



December 9, 2014

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

**Re: Sump Excavation Summary Letter Report
Hart Martin "C" GU #1
API# 05-123-07802
SWNE 28-T2N-R67W**

Dear Mr. Schwarz:

LT Environmental, Inc. (LTE) was contracted by Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) to perform environmental oversight activities at the above referenced site. The oversight activities included collection of a confirmation soil sample from the sump excavation, documentation of field activities, and analytical results review.

The objective of the soil sampling was to determine if petroleum hydrocarbon impacts to subsurface soil resulted from Kerr-McGee operating a produced water sump at the site. The soil sampling activities, laboratory analytical results, and conclusions are summarized below. The general site layout, sump excavation dimensions, and soil sample location are shown on the attached hand-sketched map.

After removing the produced water sump, one representative confirmation soil sample (B01@6') was collected from the soil directly beneath the water sump. The soil sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8260 and total petroleum hydrocarbons (TPH) by EPA Methods 8015 and 8260. The laboratory analytical results are summarized in Table 1 and provided in the attached laboratory analytical report.

The sump excavation measured approximately 15 feet north to south by 15 feet east to west to an approximate depth of 6 feet below ground surface. No indication of petroleum hydrocarbon impacts, including soil staining or odor, was observed beneath the water sump. In addition, TPH and BTEX concentrations were below Colorado Oil and Gas Conservation Commission allowable levels and laboratory reporting limits in soil sample B01@6'. Based on the field and analytical results, no remedial action is required at this site.



Please call us at (303) 433-9788 if you have any questions regarding this Sump Excavation Summary Letter Report or if you require additional information.

Sincerely,
LT ENVIRONMENTAL, INC.

A blue ink signature of Jeremy Espinoza, written in a cursive style.

Jeremy Espinoza
Staff Geologist

Reviewed by

A blue ink signature of Kelly L. Kenyon, written in a cursive style.

Kelly L. Kenyon
Project Environmental Scientist

Attachments



PROJECT Hart Martin "C" Gu #1
PROJECT MANAGER John Cocroft
JOB No. 014214370
LOCATION SWNE 28 2N 67W 6

DATE 11/12/2014

CONT. No.

