



May 10, 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**  
**Martin T. Hart Unit C-62N67W28SWSE (Martin Hart C GU#2)**  
**API: 05-123-10849**  
**Facility ID: 319196**  
**Legal: SWSE Sec 28-T2N-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 October 9, 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 10 feet by 10 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**  
**MARTIN T. HART UNIT C-62N67W28SWSE (MARTIN HART C GU#2)**  
**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'	10/09/15	5	<0.050	<0.050	<0.050	<0.050	47.0	210	<200	0.194	<b>9.14*</b>

**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.

\* = Sample collected from below the designated root zone.

ft. bgs = Feet below ground surface.

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

## **Attachment A**



DATE:	May 3, 2016
DESIGNED BY:	B. Nelson
DRAWN BY:	B. Nelson



Kerr-McGee Oil and Gas Onshore, LP  
Martin T. Hart Unit C-62N67W28SWSE (Martin Hart C GU#2)  
SWSE, Section 28, Township 2 North, Range 67 West  
Weld County, Colorado

Sample Location  
Map

FIGURE  
1

## **Attachment B**

October 12, 2015

Tasman Geosciences

Christine Wasko

6899 Pecos Street, Unit C

Denver

CO 80211

**Project Name - KMG - Martin Hart C GU #2**

**Project Number - [none]**

Attached are your analytical results for KMG - Martin Hart C GU #2 received by Origins Laboratory, Inc. October 09, 2015. This project is associated with Origins project number X510107-05.

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 - Martin Hart C GU #2

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 5	X510107-05	Soil	October 9, 2015 13:10	10/09/2015 15:45

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 - Martin Hart C GU #2

www.originslaboratory.com

page  of

X51007

Client: Tasman Co

Address:

Telephone Number: 912 230 4807

Email Address: CWasko@Tasman-Geo.com

Project Manager: Christine Wasko

Project Name: Martin Hart C GU #2

Project Number:

Samples Collected By: Jack Nelson

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa Canister #			Other
Al(OH) <sub>3</sub>	11/9/15	1302	2	X					X			1	
So(OH) <sub>3</sub>	11/9/15	1304	2	X					X			2	
Fe(OH) <sub>3</sub>	11/9/15	1306	2	X								3	
Mn(OH) <sub>2</sub>	11/9/15	1308	2	X								4	
Bo(OH) <sub>3</sub>	11/9/15	1310	2	X					X			5	65TEX 8216 TRA Dec 10 8015
												6	ECph
												7	
												8	
												9	
												10	

Relinquished By: [Signature]

Relinquished By: [Signature]

Date: 11/9/15

Date: 11/9/15

Received By: [Signature]

Received By: [Signature]

Date: 10/9/15

Date: 10/9/15

Turnaround Time: ☒ Same Day ☐ 24 Hr ☐ 48 Hr ☐ 72 Hr ☐ Standard ☒ 91

Date Results Needed:

Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X50107

Client: Tasman

Client Project ID: Martin Hart C GU #2

Checklist Completed by: Jesse Smith

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

Date/time completed: 10/9/15

Airbill #: NA

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

Cooler Number/Temperature: 1 / 9.1 °C        /        °C        /        °C        /        °C (Describe)

Thermometer ID: T053

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		Sampled Same Day
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.

Jesse Smith  
Reviewed by (Project Manager)

10/9/15  
Date/Time Reviewed

Origins Laboratory, Inc.

Jesse 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

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**B01 @ 5**  
**10/9/2015 1:10:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X510107-05 (Soil)**

**DRO/RRO by EPA8015C**

Diesel (C10-C28)	210	50	mg/kg	1	5J09007	10/09/2015	10/09/2015
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	99.2 %	59-131			"	"	"
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**GBTEX by EPA 8260C**

Gasoline Range Hydrocarbons	47.0	5.00	mg/kg	25	5J09008	10/09/2015	10/10/2015
Benzene	ND	0.050	"	"	"	"	"
Toluene	ND	0.050	"	"	"	"	"
Ethylbenzene	ND	0.050	"	"	"	"	"
Xylenes, total	ND	0.050	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	91.6 %	70-130			"	"	"
Surrogate: Toluene-d8	90.9 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	70-130			"	"	"

**pH in Soil by EPA 9045D**

pH	9.14		pH Units	1	5J09009	10/09/2015	10/09/2015
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**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	0.194		mmhos/cm	"	5J09010	10/09/2015	"
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Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

**Blank (5J09008-BLK1)**

Prepared: 10/09/2015 Analyzed: 10/09/2015

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	60.6		ug/kg	62.5		97.0	70-130			
Surrogate: Toluene-d8	60.0		"	62.5		95.9	70-130			
Surrogate: 4-Bromofluorobenzene	62.3		"	62.5		99.7	70-130			

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Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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
<b>Batch 5J09008 - EPA 5030 (soil)</b>										
<b>Blank (5J09008-BLK2)</b>					Prepared: 10/09/2015 Analyzed: 10/09/2015					
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	57.2		ug/kg	62.5		91.6	70-130			
Surrogate: Toluene-d8	57.3		"	62.5		91.7	70-130			
Surrogate: 4-Bromofluorobenzene	59.6		"	62.5		95.3	70-130			

Origins Laboratory, Inc.



