replacement activities. 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 4 feet bgs. A confirmation soil sample was not collected from the base of the excavation 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 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 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
BROTEMARKLE 29C-13HZ
(BROTEMARKLE 3N-13HZ)
SOIL SAMPLE RESULTS SUMMARY TABLE
KERR-McGEE OIL AND GAS ONSHORE LP

Sample ID	Date Sampled	Depth (feet 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	6 - 9
E01@4'	6/17/2015	4	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<200	0.102	8.16

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

mg/kg = Milligrams per kilogram

EC = Electrical conductivity

mmhos/cm = Millimhos per centimeter

bgs = Below ground surface

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

Attachment A

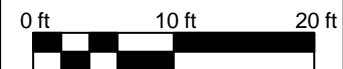


Surface
Drainage



B – Benzene
TPH – Total Petroleum Hydrocarbons
mg/kg – Milligrams Per Kilogram

Image Source:
Google Earth 2015



Facility Diagram

Kerr-McGee Oil and Gas Onshore, LP
Brotomarkle 29C-13HZ
(Brotomarkle 3N-13HZ)
SESW S13 T3N R66W
Weld County, CO



6899 Pecos St., Unit C
Denver, CO 80221

LEGEND

- Approximate Excavation Extent
- Former Infrastructure
- Existing Infrastructure
- Berm



Approximate Soil
Sample Location

FIGURE 1
SITE MAP

DRAWN BY: BRN

DATE: 9/14/2015

Attachment B



June 18, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

Project Name - KMG - Brotemarckle 3N-13Hz

Project Number - [none]

Attached are your analytical results for KMG - Brotemarckle 3N-13Hz received by Origins Laboratory, Inc. June 17, 2015. This project is associated with Origins project number X506211-01.

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

Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - Brotemarckle 3N-13Hz

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
E01@4'	X506211-01	Soil	June 17, 2015 12:57	06/17/2015 14:35

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.

Christine Wasko
Project Number: [none]
Project: KMG - Brotemarckle 3N-13Hz

ORIGINS

LABORATORY, INC

www.originslaboratory.com

page 1 of 1

Client: Tasman APC

Address: _____

Telephone Number: 720 409 8791

Email Address: awaska@tasman-apc.com

X506211

Project Manager: Christine Waska

Project Name: Brooklyn 3N-15H7

Project Number: _____

Samples Collected By: Kate Finnmark

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #		
E0104	6/17/15	1257	2	X					X		LOTEX 8200 DRO, ORO, SPS PH, EC, SAR (undil)	IFEC-HLO run SAR 1
												2
												3
												4
												5
												6
												7
												8
												9
												10
Relinquished By: <u>Kate</u>	Date: <u>6/17/15</u>											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: <u>14:30</u> Date: <u>6/17/15</u>

Date Results Needed _____

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.

Tasman Geosciences
6899 Pecos Street, Unit C
Denver CO 80211

Christine Wasko
Project Number: [none]
Project: KMG - Brotemarckle 3N-13Hz

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 4506211

Client: Tasman

Client Project ID: KMG - Brotemarckle 3N-13Hz

Checklist Completed by: Joe Henderson

Shipped Via: HL

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

Date/time completed: 6/17/15 1449

Airbill #: _____

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

Cooler Number/Temperature: 1 / 2.7 °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"/>	<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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<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 type="checkbox"/>	<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 type="checkbox"/>	<input type="checkbox"/>	<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]

Date/Time Reviewed 6/17/15

Origins Laboratory, Inc.

[Signature]

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 - Brotemarckle 3N-13Hz

E01@4'

6/17/2015 12:57:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X506211-01 (Soil)

DRO/RRO by EPA8015C

Diesel (C10-C28)	ND	50	mg/kg	1	5F17006	06/17/2015	06/17/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl 87.9 % 59-131 " " "

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	5F17005	06/17/2015	06/17/2015
Benzene	ND	0.002	"	"	"	"	"
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4 114 % 70-130 " " "
Surrogate: Toluene-d8 87.9 % 70-130 " " "
Surrogate: 4-Bromofluorobenzene 98.4 % 70-130 " " "

pH in Soil by EPA 9045D

pH	8.16		pH Units	1	5F17008	06/17/2015	06/17/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.102		mmhos/cm	"	5F17009	"	06/17/2015
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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 - Brotemarckle 3N-13Hz

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 5F17005 - EPA 5030 (soil)

Blank (5F17005-BLK1)

