



Ensolum

October 17, 2024

Jeremy Espinoza

11049 W 44th Avenue, Suite 103

Wheat Ridge CO 80033

Project Name - KMG - Kerr McGee 23-13 Flowline Project Number - 09A1417861

Attached are your analytical results for KMG - Kerr McGee 23-13 Flowline received by Origins Laboratory September 20, 2024. This project is associated with Origins project number E409641-01.

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
303.433.1322
projectmanager@originslab.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Ensolum
 11049 W 44th Avenue, Suite 103
 Wheat Ridge CO 80033

Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B01(23-13)@6'	E409641-01	Soil	September 20, 2024 10:37	09/20/2024 17:19
B01(23-13)@6'-V	E409641-02	Soil	September 20, 2024 10:38	09/20/2024 17:19
NATIVE-BG01@3'	E409641-03	Soil	September 20, 2024 10:55	09/20/2024 17:19
NATIVE-BG01@6'	E409641-04	Soil	September 20, 2024 11:01	09/20/2024 17:19
NATIVE-BG02@3'	E409641-05	Soil	September 20, 2024 11:06	09/20/2024 17:19
NATIVE-BG02@6'	E409641-06	Soil	September 20, 2024 11:07	09/20/2024 17:19
NATIVE-BG03@3'	E409641-07	Soil	September 20, 2024 11:12	09/20/2024 17:19
NATIVE-BG03@6'	E409641-08	Soil	September 20, 2024 11:13	09/20/2024 17:19
NATIVE-BG04@3'	E409641-09	Soil	September 20, 2024 11:24	09/20/2024 17:19
NATIVE-BG04@6'	E409641-10	Soil	September 20, 2024 11:26	09/20/2024 17:19

Origins Laboratory



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Ensolum
11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

ORIGINS LABORATORY INC

ORIGINS WORK ORDER #

64091641

Page 1 of 1

Client: Ensolum
 Address: _____
 Project Manager: J. Espinoza
 Project Name: Kerr McGee 23-13 Wellhead
 Project Number: 09A1417861
 Key: _____
 Telephone Number: _____
 Collected By: HK
 W=Water
 GI=Groundwater
 SW=Surface Water
 MW=Waste Water
 L=Liquid
 Email Address: KMGTEAM
 Invoice/Billing Info: Initial
 S=Soil | SO=Solid | O=Oil | A=Air | G=Gas | UNP=Unpres | HCL=Hydrochloric | HNO3=Nitric | H2SO4=Sulfuric | NaOH=sodium Hydroxide

#	Sample ID	Date Sampled	Time Sampled	# of Containers	Matrix Preservative	Analysis		Comments
						Metals	Organics	
1	BO(23-13)EG1	10/24	1037	3	S. unsp	X		
2	BO(23-13)EG.V		1038	3		X		
3	NATIVE-BG01EG1		1059	2				
4	NATIVE-BG01EG1		1161					
5	NATIVE-BG02EG1		1106					
6	NATIVE-BG02EG1		1107					
7	NATIVE-BG03EG1		1112					
8	NATIVE-BG03EG1		1113					
9	NATIVE-BG04EG1		1124					
10	NATIVE-BG04EG1		1126					

Relinquished By: [Signature] Date: 11/20/24 Time: 1710
 Received By: [Signature] Date: 11/20/24 Time: 1719
 Turnaround Time: SAME DAY 24 Hr 48 Hr 72 Hr
 Standard
 Received On Ice? Yes No

1725 Elk Place Denver, Co, 80211 | # 303.433.1322 | originslab.com | Temp Received - SO Received On Ice? Yes No

Origins Laboratory
[Signature]

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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: E4091641

Client: ENSOLUM

Client Project ID: Kerr McGee

Checklist Completed by: JHD KK

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

Date/time completed: 9/20/12

Airbill #: N/A

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

Cooler Number/Temperature: 115 °C / _____ °C / _____ °C (Describe)

Thermometer ID: 7005

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ^{(1)?}	/			
Is there ice present (document if blue ice is used)	/			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		/		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		/		
Were all samples received intact ^{(1)?}	/			
Was adequate sample volume provided ^{(1)?}	/			
Are short holding time analytes or samples with HTs due within 48 hours present ^{(1)?}		/		
Is a chain-of-custody (COC) present and filled out completely ^{(1)?}	/			
Does the COC agree with the number and type of sample bottles received ^{(1)?}	/			
Do the sample IDs on the bottle labels match the COC ^{(1)?}	/			
Is the COC properly relinquished by the client with date and time recorded ^{(1)?}	/			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			/	
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 HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)			/	
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) JHD Date/Time Reviewed 9/20/12