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6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

**Blank (5J09008-BLK3)**

Prepared: 10/09/2015 Analyzed: 10/09/2015

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	59.4		ug/kg	62.5		95.0	70-130			
Surrogate: Toluene-d8	57.0		"	62.5		91.2	70-130			
Surrogate: 4-Bromofluorobenzene	60.8		"	62.5		97.2	70-130			

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6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

**LCS (5J09008-BS1)**

Prepared: 10/09/2015 Analyzed: 10/09/2015

Benzene	0.101	0.002	mg/kg	0.100		101	77.1-124			
Toluene	0.105	0.002	"	0.100		105	74.5-128			
Ethylbenzene	0.114	0.002	"	0.100		114	66.4-127			
m,p-Xylene	0.235	0.004	"	0.200		118	76.6-124			
o-Xylene	0.114	0.002	"	0.100		114	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	59.9		ug/kg	62.5		95.8	70-130			
Surrogate: Toluene-d8	59.4		"	62.5		95.1	70-130			
Surrogate: 4-Bromofluorobenzene	63.6		"	62.5		102	70-130			

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Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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
<b>Batch 5J09008 - EPA 5030 (soil)</b>										
<b>LCS (5J09008-BS2)</b>					Prepared: 10/09/2015 Analyzed: 10/09/2015					
Benzene	0.101	0.002	mg/kg	0.100		101	77.1-124			
Toluene	0.101	0.002	"	0.100		101	74.5-128			
Ethylbenzene	0.115	0.002	"	0.100		115	66.4-127			
m,p-Xylene	0.227	0.004	"	0.200		114	76.6-124			
o-Xylene	0.118	0.002	"	0.100		118	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57.6		ug/kg	62.5		92.2	70-130			
Surrogate: Toluene-d8	57.8		"	62.5		92.5	70-130			
Surrogate: 4-Bromofluorobenzene	60.4		"	62.5		96.7	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 - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)

**LCS (5J09008-BS3)**

Prepared: 10/09/2015 Analyzed: 10/09/2015

Benzene	0.094	0.002	mg/kg	0.100		93.7	77.1-124			
Toluene	0.098	0.002	"	0.100		97.6	74.5-128			
Ethylbenzene	0.107	0.002	"	0.100		107	66.4-127			
m,p-Xylene	0.217	0.004	"	0.200		109	76.6-124			
o-Xylene	0.109	0.002	"	0.100		109	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	62.0		ug/kg	62.5		99.2	70-130			
Surrogate: Toluene-d8	60.1		"	62.5		96.1	70-130			
Surrogate: 4-Bromofluorobenzene	62.6		"	62.5		100	70-130			

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6899 Pecos Street, Unit C  
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Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

Matrix Spike (5J09008-MS1)		Source: X510098-01			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Benzene	0.099	0.002	mg/kg	0.100	0.002	97.0	71.8-126			
Toluene	0.102	0.002	"	0.100	0.006	96.6	65.1-130			
Ethylbenzene	0.107	0.002	"	0.100	ND	107	62.2-130			
m,p-Xylene	0.221	0.004	"	0.200	0.003	109	46.5-137			
o-Xylene	0.107	0.002	"	0.100	0.001	106	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	61.0		ug/kg	62.5		97.6	70-130			
Surrogate: Toluene-d8	58.7		"	62.5		93.9	70-130			
Surrogate: 4-Bromofluorobenzene	62.4		"	62.5		99.8	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 - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

Matrix Spike (5J09008-MS2)		Source: X510098-02			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Benzene	0.097	0.002	mg/kg	0.100	ND	96.9	71.8-126			
Toluene	0.097	0.002	"	0.100	ND	97.2	65.1-130			
Ethylbenzene	0.109	0.002	"	0.100	ND	109	62.2-130			
m,p-Xylene	0.209	0.004	"	0.200	ND	105	46.5-137			
o-Xylene	0.107	0.002	"	0.100	ND	107	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	61.6		ug/kg	62.5		98.6	70-130			
Surrogate: Toluene-d8	59.3		"	62.5		94.9	70-130			
Surrogate: 4-Bromofluorobenzene	62.2		"	62.5		99.6	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 - Martin Hart C GU #2

