



September 7, 2016

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

**RE: Sump Closure Report  
Floyd C. Shaw Unit #2  
API# 05-123-09964  
Spill/Release Point ID# 446961  
NESE Sec 1-T2N-R67W  
Weld County, Colorado**

Dear Mr. Mickelson:

LT Environmental, Inc. (LTE) was contracted by Kerr-McGee Oil & Gas Onshore LP (Kerr-McGee) to conduct environmental oversight activities at the Fantastyk Red V 1-09 tank battery (API# 05-123-19181), which adjoins the tank battery for the subject well. The produced water sump at the subject site was removed during excavation activities associated with the release at the adjoining tank battery. Impacted soil extended from the release area at the Fantastyk Red V 1-09 tank battery to beneath the Floyd C. Shaw Unit #2 produced water sump. There was no indication of a separate release from the Floyd C. Shaw Unit #2 produced water sump.

In July 2016, the produced water sump associated with the Fantastyk Red V 1-09 well overflowed onto the ground surface inside the tank battery containment berm. While removing the produced water sump, a corrosion hole was discovered in an associated dump line. The volume of the release is unknown. The release became reportable on July 22, 2016, due to the volume of soil impact removed (Spill/Release Point ID# 446961).

On July 22, 2016, following removal of the Fantastyk Red V 1-09 produced water sump, groundwater with impacts exceeding Colorado Groundwater Quality Standards (CGWQS) (benzene at 1,110 micrograms per liter) was confirmed. Excavation activities are ongoing at the site. Groundwater monitoring wells will be installed and monitoring will be conducted on a quarterly basis. Further details are presented in the Form 27 accompanying this Sump Closure Report. The general site layout and groundwater sample location are depicted on the Excavation Site Map provided as Figure 1. The groundwater sample analytical results for the Fantastyk Red V 1-09 location are summarized in Table 1, and the laboratory analytical report is attached.

The produced water sump at this facility has been permanently removed. Following completion of site investigation activities, the excavation area will be backfilled and contoured to match pre-



existing site conditions. No further action is required with respect to the produced water sump associated with the Floyd C. Shaw Unit #2 tank battery.

Please contact LTE at (303) 433-9788 if you have any questions regarding this Sump Closure Report or if you require additional information.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Michael J. Furtaw".

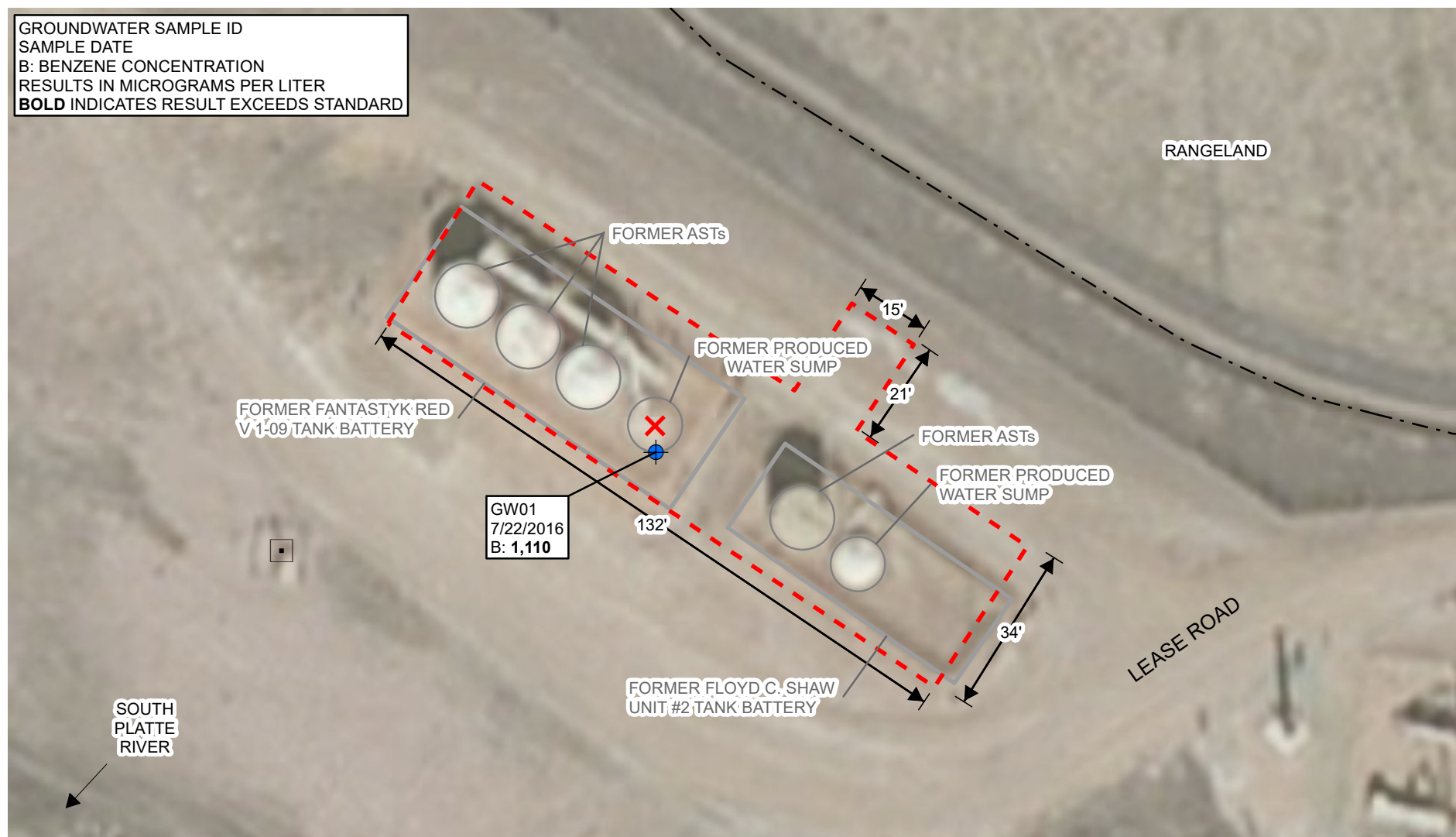
Michael J. Furtaw, P.G.  
Project Geologist

