



February 23, 2015

Mr. Sam LaRue
Senior HSE Representative
Kerr-McGee Oil & Gas Onshore LP
501 N. Division Blvd
Platteville, CO 80651

**Re: Sump Excavation Summary Letter Report
Drew Gas Unit True #1
API# 05-123-11551
SWSE 18-T2N-R67W**

Dear Mr. LaRue:

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 displayed on the attached hand-sketched map.

After removing the produced water sump, one representative confirmation soil sample (B01@5') was collected from the base of excavation. The soil sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8260C, total petroleum hydrocarbons (TPH) by EPA Method 8015C, pH by EPA Method 9045D, and specific conductance (EC) by EPA Method 9050A. The laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.

The sump excavation measured approximately 15 feet north to south by 15 feet east to west to an approximate depth of 5 feet bgs. No indication of petroleum hydrocarbon impact, including soil staining or odor was observed beneath the water sump. In addition, TPH, BTEX, pH, and EC levels were below or within Colorado Oil and Gas Conservation Commission allowable levels in soil sample B01@5'. Based on the field observations and laboratory 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.

Reviewed by

A handwritten signature in blue ink, appearing to read 'Chad Terry'.

Chad Terry
Staff Scientist

A handwritten signature in blue ink, appearing to read 'Kelly L. Kenyon'.

Kelly L. Kenyon
Project Environmental Scientist

Attachments



PROJECT Drew Gas unit Trac #1
PROJECT MANAGER John CoCROFT
JOB No. 014215018
LOCATION SWSE 18-T2N-R67W

DATE 02/23/2015

CONT. No.