**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 5J09008 - EPA 5030 (soil)**

Matrix Spike (5J09008-MS3)		Source: X510098-03			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Benzene	0.095	0.002	mg/kg	0.100	0.002	93.4	71.8-126			
Toluene	0.096	0.002	"	0.100	ND	95.7	65.1-130			
Ethylbenzene	0.104	0.002	"	0.100	ND	104	62.2-130			
m,p-Xylene	0.198	0.004	"	0.200	ND	99.1	46.5-137			
o-Xylene	0.100	0.002	"	0.100	ND	99.8	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	62.3		ug/kg	62.5		99.7	70-130			
Surrogate: Toluene-d8	58.9		"	62.5		94.3	70-130			
Surrogate: 4-Bromofluorobenzene	62.1		"	62.5		99.3	70-130			

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Tasman Geosciences  
6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

**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
<b>Batch 5J09008 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (5J09008-MSD1)</b>										
					<b>Source: X510098-01</b>					Prepared: 10/09/2015 Analyzed: 10/09/2015
Benzene	0.102	0.002	mg/kg	0.100	0.002	99.9	71.8-126	2.92	11.3	
Toluene	0.104	0.002	"	0.100	0.006	98.0	65.1-130	1.40	15.4	
Ethylbenzene	0.113	0.002	"	0.100	ND	113	62.2-130	4.83	19.6	
m,p-Xylene	0.217	0.004	"	0.200	0.003	107	46.5-137	1.67	19.2	
o-Xylene	0.109	0.002	"	0.100	0.001	108	54.2-134	1.66	17.9	
Surrogate: 1,2-Dichloroethane-d4	60.8		ug/kg	62.5		97.2	70-130			
Surrogate: Toluene-d8	58.0		"	62.5		92.7	70-130			
Surrogate: 4-Bromofluorobenzene	62.1		"	62.5		99.4	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 5J09008 - EPA 5030 (soil)

Matrix Spike Dup (5J09008-MSD2)		Source: X510098-02			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Benzene	0.094	0.002	mg/kg	0.100	ND	94.3	71.8-126	2.78	11.3	
Toluene	0.096	0.002	"	0.100	ND	95.7	65.1-130	1.47	15.4	
Ethylbenzene	0.103	0.002	"	0.100	ND	103	62.2-130	5.54	19.6	
m,p-Xylene	0.203	0.004	"	0.200	ND	101	46.5-137	3.15	19.2	
o-Xylene	0.101	0.002	"	0.100	ND	101	54.2-134	5.65	17.9	
Surrogate: 1,2-Dichloroethane-d4	63.3		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	58.9		"	62.5		94.2	70-130			
Surrogate: 4-Bromofluorobenzene	60.4		"	62.5		96.7	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
<b>Batch 5J09008 - EPA 5030 (soil)</b>										
<b>Matrix Spike Dup (5J09008-MSD3)</b>										
					<b>Source: X510098-03</b>					
					Prepared: 10/09/2015		Analyzed: 10/09/2015			
Benzene	0.094	0.002	mg/kg	0.100	0.002	92.5	71.8-126	0.992	11.3	
Toluene	0.093	0.002	"	0.100	ND	92.6	65.1-130	3.27	15.4	
Ethylbenzene	0.106	0.002	"	0.100	ND	106	62.2-130	1.93	19.6	
m,p-Xylene	0.206	0.004	"	0.200	ND	103	46.5-137	3.75	19.2	
o-Xylene	0.101	0.002	"	0.100	ND	101	54.2-134	1.53	17.9	
Surrogate: 1,2-Dichloroethane-d4	60.2		ug/kg	62.5		96.3	70-130			
Surrogate: Toluene-d8	56.7		"	62.5		90.7	70-130			
Surrogate: 4-Bromofluorobenzene	60.8		"	62.5		97.3	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 5J09007 - EPA 3580

##### Blank (5J09007-BLK1)

Prepared: 10/09/2015 Analyzed: 10/09/2015

Diesel (C10-C28) ND 50 mg/kg

Residual Range Organics (C28-C36) ND 200 "

Surrogate: o-Terphenyl 45 " 50.0 89.2 59-131

##### Blank (5J09007-BLK2)

Prepared: 10/09/2015 Analyzed: 10/09/2015

Diesel (C10-C28) ND 50 mg/kg

Residual Range Organics (C28-C36) ND 200 "

Surrogate: o-Terphenyl 35 " 50.0 70.7 59-131

##### Blank (5J09007-BLK3)

Prepared: 10/09/2015 Analyzed: 10/09/2015

Diesel (C10-C28) ND 50 mg/kg

Residual Range Organics (C28-C36) ND 200 "