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Ensolum
11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

B01(23-13)@6'

9/20/2024 10:37:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-01 (Soil)**

Boron (DTPA Sorbitol)

Boron	ND		0.102	mg/L	1	B412328	09/23/2024	09/24/2024	
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	ND		25.0	mg/kg	1	B412033	09/20/2024	09/21/2024	Ua
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	Ua

Surrogate: o-Terphenyl	93.1 %		50-150			"	"	"	
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GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B412034	09/20/2024	09/21/2024	Ua
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	Ua
Benzene	ND		0.00200	"	"	"	"	"	Ua
Ethylbenzene	ND		0.00200	"	"	"	"	"	Ua
Toluene	ND		0.00200	"	"	"	"	"	Ua
Xylenes, total	ND		0.00200	"	"	"	"	"	Ua
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	Ua

Surrogate: 1,2-Dichloroethane-d4	79.6 %		70-130			"	"	"	
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9/20/2024 10:37:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-01 (Soil)

GBTEX+TMBs by 8260D

Surrogate: Toluene-d8	95.9 %	70-130	B4I203 4	09/20/2024	09/21/2024
Surrogate: 4-Bromofluorobenzene	82.0 %	70-130	"	"	"

Metals by Saturated Paste by EPA 6010

Calcium	1.23	0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024
Magnesium	ND	0.823	"	"	"	"	"
Sodium	ND	0.435	"	"	"	"	"

PAH by EPA 8270E extracted via 3580A

1-Methylnaphthalene	ND	0.002	mg/kg	1	B4I2039	09/20/2024	09/21/2024	Ua
2-Methylnaphthalene	ND	0.002	"	"	"	"	"	Ua
Acenaphthene	ND	0.020	"	"	"	"	"	Ua
Anthracene	ND	0.020	"	"	"	"	"	Ua
Benzo (a) anthracene	ND	0.005	"	"	"	"	"	Ua
Benzo (a) pyrene	ND	0.020	"	"	"	"	"	Ua
Benzo (b) fluoranthene	ND	0.020	"	"	"	"	"	Ua
Benzo (k) fluoranthene	ND	0.020	"	"	"	"	"	Ua
Chrysene	ND	0.020	"	"	"	"	"	Ua
Dibenz (a,h) anthracene	ND	0.020	"	"	"	"	"	Ua
Fluoranthene	ND	0.020	"	"	"	"	"	Ua

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B01(23-13)@6'

9/20/2024 10:37:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-01 (Soil)

PAH by EPA 8270E extracted via 3580A

Fluorene	ND		0.020	mg/kg	1	B412039	09/20/2024	09/21/2024	Ua
Indeno (1,2,3-cd) pyrene	ND		0.020	"	"	"	"	"	Ua
Naphthalene	ND		0.002	"	"	"	"	"	Ua
Pyrene	ND		0.020	"	"	"	"	"	Ua

Surrogate: Fluorene-d10	102 %		60-130			"	"	"	
Surrogate: Anthracene-d10	98.5 %		60-130			"	"	"	
Surrogate: Pyrene-d10	95.0 %		60-130			"	"	"	
Surrogate: Benzo (a) pyrene-d12	97.6 %		60-130			"	"	"	

pH in Soil by 9045D

pH	7.90			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.310		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.528		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Origins Laboratory



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Project: KMG - Kerr McGee 23-13 Flowline

B01(23-13)@6'

9/20/2024 10:37:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-01 (Soil)

Table 915 metals by EPA 6020B

Arsenic	1.62		0.271	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	59.6		9.33	"	"	"	"	"	
Cadmium	0.118		0.0933	"	"	"	"	"	
Copper	ND		9.33	"	"	"	"	"	
Lead	8.78		0.933	"	"	"	"	"	
Nickel	5.00		0.933	"	"	"	"	"	
Selenium	ND		0.243	"	"	"	"	"	
Silver	ND		0.0933	"	"	"	"	"	
Zinc	ND		34.5	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.161	0.402	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Origins Laboratory



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Project: KMG - Kerr McGee 23-13 Flowline

B01(23-13)@6'-V

9/20/2024 10:38:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-02 (Soil)

pH in Soil by 9045D

pH	7.97			pH Units	1	B4J0115	10/01/2024	10/02/2024	
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Origins Laboratory



