



April 8, 2015

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

**Re: Sump Excavation Letter Report
Appel Heirs W 32-5DI
API# 05-123-19736
SWNW 32-T2N-R66W
Remediation Project #8961**

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 the excavation. The soil sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (USEPA) Method 8260C, total petroleum hydrocarbons (TPH) by USEPA Method 8015C, pH by USEPA Method 9045D, and specific conductance (EC) by USEPA Method 9050A. The laboratory analytical results are summarized in Table 1 and the laboratory analytical report is attached.

The sump excavation measured approximately 20 feet north to south by 15 feet east to west to an approximate depth of 5 feet below ground surface (bgs). No indication of petroleum hydrocarbon impact, including soil staining or odor was observed beneath the water sump. In addition, TPH, BTEX, and EC levels were below or within Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels in soil sample B01@5'. The pH level in soil sample B01@5' exceeded the upper limit of the



COGCC Table 910-1 allowable range. However, based on the sample collection depth (>3 feet bgs), 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 Letter Report or if you require additional information.

Sincerely,
LT ENVIRONMENTAL, INC.

Reviewed by

A handwritten signature in black ink, appearing to read 'R. Zernis' with 'ERNIS' written below it.

Ryan Zernis
Staff Geologist

A handwritten signature in blue ink, reading 'Kelly L. Kenyon'.

Kelly Kenyon
Project Environmental Scientist

Attachments



PROJECT APPEL HEIRS W32-SDI
PROJECT MANAGER John Cocroft
JOB No. 04215061
LOCATION SWNW 32-T2N-R66W

DATE 3/26/15

CONT. No.