Prepared: 06/17/2015 Analyzed: 06/17/2015

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	62.9		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	63.1		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	64.4		"	62.5		103	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 - Brotemarckle 3N-13Hz

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 5F17005 - EPA 5030 (soil)										
LCS (5F17005-BS1)					Prepared: 06/17/2015 Analyzed: 06/17/2015					
Benzene	0.088	0.002	mg/kg	0.100		87.9	77.1-124			
Toluene	0.086	0.002	"	0.100		86.1	74.5-128			
Ethylbenzene	0.091	0.002	"	0.100		91.1	66.4-127			
m,p-Xylene	0.182	0.004	"	0.200		91.1	76.6-124			
o-Xylene	0.090	0.002	"	0.100		90.5	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	66.2		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	62.9		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62.1		"	62.5		99.3	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 - Brotemarckle 3N-13Hz

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 5F17005 - EPA 5030 (soil)

Matrix Spike (5F17005-MS1)		Source: X506199-01			Prepared: 06/17/2015 Analyzed: 06/17/2015					
Benzene	0.096	0.002	mg/kg	0.100	ND	96.4	71.8-126			
Toluene	0.090	0.002	"	0.100	ND	90.2	65.1-130			
Ethylbenzene	0.100	0.002	"	0.100	ND	100	62.2-130			
m,p-Xylene	0.195	0.004	"	0.200	ND	97.3	46.5-137			
o-Xylene	0.098	0.002	"	0.100	ND	98.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62.5		ug/kg	62.5		100	70-130			
Surrogate: Toluene-d8	61.3		"	62.5		98.0	70-130			
Surrogate: 4-Bromofluorobenzene	63.3		"	62.5		101	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 - Brotemarckle 3N-13Hz

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 5F17005 - EPA 5030 (soil)

Matrix Spike Dup (5F17005-MSD1)		Source: X506199-01			Prepared: 06/17/2015 Analyzed: 06/17/2015					
Benzene	0.092	0.002	mg/kg	0.100	ND	91.7	71.8-126	5.00	11.3	
Toluene	0.090	0.002	"	0.100	ND	90.5	65.1-130	0.243	15.4	
Ethylbenzene	0.095	0.002	"	0.100	ND	94.7	62.2-130	5.40	19.6	
m,p-Xylene	0.181	0.004	"	0.200	ND	90.3	46.5-137	7.47	19.2	
o-Xylene	0.092	0.002	"	0.100	ND	91.9	54.2-134	6.89	17.9	
Surrogate: 1,2-Dichloroethane-d4	62.2		ug/kg	62.5		99.6	70-130			
Surrogate: Toluene-d8	60.4		"	62.5		96.6	70-130			
Surrogate: 4-Bromofluorobenzene	62.9		"	62.5		101	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 - Brotemarckle 3N-13Hz

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 5F17006 - EPA 3580

Blank (5F17006-BLK1)

Prepared: 06/17/2015 Analyzed: 06/17/2015

Diesel (C10-C28) ND 50 mg/kg

Residual Range Organics (C28-C36) ND 200 "

Surrogate: o-Terphenyl 46 " 50.0 92.1 59-131

LCS (5F17006-BS1)

Prepared: 06/17/2015 Analyzed: 06/17/2015

Diesel (C10-C28) 890 50 mg/kg 64-121

Residual Range Organics (C28-C36) 740 200 " 1000 73.8 58-124

Surrogate: o-Terphenyl 48 " 50.0 95.4 59-131

LCS Dup (5F17006-BSD1)

Prepared: 06/17/2015 Analyzed: 06/17/2015

Diesel (C10-C28) 930 50 mg/kg 64-121 4.72 20

Residual Range Organics (C28-C36) 730 200 " 1000 73.0 58-124 1.15 20

Surrogate: o-Terphenyl 49 " 50.0 97.1 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 - Brotemarckle 3N-13Hz

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 5F17008 - NO PREP										
Duplicate (5F17008-DUP1)		Source: X506210-01			Prepared: 06/17/2015 Analyzed: 06/17/2015					
pH	8.00		pH Units		7.96			0.501	25	
Batch 5F17009 - NO PREP										
Blank (5F17009-BLK1)		Prepared: 06/17/2015 Analyzed: 06/17/2015								
Specific Conductance (EC)	0.00350		mmhos/cm							
Duplicate (5F17009-DUP1)		Source: X506210-01			Prepared: 06/17/2015 Analyzed: 06/17/2015					
Specific Conductance (EC)	0.126		mmhos/cm		0.118			5.99	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 - Brotemarckle 3N-13Hz

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.



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.