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Ensolum
 11049 W 44th Avenue, Suite 103
 Wheat Ridge CO 80033

Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG01@3'

9/20/2024 10:59:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-03 (Soil)

Boron (DTPA Sorbitol)

Boron	ND		0.100	mg/L	1	B412328	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	0.534		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.55			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.270		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0842		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	2.00		0.288	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	85.2		9.95	"	"	"	"	"	
Cadmium	ND		0.0995	"	"	"	"	"	

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG01@3'

9/20/2024 10:59:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-03 (Soil)**

Table 915 metals by EPA 6020B

Copper	ND		9.95	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	7.26		0.995	"	"	"	"	"	
Nickel	7.20		0.995	"	"	"	"	"	
Selenium	ND		0.259	"	"	"	"	"	
Silver	ND		0.0995	"	"	"	"	"	
Zinc	ND		36.8	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.139	0.348	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Origins Laboratory



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11049 W 44th Avenue, Suite 103
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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG01@6'

9/20/2024 11:01:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-04 (Soil)**

Boron (DTPA Sorbitol)

Boron	ND		0.0985	mg/L	1	B412328	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	0.534		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.64			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.196		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0967		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	1.64		0.289	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	62.0		9.95	"	"	"	"	"	
Cadmium	ND		0.0995	"	"	"	"	"	

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG01@6'

9/20/2024 11:01:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-04 (Soil)**

Table 915 metals by EPA 6020B

Copper	ND		9.95	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	4.65		0.995	"	"	"	"	"	
Nickel	5.71		0.995	"	"	"	"	"	
Selenium	ND		0.259	"	"	"	"	"	
Silver	ND		0.0995	"	"	"	"	"	
Zinc	ND		36.8	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.138	0.346	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG02@3'

9/20/2024 11:06:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-05 (Soil)

Boron (DTPA Sorbitol)

Boron	ND		0.0996	mg/L	1	B4I2328	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	ND		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	6.74			pH Units	1	B4I2322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.234		0.0100	SAR	1	B4I2316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.107		0.00500	mmhos/cm	1	B4I2322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	1.32		0.259	mg/kg	10	B4I2036	09/20/2024	09/21/2024	
Barium	46.7		8.92	"	"	"	"	"	
Cadmium	0.129		0.0892	"	"	"	"	"	

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Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG02@3'

9/20/2024 11:06:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-05 (Soil)**

Table 915 metals by EPA 6020B

Copper	ND		8.92	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	5.71		0.892	"	"	"	"	"	
Nickel	3.25		0.892	"	"	"	"	"	
Selenium	ND		0.232	"	"	"	"	"	
Silver	ND		0.0892	"	"	"	"	"	
Zinc	ND		33.0	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.140	0.349	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Origins Laboratory



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Ensolum
 11049 W 44th Avenue, Suite 103
 Wheat Ridge CO 80033

Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG02@6'

9/20/2024 11:07:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-06 (Soil)

Boron (DTPA Sorbitol)

Boron	0.214	0.0989	mg/L	1	B412328	09/23/2024	09/24/2024
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Metals by Saturated Paste by EPA 6010

Calcium	0.508	0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024
Magnesium	ND	0.823	"	"	"	"	"
Sodium	0.543	0.435	"	"	"	"	"

pH in Soil by 9045D

pH	7.70	pH Units	1	B412322	09/23/2024	09/24/2024
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SAR by 20B Saturated Paste

SAR	0.889	0.0100	SAR	1	B412316	09/23/2024	09/24/2024
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.136	0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024
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Table 915 metals by EPA 6020B

Arsenic	3.19	0.281	mg/kg	10	B412036	09/20/2024	09/21/2024
Barium	86.3	9.70	"	"	"	"	"
Cadmium	ND	0.0970	"	"	"	"	"
Copper	ND	9.70	"	"	"	"	"

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11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG02@6'

9/20/2024 11:07:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-06 (Soil)**

Table 915 metals by EPA 6020B

Lead	7.05		0.970	mg/kg	10	B412036	09/20/2024	09/21/2024	
Nickel	9.26		0.970	"	"	"	"	"	
Selenium	ND		0.252	"	"	"	"	"	
Silver	ND		0.0970	"	"	"	"	"	
Zinc	ND		35.9	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.118	0.295	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Ensolum
11049 W 44th Avenue, Suite 103
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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG03@3'

9/20/2024 11:12:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-07 (Soil)**

Boron (DTPA Sorbitol)