BY KS

CHK'D

SHEET No. 1

OF 1

95LT0038 10/1997

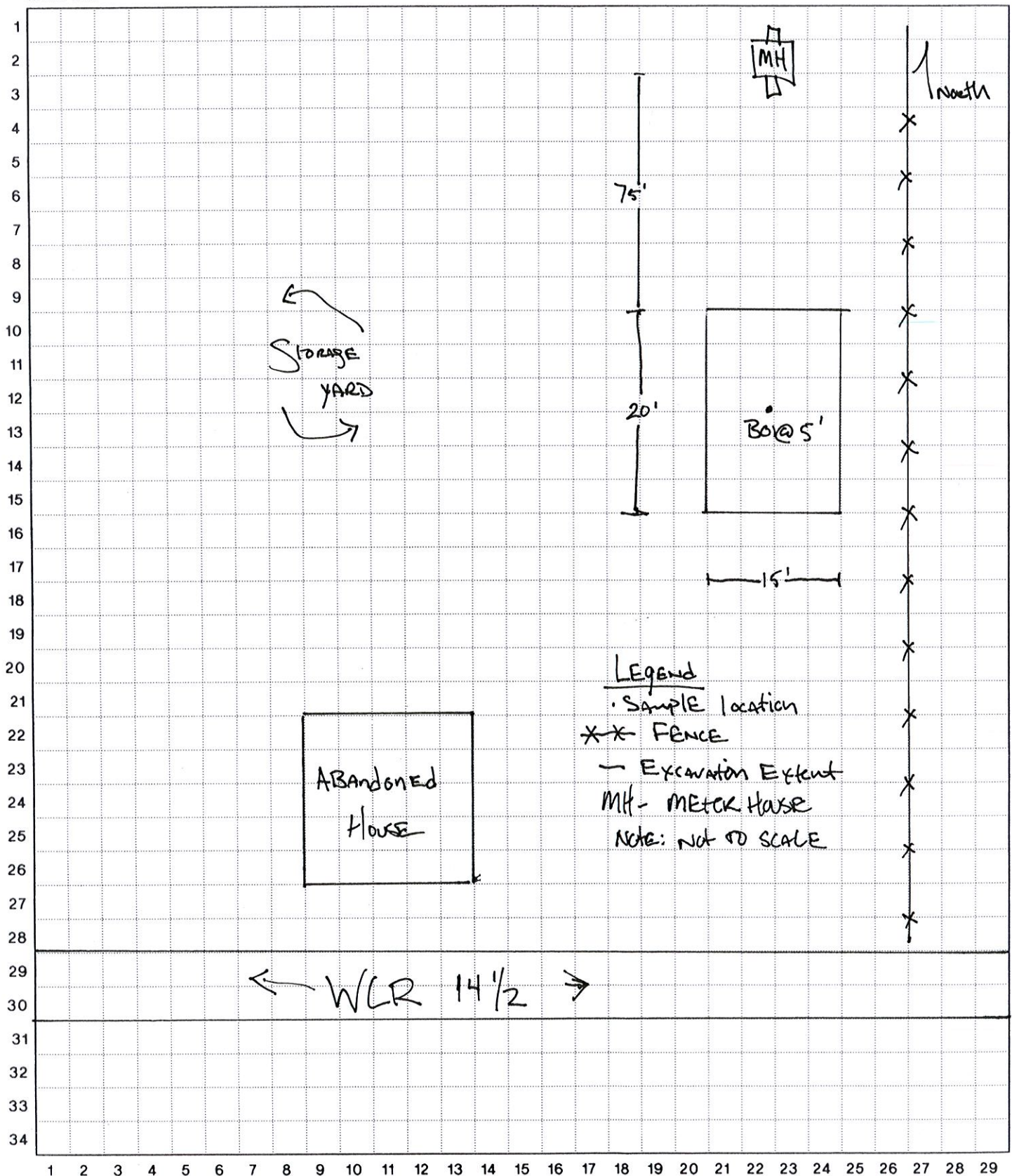


TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
APPEL HEIRS W 32-5 DI
WELD COUNTY, COLORADO
KERR-MCGEE OIL & GAS ONSHORE LP

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'	03/26/2015	<0.002	<0.002	<0.002	<0.002	<50	<50	<200	9.55	0.0531
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





March 27, 2015

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

Project Name - KMG - Apple-Heirs W32-5DI

Project Number - 014215061

Attached are your analytical results for KMG - Apple-Heirs W32-5DI received by Origins Laboratory, Inc. March 26, 2015. This project is associated with Origins project number X503341-01.

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: 014215061

Project: KMG - Apple-Heirs W32-5DI

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01 @ 5'	X503341-01	Soil	March 26, 2015 15:10	03/26/2015 17:10

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.

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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

www.originslaboratory.com

page 1 of 1





XS03341

ORIGINS
LABORATORY, INC

Client: LTE
Address: 4600 W 60th Ave.
Telephone Number: 303/433-9788
Email Address: Jcocroft@ltenv.com

Project Manager: J. Cocroft
Project Name: Apple-Heirs W32-5DI
Project Number: 014215061
Samples Collected By: Kris Shepherd

Fax: 303.265.9645 | Phone: 303.433.1322 | Denver, CO 80211

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix			Analysis				Sample Instructions	
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #	Other	BTEX	TH	FA	SAR		
B0105'	3/24/15	1510	2	X					X			X	X	X	H	HOLD SAR	1
N0104'		1515	2	X					X				H	H	H	HOLD AI	2
E0104'		1520	2	X					X								3
S0104'		1525	2	X					X								4
W0104'		1530	2	X					X								5
B0401		1535	1	X					X								6
																	7
																	8
																	9
																	10
Relinquished By: 	Date: 3/24/15	Time: 1620	Received By: 	Date: 3/26/15	Time: 1710	Turnaround Time: Same Day <input checked="" type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr											
Relinquished By: 	Date: 3/24/15	Time: 1710	Received By: 	Date: 3/26/15	Time: 1710	Standard <input type="checkbox"/>											

Date Results Needed

Temp Received: 5, 2

Origins Laboratory, Inc.

Jefe Pellegrini

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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X505341

Client: LTE

Client Project ID: Apple-Heirs W32-5DI

Checklist Completed by: J. E. Smith

Shipped Via: Dixie

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

Date/time completed: 3/26/15

Airbill #: NA

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

Cooler Number/Temperature: 1 / 5.2 °C 1 / _____ °C 1 / _____ °C (Describe)

Thermometer ID: 7053

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"/>			
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.

Jen Pellegrini

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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

B01 @ 5'
3/26/2015 3:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X503341-01 (Soil)

BTEX by EPA 8260C

Benzene	ND	0.002	mg/kg	1	5C26006	03/26/2015	03/26/2015
Toluene	ND	0.002	"	"	"	"	"
Ethylbenzene	ND	0.002	"	"	"	"	"
Xylenes, total	ND	0.002	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	108 %	70-130			"	"	"
Surrogate: Toluene-d8	98.3 %	70-130			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"

pH in Soil by EPA 9045D

pH	9.55		pH Units	1	5C26010	03/26/2015	03/26/2015
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0531		mmhos/cm	"	5C26011	"	03/26/2015
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TPH-Carbon Chain by EPA Method 8015C

Gasoline (C6-C10)	ND	50	mg/kg	1	5C26005	03/26/2015	03/26/2015
Diesel (C10-C28)	ND	50	"	"	"	"	"
Residual Range Organics (C28-C36)	ND	200	"	"	"	"	"

Surrogate: o-Terphenyl	93.8 %	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: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26006 - EPA 5030 (soil)

Blank (5C26006-BLK1)

Prepared: 03/26/2015 Analyzed: 03/26/2015

Benzene	ND	0.002	mg/kg							
Toluene	ND	0.002	"							
Ethylbenzene	ND	0.002	"							
Xylenes, total	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5	108		70-130			
Surrogate: Toluene-d8	61		"	62.5	98.0		70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5	102		70-130			

Origins Laboratory, Inc.