Surrogate: o-Terphenyl 35 " 50.0 70.3 59-131

##### LCS (5J09007-BS1)

Prepared: 10/09/2015 Analyzed: 10/09/2015

Diesel (C10-C28) 1000 50 mg/kg 1000 104 64-121

Residual Range Organics (C28-C36) 970 200 " 1000 97.2 58-124

Surrogate: o-Terphenyl 50 " 50.0 100 59-131

##### LCS (5J09007-BS2)

Prepared: 10/09/2015 Analyzed: 10/09/2015

Diesel (C10-C28) 860 50 mg/kg 1000 86.0 64-121

Residual Range Organics (C28-C36) 700 200 " 1000 70.2 58-124

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6899 Pecos Street, Unit C  
Denver CO 80211

Christine Wasko  
Project Number: [none]  
Project: KMG - Martin Hart C GU #2

## 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
<b>Batch 5J09007 - EPA 3580</b>										
<b>LCS (5J09007-BS2)</b>					Prepared: 10/09/2015 Analyzed: 10/09/2015					
Surrogate: o-Terphenyl	40		mg/kg	50.0		81.0	59-131			
<b>LCS (5J09007-BS3)</b>					Prepared: 10/09/2015 Analyzed: 10/09/2015					
Diesel (C10-C28)	870	50	mg/kg	1000		86.9	64-121			
Residual Range Organics (C28-C36)	740	200	"	1000		74.0	58-124			
Surrogate: o-Terphenyl	42		"	50.0		83.6	59-131			
<b>Matrix Spike (5J09007-MS1)</b>					<b>Source: X510098-01</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015			
Diesel (C10-C28)	1000	50	mg/kg	1000	ND	103	53-125			
Residual Range Organics (C28-C36)	950	200	"	1000	16	93.7	47-133			
Surrogate: o-Terphenyl	48		"	50.0		96.2	59-131			
<b>Matrix Spike (5J09007-MS2)</b>					<b>Source: X510098-02</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015			
Diesel (C10-C28)	870	50	mg/kg	1000	ND	86.7	53-125			
Residual Range Organics (C28-C36)	720	200	"	1000	16	70.4	47-133			
Surrogate: o-Terphenyl	39		"	50.0		78.8	59-131			
<b>Matrix Spike (5J09007-MS3)</b>					<b>Source: X510098-03</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015			
Diesel (C10-C28)	960	50	mg/kg	1000	ND	96.3	53-125			
Residual Range Organics (C28-C36)	880	200	"	1000	15	86.8	47-133			
Surrogate: o-Terphenyl	47		"	50.0		93.3	59-131			
<b>Matrix Spike Dup (5J09007-MSD1)</b>					<b>Source: X510098-01</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015			
Diesel (C10-C28)	1000	50	mg/kg	1000	ND	99.8	53-125	2.89	20	
Residual Range Organics (C28-C36)	920	200	"	1000	16	90.5	47-133	3.39	20	
Surrogate: o-Terphenyl	48		"	50.0		96.5	59-131			
<b>Matrix Spike Dup (5J09007-MSD2)</b>					<b>Source: X510098-02</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015			

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Christine Wasko  
Project Number: [none]  
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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
<b>Batch 5J09007 - EPA 3580</b>										
<b>Matrix Spike Dup (5J09007-MSD2)</b>		<b>Source: X510098-02</b>			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Diesel (C10-C28)	1100	50	mg/kg	1000	ND	105	53-125	19.4	20	
Residual Range Organics (C28-C36)	930	200	"	1000	16	91.1	47-133	25.2	20	QR-02
Surrogate: o-Terphenyl	48		"	50.0		96.2	59-131			
<b>Matrix Spike Dup (5J09007-MSD3)</b>		<b>Source: X510098-03</b>			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Diesel (C10-C28)	1000	50	mg/kg	1000	ND	100	53-125	3.96	20	
Residual Range Organics (C28-C36)	910	200	"	1000	15	89.7	47-133	3.20	20	
Surrogate: o-Terphenyl	46		"	50.0		91.1	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
<b>Batch 5J09009 - NO PREP</b>										
<b>Duplicate (5J09009-DUP1)</b>		<b>Source: X510106-01</b>			Prepared: 10/09/2015 Analyzed: 10/09/2015					
pH	8.08		pH Units		8.11			0.371	25	
<b>Batch 5J09010 - NO PREP</b>										
<b>Blank (5J09010-BLK1)</b>		Prepared: 10/09/2015 Analyzed: 10/09/2015								
Specific Conductance (EC)	0.00470		mmhos/cm							
<b>Duplicate (5J09010-DUP1)</b>		<b>Source: X510106-01</b>			Prepared: 10/09/2015 Analyzed: 10/09/2015					
Specific Conductance (EC)	0.488		mmhos/cm		0.427			13.3	25	

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Tasman Geosciences

6899 Pecos Street, Unit C

Denver CO 80211

Christine Wasko

Project Number: [none]

Project: KMG - Martin Hart C GU #2

## Notes and Definitions

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.

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