Boron	0.120		0.102	mg/L	1	B412328	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	ND		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.44			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.175		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0792		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	1.88		0.247	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	67.9		8.52	"	"	"	"	"	
Cadmium	0.107		0.0852	"	"	"	"	"	

Origins Laboratory



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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG03@3'

9/20/2024 11:12:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-07 (Soil)

Table 915 metals by EPA 6020B

Copper	ND		8.52	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	6.12		0.852	"	"	"	"	"	
Nickel	6.91		0.852	"	"	"	"	"	
Selenium	ND		0.222	"	"	"	"	"	
Silver	ND		0.0852	"	"	"	"	"	
Zinc	ND		31.5	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.137	0.343	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG03@6'

9/20/2024 11:13:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-08 (Soil)

Boron (DTPA Sorbitol)

Boron	0.297		0.102	mg/L	1	B412329	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	ND		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	0.894		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.93			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	1.87		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.170		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	3.88		0.288	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	92.3		9.94	"	"	"	"	"	
Cadmium	ND		0.0994	"	"	"	"	"	

Origins Laboratory



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11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG03@6'

9/20/2024 11:13:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-08 (Soil)**

Table 915 metals by EPA 6020B

Copper	ND		9.94	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	8.86		0.994	"	"	"	"	"	
Nickel	13.5		0.994	"	"	"	"	"	
Selenium	ND		0.259	"	"	"	"	"	
Silver	ND		0.0994	"	"	"	"	"	
Zinc	42.6		36.8	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.131	0.329	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG04@3'

9/20/2024 11:24:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-09 (Soil)**

Boron (DTPA Sorbitol)

Boron	ND		0.100	mg/L	1	B4I2329	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	ND		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.39			pH Units	1	B4I2322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.298		0.0100	SAR	1	B4I2316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0672		0.00500	mmhos/cm	1	B4I2322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	1.99		0.279	mg/kg	10	B4I2036	09/20/2024	09/21/2024	
Barium	65.9		9.63	"	"	"	"	"	
Cadmium	ND		0.0963	"	"	"	"	"	

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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG04@3'

9/20/2024 11:24:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E409641-09 (Soil)

Table 915 metals by EPA 6020B

Copper	ND		9.63	mg/kg	10	B412036	09/20/2024	09/21/2024	
Lead	5.95		0.963	"	"	"	"	"	
Nickel	6.41		0.963	"	"	"	"	"	
Selenium	ND		0.250	"	"	"	"	"	
Silver	ND		0.0963	"	"	"	"	"	
Zinc	ND		35.6	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.143	0.358	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG04@6'

9/20/2024 11:26:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-10 (Soil)**

Boron (DTPA Sorbitol)

Boron	0.109		0.101	mg/L	1	B412329	09/23/2024	09/24/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	0.514		0.499	meq/L	10	[CALC]	09/23/2024	09/24/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

pH in Soil by 9045D

pH	7.30			pH Units	1	B412322	09/23/2024	09/24/2024	
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SAR by 20B Saturated Paste

SAR	0.170		0.0100	SAR	1	B412316	09/23/2024	09/24/2024	
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0929		0.00500	mmhos/cm	1	B412322	09/23/2024	09/24/2024	
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Table 915 metals by EPA 6020B

Arsenic	3.49		0.259	mg/kg	10	B412036	09/20/2024	09/21/2024	
Barium	96.6		8.93	"	"	"	"	"	
Cadmium	ND		0.0893	"	"	"	"	"	
Copper	8.93		8.93	"	"	"	"	"	

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

NATIVE-BG04@6'

9/20/2024 11:26:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E409641-10 (Soil)**

Table 915 metals by EPA 6020B

Lead	7.92		0.893	mg/kg	10	B412036	09/20/2024	09/21/2024	
Nickel	12.0		0.893	"	"	"	"	"	
Selenium	ND		0.232	"	"	"	"	"	
Silver	ND		0.0893	"	"	"	"	"	
Zinc	35.2		33.0	"	"	"	"	"	

Total Metals 7196A

Hexavalent Chromium	ND	0.150	0.375	mg/kg dry	1	2685731	10/10/2024	10/10/2024	U
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Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

Extractable Petroleum Hydrocarbons by 8015D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B4I2033 - EPA 3550B										
Blank (B4I2033-BLK1)										
					Prepared: 09/20/2024 Analyzed: 09/21/2024					
Diesel (C10-C28)	ND	25.0	mg/kg							Ua
Residual Range Organics (C28-C40)	ND	100	"							Ua
Surrogate: o-Terphenyl	23		"	24.9		90.6	50-150			