BY Chad Terry

CHK'D

SHEET No. 1

OF 1

SLT0038 10/1991

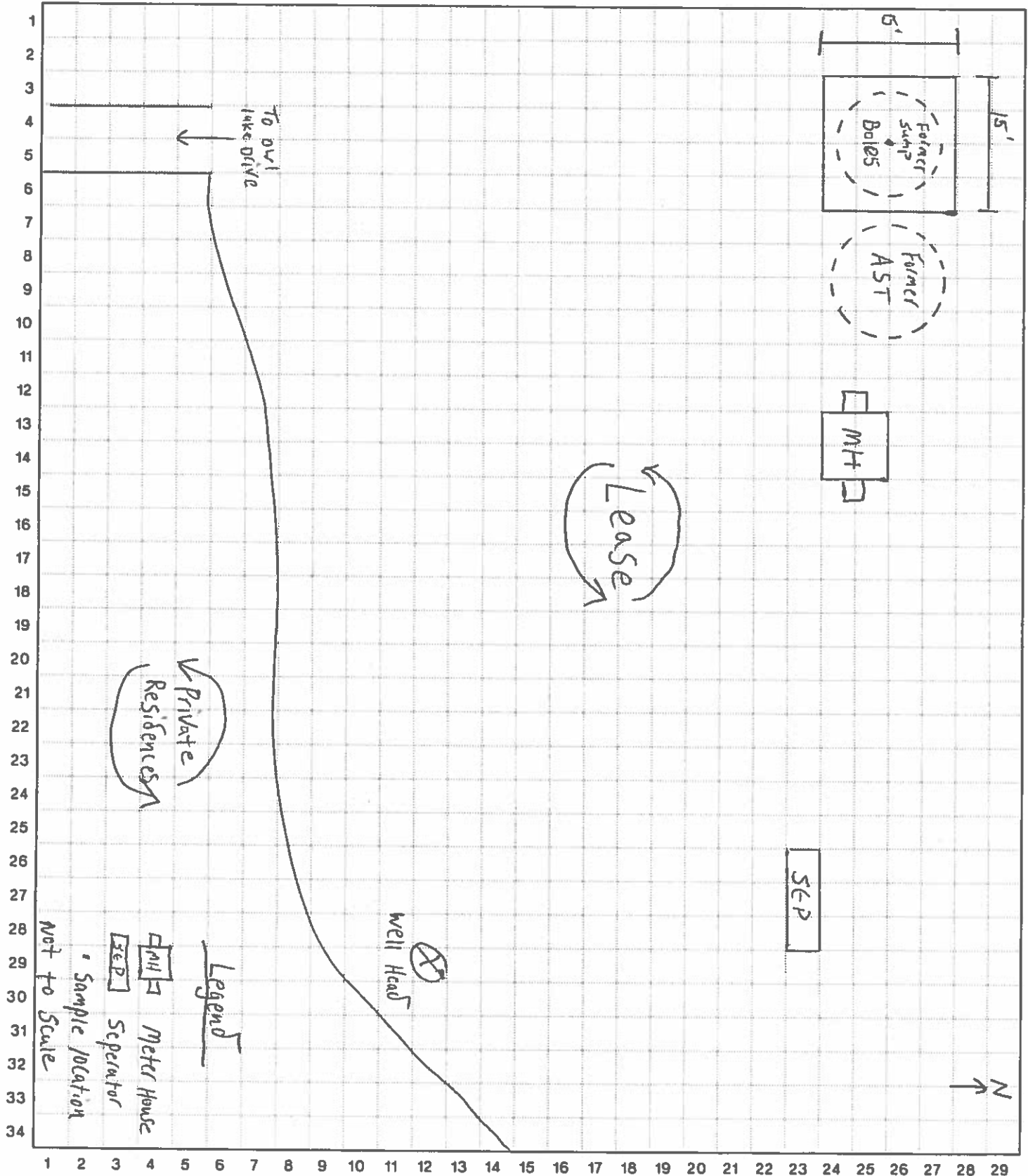


TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
DREW GAS UNIT TRUE #1
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

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)	pH (su)	Specific Conductance (mmhos/cm)
B01 @ 5'	5'	02/12/2015	<0.002	<0.002	<0.002	<0.002	<50	<50	<200	8.19	0.0735
COGCC Standards			0.17	85	100	175	500*	500*	500*	6-9	4

Notes: bgs - below ground surface
mg/kg - milligrams per kilogram
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
ORO - Oil Range Organics
su - standard units

mmhos/cm - millimhos per centimeter
< - less than laboratory reporting limit
Bold numbers indicate result equaled or exceeded standard.
NA - Not Analyzed/Not Available
COGCC - Colorado Oil and Gas Conservation Commission
* - Standard applies to combined DRO-GRO-ORO





February 13, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Drew Gas Unit True #1

Project Number - [none]

Attached are your analytical results for KMG - Drew Gas Unit True #1 received by Origins Laboratory, Inc. February 12, 2015. This project is associated with Origins project number X502154-05.

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



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 - Drew Gas Unit True #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 5	X502154-05	Soil	February 12, 2015 15:50	02/12/2015 16:33

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.

Origins Laboratory, Inc.

Jose Pellegrini

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

John Cocroft
Project Number: [none]
Project: KMG - Drew Gas Unit True #1

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X502154

Client: LTE

Client Project ID: Drew Gas Unit True #1

Checklist Completed by: Jeff Smith

Shipped Via: HAD

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

Date/time completed: 2/12/15

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid

☐ Water

☐ Other:

(Describe)

Cooler Number/Temperature: 1 / 10.7 °C

1 °C

1 °C

1 °C

Thermometer ID: T003

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"/>		Sampled Same Day
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"/>			PH
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.

Reviewed by (Project Manager)

Date/Time Reviewed

Origins Laboratory, Inc.

Jeff Pellegrini

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

John Cocroft
Project Number: [none]
Project: KMG - Drew Gas Unit True #1

B01 @ 5
2/12/2015 3:50:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X502154-05 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5B12013	02/12/2015	02/13/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	143 %	70-130			"	"	" S-07
Surrogate: Toluene-d8	102 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	116 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	8.19		pH Units	1	5B12007	02/12/2015	02/12/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0735		mmhos/cm	"	5B12008	02/12/2015	02/12/2015
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50	mg/kg	1	5B12012	02/12/2015	02/12/2015
Diesel (C10-C28)	ND	50	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	94.6 %	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 - Drew Gas Unit True #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 5B12013 - EPA 5030 (soil)

Blank (5B12013-BLK1)

Prepared: 02/12/2015 Analyzed: 02/12/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	90		ug/kg	62.5	145		70-130			
Surrogate: Toluene-d8	69		"	62.5	111		70-130			
Surrogate: 4-Bromofluorobenzene	72		"	62.5	115		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 - Drew Gas Unit True #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 5B12013 - EPA 5030 (soil)

LCS (5B12013-BS1)

Prepared: 02/12/2015 Analyzed: 02/12/2015

Benzene	0.102	0.002	mg/kg	0.100		102	77.1-124			
Toluene	0.100	0.002	"	0.100		99.9	74.5-128			
Ethylbenzene	0.110	0.002	"	0.100		110	66.4-127			
m,p-Xylene	0.225	0.004	"	0.200		113	76.6-124			
o-Xylene	0.112	0.002	"	0.100		112	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	82		ug/kg	62.5		132	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.4	70-130			
Surrogate: 4-Bromofluorobenzene	72		"	62.5		114	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 - Drew Gas Unit True #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 5B12013 - EPA 5030 (soil)