BY C. Terry

CHK'D

SHEET No. 1

OF 1

DLT0038 10/1991

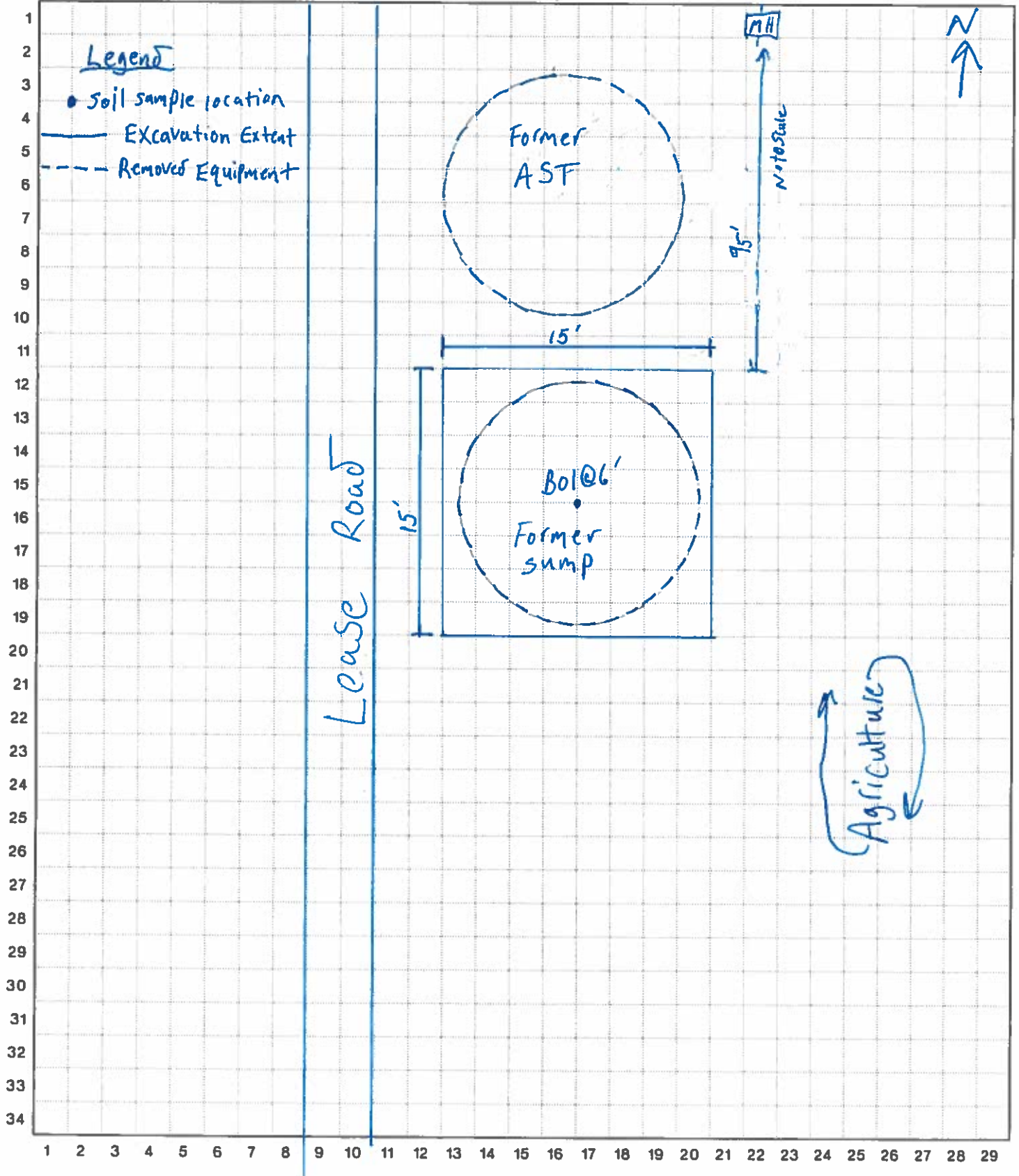


TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
HART MARTIN C GU #1
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

Soil Sample ID	Depth (bgs)	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	DRO (mg/kg)	GRO (mg/kg)	ORO (mg/kg)
B01 @ 6'	6'	10/22/2014	<0.002	<0.002	<0.002	<0.002	<50.0	<50.0	<200
COGCC Standards			0.17	85	100	175	500*	500*	500*

Notes: bgs - below ground surface

< - less than

DRO - Diesel Range Organics

ORO - Oil Range Organics

GRO - Gasoline Range Organics

* - Standard applies to combined DRO-GRO-ORO

mg/kg - milligrams per kilogram

NA - Not Analyzed/Not Available

Bold numbers indicate result equaled or exceeded standard.

COGCC - Colorado Oil and Gas Conservation Commission





December 01, 2014

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Hart Martin C Unit #1

Project Number - [none]

Attached are your analytical results for KMG - Hart Martin C Unit #1 received by Origins Laboratory, Inc. October 22, 2014. This project is associated with Origins project number X410245-01.

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

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

John Cocroft

Project Number: [none]

Project: KMG - Hart Martin C Unit #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 6'	X410245-01	Soil	October 22, 2014 12:00	10/22/2014 16:20

Jeremy Expinoza requested to have the Project ID changed to "Hart Martin C Unit #1" via email on 12/1/2014.

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.

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

ORIGINS

LABORATORY, INC

www.originslaboratory.com

X410245

page 1 of 1

Client: LTE Project Manager/Send Report To: John Couett
 Address: 4000 W. 1st Ave. Email Address: jcouett@hmv.com
Arvode, CO. Project Name/Number: Hart Martin C Unit #1
 Telephone Number: 303-433-9788 Samples Collected By: Mike Unger

Fax: 303.265.9645

Phone: 303.433.1322

Denver, CO 80211

1725 Elk Place

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis/Method		Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #	Other	TPH		
B0102'	10/22/14	12:00	1						X			X		1
N0102'		12:05	1						X			X		2
S0102'		12:10	1						X					3
S0102'		12:15	1						X					4
W0102'	10/22/14	12:20	1						X					5
														6
														7
														8
														9
														10
Relinquished By: <u>Mike Unger</u>	Date: <u>10/22/14</u>	Time: <u>16:20</u>		Received By: <u>[Signature]</u>				Received By:		Date:	Time:	Turnaround Time: <input checked="" type="checkbox"/> Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/> 7.5		
Relinquished By:	Date:	Time:		Received By:				Received By:		Date:	Time:			

X

Please analyze B0102' & hold other 4 samples.

Comments:

Drinking Water

Origins Laboratory, Inc.

Jeff Pellipini

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X410245

Client: LTE

Client Project ID: Hart Martin C Unit #1

Checklist Completed by: Jeff Smith

Shipped Via: HTD

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

Date/time completed: 10/22/14

Airbill #: NA

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

Cooler Number/Temperature: _____ / 3.3 °C _____ / _____ °C _____ / _____ °C (Describe)

Thermometer ID: TD53

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"/>	<input checked="" type="checkbox"/>		see below
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): <u>BOI has a depth of 6' on bottle</u> <u>all other samples have 5' on bottles</u> <u>sp 10-22-14</u>				

⁽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.

[Signature]
Reviewed by (Project Manager)

10-22-14
Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

B01 @ 6'
10/22/2014 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X410245-01 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	4J22007	10/22/2014	10/22/2014
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	95.4 %	70-130			"	"	"
Surrogate: Toluene-d8	100 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	98.1 %	70-130			"	"	"

TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50.0	mg/kg	1	4J22016	10/22/2014	10/22/2014
Diesel (C10-C28)	ND	50.0	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	80.2 %	65-146			"	"	"
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Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

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 4J22007 - EPA 5030 (soil)

Blank (4J22007-BLK1)

Prepared: 10/22/2014 Analyzed: 10/22/2014

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	77		ug/kg	62.5	124		70-130			
Surrogate: Toluene-d8	59		"	62.5	95.1		70-130			
Surrogate: 4-Bromofluorobenzene	54		"	62.5	86.1		70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