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Arvada CO 80003

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26006 - EPA 5030 (soil)

LCS (5C26006-BS1)

Prepared: 03/26/2015 Analyzed: 03/26/2015

Benzene	0.104	0.002	mg/kg	0.100	104	77.1-124
Toluene	0.102	0.002	"	0.100	102	74.5-128
Ethylbenzene	0.100	0.002	"	0.100	100	66.4-127
m,p-Xylene	0.201	0.004	"	0.200	101	76.6-124
o-Xylene	0.103	0.002	"	0.100	103	76.6-124
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5	101	70-130
Surrogate: Toluene-d8	62		"	62.5	99.3	70-130
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.2	70-130

Origins Laboratory, Inc.



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John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26006 - EPA 5030 (soil)

Matrix Spike (5C26006-MS1)		Source: X503327-01			Prepared: 03/26/2015 Analyzed: 03/26/2015					
Benzene	0.103	0.002	mg/kg	0.100	ND	103	71.8-126			
Toluene	0.100	0.002	"	0.100	ND	100	65.1-130			
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130			
m,p-Xylene	0.202	0.004	"	0.200	ND	101	46.5-137			
o-Xylene	0.102	0.002	"	0.100	ND	102	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.6	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26006 - EPA 5030 (soil)										
Matrix Spike Dup (5C26006-MSD1)					Source: X503327-01					Prepared: 03/26/2015 Analyzed: 03/26/2015
Benzene	0.097	0.002	mg/kg	0.100	ND	96.7	71.8-126	6.60	11.3	
Toluene	0.094	0.002	"	0.100	ND	94.5	65.1-130	5.93	15.4	
Ethylbenzene	0.093	0.002	"	0.100	ND	93.1	62.2-130	7.82	19.6	
m,p-Xylene	0.186	0.004	"	0.200	ND	92.9	46.5-137	8.18	19.2	
o-Xylene	0.094	0.002	"	0.100	ND	94.5	54.2-134	7.22	17.9	
Surrogate: 1,2-Dichloroethane-d4	66		ug/kg	62.5		106	70-130			
Surrogate: Toluene-d8	62		"	62.5		98.7	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.9	70-130			

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26005 - EPA 3580

Blank (5C26005-BLK1)

Prepared: 03/26/2015 Analyzed: 03/26/2015

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

Surrogate: o-Terphenyl

53.2

"

50.0

106

65-146

LCS (5C26005-BS1)

Prepared: 03/26/2015 Analyzed: 03/26/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	108	66.7-119
Diesel (C10-C28)	1000	50	"			70.1-127
Residual Range Organics (C28-C36)	1100	200	"	1000	113	54.5-139

Surrogate: o-Terphenyl

47.7

"

50.0

95.3

65-146

Matrix Spike (5C26005-MS1)

Source: X503336-01

Prepared: 03/26/2015 Analyzed: 03/26/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	20	105	56.4-132
Diesel (C10-C28)	1100	50	"		22		57.4-138
Residual Range Organics (C28-C36)	1100	200	"	1000	17	113	47.7-129

Surrogate: o-Terphenyl

47.1

"

50.0

94.2

65-146

Matrix Spike Dup (5C26005-MSD1)

Source: X503336-01

Prepared: 03/26/2015 Analyzed: 03/26/2015

Gasoline (C6-C10)	1100	50	mg/kg	1000	20	104	56.4-132	0.660	22
Diesel (C10-C28)	1100	50	"		22		57.4-138	0.281	18.3
Residual Range Organics (C28-C36)	1100	200	"	1000	17	113	47.7-129	0.0278	30.1

Surrogate: o-Terphenyl

46.7

"

50.0

93.4

65-146

Origins Laboratory, Inc.



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

John Cocroft
Project Number: 014215061
Project: KMG - Apple-Heirs W32-5DI

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 5C26010 - NO PREP										
Duplicate (5C26010-DUP1)		Source: X503341-01			Prepared: 03/26/2015 Analyzed: 03/26/2015					
pH	9.58		pH Units		9.55			0.314	25	
Batch 5C26011 - NO PREP										
Blank (5C26011-BLK1)		Prepared: 03/26/2015 Analyzed: 03/26/2015								
Specific Conductance (EC)	0.00270		mmhos/cm							
Duplicate (5C26011-DUP1)		Source: X503341-01			Prepared: 03/26/2015 Analyzed: 03/26/2015					
Specific Conductance (EC)	0.0526		mmhos/cm		0.0531			0.946	25	

Origins Laboratory, Inc.



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LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

John Cocroft

Project Number: 014215061

Project: KMG - Apple-Heirs W32-5DI

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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