Matrix Spike (5B12013-MS1)		Source: X502153-01			Prepared: 02/12/2015 Analyzed: 02/12/2015					
Benzene	0.089	0.002	mg/kg	0.100	ND	89.4	71.8-126			
Toluene	0.088	0.002	"	0.100	ND	88.1	65.1-130			
Ethylbenzene	0.097	0.002	"	0.100	ND	97.0	62.2-130			
m,p-Xylene	0.195	0.004	"	0.200	ND	97.4	46.5-137			
o-Xylene	0.092	0.002	"	0.100	ND	92.4	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	78		ug/kg	62.5		125	70-130			
Surrogate: Toluene-d8	65		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	70		"	62.5		112	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 - Drew Gas Unit True #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 5B12013 - EPA 5030 (soil)

Matrix Spike Dup (5B12013-MSD1)		Source: X502153-01			Prepared: 02/12/2015 Analyzed: 02/13/2015			QM-07		
Benzene	0.077	0.002	mg/kg	0.100	ND	76.5	71.8-126	15.5	11.3	
Toluene	0.070	0.002	"	0.100	ND	69.6	65.1-130	23.4	15.4	
Ethylbenzene	0.060	0.002	"	0.100	ND	60.0	62.2-130	47.2	19.6	
m,p-Xylene	0.123	0.004	"	0.200	ND	61.6	46.5-137	45.0	19.2	
o-Xylene	0.064	0.002	"	0.100	ND	64.5	54.2-134	35.6	17.9	
Surrogate: 1,2-Dichloroethane-d4	84		ug/kg	62.5		135	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	71		"	62.5		113	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 - Drew Gas Unit True #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 5B12012 - EPA 3580

Blank (5B12012-BLK1)

Prepared: 02/12/2015 Analyzed: 02/12/2015

Gasoline (C6-C10)	ND	50	mg/kg
Diesel (C10-C28)	ND	50	"
Residual Range Organics (C28-C36)	ND	200	"

Surrogate: o-Terphenyl

47.2

"

50.0

94.3

65-146

LCS (5B12012-BS1)

Prepared: 02/12/2015 Analyzed: 02/12/2015

Gasoline (C6-C10)	920	50	mg/kg	1000	91.5	66.7-119
Diesel (C10-C28)	950	50	"	1000	94.8	70.1-127
Residual Range Organics (C28-C36)	1100	200	"	1000	108	54.5-139

Surrogate: o-Terphenyl

52.3

"

50.0

105

65-146

Matrix Spike (5B12012-MS1)

Source: X502153-01

Prepared: 02/12/2015 Analyzed: 02/12/2015

Gasoline (C6-C10)	890	50	mg/kg	1000	24	86.1	56.4-132
Diesel (C10-C28)	910	50	"	1000	21	88.7	57.4-138
Residual Range Organics (C28-C36)	1000	200	"	1000	19	102	47.7-129

Surrogate: o-Terphenyl

42.0

"

50.0

84.0

65-146

Matrix Spike Dup (5B12012-MSD1)

Source: X502153-01

Prepared: 02/12/2015 Analyzed: 02/12/2015

Gasoline (C6-C10)	900	50	mg/kg	1000	24	87.2	56.4-132	1.21	22
Diesel (C10-C28)	960	50	"	1000	21	93.8	57.4-138	5.43	18.3
Residual Range Organics (C28-C36)	1100	200	"	1000	19	106	47.7-129	3.98	30.1

Surrogate: o-Terphenyl

41.4

"

50.0

82.9

65-146

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Drew Gas Unit True #1

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 5B12007 - NO PREP										
Duplicate (5B12007-DUP1)		Source: X502131-05			Prepared: 02/12/2015 Analyzed: 02/12/2015					
pH	7.80		pH Units		7.83			0.384	25	
Duplicate (5B12007-DUP2)		Source: X502131-06			Prepared: 02/12/2015 Analyzed: 02/12/2015					
pH	8.77		pH Units		8.81			0.455	25	
Batch 5B12008 - NO PREP										
Blank (5B12008-BLK1)					Prepared: 02/12/2015 Analyzed: 02/12/2015					
Specific Conductance (EC)	0.00250		mmhos/cm							
Blank (5B12008-BLK2)					Prepared: 02/12/2015 Analyzed: 02/12/2015					
Specific Conductance (EC)	0.00310		mmhos/cm							
Duplicate (5B12008-DUP1)		Source: X502131-05			Prepared: 02/12/2015 Analyzed: 02/12/2015					
Specific Conductance (EC)	0.0293		mmhos/cm		0.0333			12.8	25	
Duplicate (5B12008-DUP2)		Source: X502131-06			Prepared: 02/12/2015 Analyzed: 02/12/2015					
Specific Conductance (EC)	0.111		mmhos/cm		0.107			3.21	25	

Origins Laboratory, Inc.



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

John Cocroft
Project Number: [none]
Project: KMG - Drew Gas Unit True #1

Notes and Definitions

- S-07 High surrogate in sample, however sample is non-detect. High surrogate indicates result values are biased high.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- 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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