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 4J22007 - EPA 5030 (soil)

LCS (4J22007-BS1)

Prepared: 10/22/2014 Analyzed: 10/22/2014

Benzene	0.19	0.002	mg/kg	0.100		186	77.1-124
Toluene	0.22	0.002	"	0.100		217	74.5-128
Ethylbenzene	0.21	0.002	"	0.100		211	66.4-127
m,p-Xylene	0.42	0.004	"	0.200		210	76.6-124
o-Xylene	0.21	0.002	"	0.100		209	76.6-124
Surrogate: 1,2-Dichloroethane-d4	75		ug/kg	62.5		120	70-130
Surrogate: Toluene-d8	80		"	62.5		128	70-130
Surrogate: 4-Bromofluorobenzene	52		"	62.5		82.6	70-130

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

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 4J22007 - EPA 5030 (soil)

Matrix Spike (4J22007-MS1)		Source: X410223-01			Prepared: 10/22/2014 Analyzed: 10/22/2014					
Benzene	0.18	0.002	mg/kg	0.200	ND	89.9	71.8-126			
Toluene	0.16	0.002	"	0.200	ND	78.2	65.1-130			
Ethylbenzene	0.17	0.002	"	0.200	ND	83.3	62.2-130			
m,p-Xylene	0.33	0.004	"	0.400	ND	81.5	46.5-137			
o-Xylene	0.16	0.002	"	0.200	ND	80.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	75		ug/kg	62.5		120	70-130			
Surrogate: Toluene-d8	61		"	62.5		96.9	70-130			
Surrogate: 4-Bromofluorobenzene	52		"	62.5		83.4	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

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 4J22007 - EPA 5030 (soil)

Matrix Spike Dup (4J22007-MSD1)		Source: X410223-01			Prepared: 10/22/2014 Analyzed: 10/22/2014					
Benzene	0.19	0.002	mg/kg	0.200	ND	92.5	71.8-126	2.84	11.3	
Toluene	0.16	0.002	"	0.200	ND	82.3	65.1-130	5.11	15.4	
Ethylbenzene	0.18	0.002	"	0.200	ND	91.4	62.2-130	9.24	19.6	
m,p-Xylene	0.37	0.004	"	0.400	ND	91.9	46.5-137	11.9	19.2	
o-Xylene	0.18	0.002	"	0.200	ND	90.6	54.2-134	11.7	17.9	
Surrogate: 1,2-Dichloroethane-d4	76		ug/kg	62.5		121	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.5	70-130			
Surrogate: 4-Bromofluorobenzene	73		"	62.5		117	70-130			

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

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 8015M - 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 4J22016 - EPA 3580

Blank (4J22016-BLK1)

Prepared: 10/22/2014 Analyzed: 10/22/2014

Gasoline (C6-C10)	ND	50.0	mg/kg							
Diesel (C10-C28)	ND	50.0	"							
Residual Range Organics (C28-C36)	ND	200	"							
TPH - Carbon Chain Total	ND	50.0	"							

Surrogate: o-Terphenyl	47		g	50.0		93.2	65-146			
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LCS (4J22016-BS1)

Prepared: 10/22/2014 Analyzed: 10/22/2014

Gasoline (C6-C10)	961	50.0	mg/kg	1000		96.1	66.7-119			
Diesel (C10-C28)	816	50.0	"	1000		81.6	70.1-127			
Residual Range Organics (C28-C36)	825	200	"	1000		82.5	54.5-139			

Surrogate: o-Terphenyl	48		g	50.0		95.8	65-146			
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Matrix Spike (4J22016-MS1)

Source: X410238-01

Prepared: 10/22/2014 Analyzed: 10/22/2014

Gasoline (C6-C10)	971	50.0	mg/kg	1000	ND	97.1	56.4-132			
Diesel (C10-C28)	835	50.0	"	1000	17.2	81.8	57.4-138			
Residual Range Organics (C28-C36)	852	200	"	1000	30.7	82.1	47.7-129			

Surrogate: o-Terphenyl	48		g	50.0		95.6	65-146			
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Matrix Spike Dup (4J22016-MSD1)

Source: X410238-01

Prepared: 10/22/2014 Analyzed: 10/22/2014

Gasoline (C6-C10)	997	50.0	mg/kg	1000	ND	99.7	56.4-132	2.59	22	
Diesel (C10-C28)	912	50.0	"	1000	17.2	89.5	57.4-138	8.76	18.3	
Residual Range Organics (C28-C36)	924	200	"	1000	30.7	89.3	47.7-129	8.12	30.1	

Origins Laboratory, Inc.



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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO 80003

John Cocroft
Project Number: [none]
Project: KMG - Hart Martin C Unit #1

Extractable Petroleum Hydrocarbons by 8015M - 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 4J22016 - EPA 3580

Matrix Spike Dup (4J22016-MSD1)

Source: X410238-01

Prepared: 10/22/2014 Analyzed: 10/22/2014

Surrogate: o-Terphenyl	52		g	50.0		105	65-146			
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Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

John Cocroft

Project Number: [none]

Project: KMG - Hart Martin C Unit #1

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.