A handwritten signature in black ink that reads "Justin Solomon".

Justin Solomon  
Senior Environmental Scientist

Attachments

GROUNDWATER SAMPLE ID  
 SAMPLE DATE  
 B: BENZENE CONCENTRATION  
 RESULTS IN MICROGRAMS PER LITER  
**BOLD** INDICATES RESULT EXCEEDS STANDARD



# LEGEND

- ✕ RELEASE LOCATION
- ⊕ GROUNDWATER SAMPLE
- WELLHEAD
- - - IRRIGATION DITCH
- MEASURED DIMENSION
- EXCAVATION EXTENT
- FORMER BERM
- AST: ABOVEGROUND STORAGE TANK

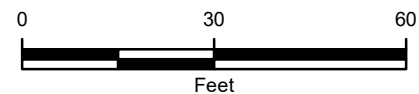


IMAGE COURTESY OF ESRI



**FIGURE 1**  
 EXCAVATION SITE MAP  
 FANTASTYK RED V 1-09  
 NESE SEC 1-T2N-R67W  
 WELD COUNTY, COLORADO  
 KERR-MCGEE OIL & GAS ONSHORE LP



**TABLE 1**  
**GROUNDWATER ANALYTICAL AND FIELD RESULTS**  
**FANTASTYK RED V 1-09**  
**WELD COUNTY, COLORADO**  
**KERR-MCGEE OIL & GAS ONSHORE LP**

Well Name	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth Water/ (Product Thickness) (ft bgs)
GW01	07/22/2016	<b>1110</b>	248	435	1180	8.00
<b>CGWQS</b>		<b>5</b>	<b>1000</b>	<b>700</b>	<b>1400</b>	

Notes: CGWQS - Colorado Groundwater Quality Standards  
ft bgs - feet below ground surface  
NA - not analyzed/not available  
NM - not measured

µg/L - micrograms per liter  
< - less than laboratory reporting limit  
Bold indicates result exceeds allowable level  
Excavation groundwater depth is approximate





July 25, 2016

LT Environmental, Inc.

John Cocroft

4600 West 60th Avenue

Arvada

CO 80003

**Project Name - KMG - Fantasyk Red V 1-09**

**Project Number - 014216/WO# 89080333**

Attached are your analytical results for KMG - Fantasyk Red V 1-09 received by Origins Laboratory, Inc. July 22, 2016. This project is associated with Origins project number X607248-01.

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: 014216/WO# 89080333

Project: KMG - Fantasyk Red V 1-09

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	X607248-01	Water	July 22, 2016 13:30	07/22/2016 16:45

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.*

John Cocroft  
Project Number: 014216/WO# 89080333  
Project: KMG - Fantasyk Red V 1-09

# ORIGINS

LABORATORY, INC

www.originslaboratory.com

page 1 of 1

Client: LTE

Address: 4600 w 60th Ave Arvada CO 80003

Telephone Number: (303) 433-9788

Email Address: APC Team

Project Manager: J. Carroff

Project Name: Fantastic Red V1-09

Project Number: 014216

Samples Collected By: Kris Shepherd

APC ID # B7000333 AHN: Sam LaRue

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 #	Other			
G1201	7/22/16	1530	3	X								X		1
														2
														3
														4
														5
														6
														7
														8
														9
														10

Relinquished By: <u>[Signature]</u>	Date: <u>7/22/2016</u>	Time: <u>1545</u>	Received By: <u>[Signature]</u>	Date: <u>7/22/16</u>	Time: <u>15:50</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 checked="" type="checkbox"/> 168
	Relinquished By: <u>[Signature]</u>	Date: <u>7/22/16</u>	Time: <u>1645</u>	Received By: <u>[Signature]</u>	Date: <u>7/22/16</u>	

3.7

Date Results Needed 7/25/16 0200

Origins Laboratory, Inc.

Jeff Pellipini

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

John Cocroft  
Project Number: 014216/WO# 89080333  
Project: KMG - Fantasyk Red V 1-09

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: X607248

Client: LTE

Client Project ID: Fantasyk Red V1-09

Checklist Completed by: LTE Smith

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

Date/time completed: 7/22/12

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 3.7 °C 1 / 1 °C 1 / 1 °C (Describe)

Thermometer ID: T603

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

Reviewed by (Project Manager) [Signature]

Date/Time Reviewed 7/22/12

Origins Laboratory, Inc.

Jefe Pellegrini

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

John Cocroft  
Project Number: 014216/WO# 89080333  
Project: KMG - Fantasyk Red V 1-09

**GW01**

**7/22/2016 1:30:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X607248-01 (Water)**

**BTEX by EPA 8260C**

Benzene	1110	50.0	ug/L	50	B6G2104	07/22/2016	07/22/2016
Toluene	248	4.00	"	4	"	"	07/22/2016
Ethylbenzene	435	4.00	"	"	"	"	"
Xylenes, total	1180	4.00	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	84-121			"	"	"
Surrogate: Toluene-d8	104 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	98.2 %	84-114			"	"	"

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

John Cocroft  
Project Number: 014216/WO# 89080333  
Project: KMG - Fantasyk Red V 1-09

**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 B6G2104 - EPA 5030B (Water)**

**Blank (B6G2104-BLK1)**

Prepared: 07/21/2016 Analyzed: 07/22/2016

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5	103		84-121			
Surrogate: Toluene-d8	62		"	62.5	99.7		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.3		84-114			

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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 B6G2104 - EPA 5030B (Water)**

**LCS (B6G2104-BS1)**

Prepared: 07/21/2016 Analyzed: 07/22/2016

Benzene	51.6	1.00	ug/L	50.0	103	73.3-129
Toluene	51.0	1.00	"	50.0	102	76.2-123
Ethylbenzene	50.9	1.00	"	50.0	102	73.6-130
m,p-Xylene	101	2.00	"	100	101	76.1-126
o-Xylene	51.0	1.00	"	50.0	102	76.6-124
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5	94.9	84-121
Surrogate: Toluene-d8	63		"	62.5	101	85-115
Surrogate: 4-Bromofluorobenzene	63		"	62.5	101	84-114

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Project: KMG - Fantasy Red V 1-09

**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 B6G2104 - EPA 5030B (Water)**

Matrix Spike (B6G2104-MS1)		Source: X607215-01			Prepared: 07/21/2016 Analyzed: 07/22/2016					
Benzene	50.3	1.00	ug/L	50.0	ND	101	74-130			
Toluene	50.4	1.00	"	50.0	ND	101	73-131			
Ethylbenzene	51.5	1.00	"	50.0	ND	103	76-132			
m,p-Xylene	102	2.00	"	100	0.200	102	69-139			
o-Xylene	51.2	1.00	"	50.0	ND	102	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.5	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.6	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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Project: KMG - Fantasy Red V 1-09

**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 B6G2104 - EPA 5030B (Water)**

Matrix Spike Dup (B6G2104-MSD1)		Source: X607215-01			Prepared: 07/21/2016 Analyzed: 07/22/2016					
Benzene	47.7	1.00	ug/L	50.0	ND	95.4	74-130	5.37	20	
Toluene	47.3	1.00	"	50.0	ND	94.7	73-131	6.28	20	
Ethylbenzene	48.1	1.00	"	50.0	ND	96.2	76-132	6.75	20	
m,p-Xylene	95.3	2.00	"	100	0.200	95.1	69-139	6.81	20	
o-Xylene	48.9	1.00	"	50.0	ND	97.8	74-131	4.65	20	
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		96.8	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.3	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

Origins Laboratory, Inc.



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Arvada CO 80003

John Cocroft  
Project Number: 014216/WO# 89080333  
Project: KMG - Fantasyk Red V 1-09

### Notes and Definitions

U Sample is Non-Detect.

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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Jen Pellegrini For Noelle Doyle Mathis, President