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Jeremy Espinoza
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 Project: KMG - Kerr McGee 23-13 Flowline

Extractable Petroleum Hydrocarbons by 8015D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2033 - EPA 3550B

LCS (B4I2033-BS1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

Diesel (C10-C28)	914	50.0	mg/kg	1000		91.4	70-130			
Residual Range Organics (C28-C40)	954	200	"	1000		95.4	70-130			
Surrogate: o-Terphenyl	53		"	49.8		106	50-150			

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Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Extractable Petroleum Hydrocarbons by 8015D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B4I2033 - EPA 3550B										
Matrix Spike (B4I2033-MS1)			Source: E409635-01			Prepared: 09/20/2024 Analyzed: 09/21/2024				
Diesel (C10-C28)	922	50.0	mg/kg	1000	ND	92.2	70-130			
Residual Range Organics (C28-C40)	986	200	"	1000	ND	98.6	70-130			
Surrogate: o-Terphenyl	52		"	49.8		104	50-150			

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Extractable Petroleum Hydrocarbons by 8015D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2033 - EPA 3550B

Matrix Spike Dup (B4I2033-MSD1)	Source: E409635-01		Prepared: 09/20/2024 Analyzed: 09/21/2024							
Diesel (C10-C28)	1010	50.0	mg/kg	1000	ND	101	70-130	8.76	35	
Residual Range Organics (C28-C40)	1110	200	"	1000	ND	111	70-130	12.0	35	
Surrogate: o-Terphenyl	58		"	49.8		117	50-150			

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Extractable Petroleum Hydrocarbons by 8015D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B4I2034 - EPA 5030 (soil)										
Blank (B4I2034-BLK1)										
					Prepared: 09/20/2024 Analyzed: 09/20/2024					
1,2,4-Trimethylbenzene	ND	0.00200	mg/kg							Ua
1,3,5-Trimethylbenzene	ND	0.00200	"							Ua
Benzene	ND	0.00200	"							Ua
Ethylbenzene	ND	0.00200	"							Ua
Naphthalene	ND	0.00380	"							Ua
Toluene	ND	0.00200	"							Ua
Xylenes, total	ND	0.00200	"							Ua
Gasoline Range Hydrocarbons	ND	0.200	"							Ua
Surrogate: 1,2-Dichloroethane-d4	0.096		"	0.125		77.0	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.8	70-130			
Surrogate: 4-Bromofluorobenzene	0.10		"	0.125		82.0	70-130			

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Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2034 - EPA 5030 (soil)

LCS (B4I2034-BS1)

Prepared: 09/20/2024 Analyzed: 09/20/2024

1,2,4-Trimethylbenzene	0.0816	0.00200	mg/kg	0.100		81.6	70-130			
1,3,5-Trimethylbenzene	0.0853	0.00200	"	0.100		85.3	70-130			
Benzene	0.0950	0.00200	"	0.100		95.0	70-130			
Ethylbenzene	0.0902	0.00200	"	0.100		90.2	70-130			
Naphthalene	0.0882	0.00380	"	0.100		88.2	70-130			
Toluene	0.0854	0.00200	"	0.100		85.4	70-130			
o-Xylene	0.0860	0.00200	"	0.100		86.0	70-130			
m,p-Xylene	0.187	0.00400	"	0.200		93.5	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.096		"	0.125		77.1	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.11		"	0.125		89.5	70-130			

Origins Laboratory



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11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2034 - EPA 5030 (soil)

Matrix Spike (B4I2034-MS1)	Source: E409635-01			Prepared: 09/20/2024 Analyzed: 09/20/2024						
1,2,4-Trimethylbenzene	0.0751	0.00200	mg/kg	0.100	ND	75.1	70-130			
1,3,5-Trimethylbenzene	0.0795	0.00200	"	0.100	ND	79.5	70-130			
Benzene	0.0823	0.00200	"	0.100	ND	82.3	70-130			
Ethylbenzene	0.0839	0.00200	"	0.100	ND	83.9	70-130			
Naphthalene	0.0766	0.00380	"	0.100	ND	76.6	70-130			
Toluene	0.0781	0.00200	"	0.100	ND	78.1	70-130			
o-Xylene	0.0827	0.00200	"	0.100	ND	82.7	70-130			
m,p-Xylene	0.175	0.00400	"	0.200	0.00162	86.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.098		"	0.125		78.6	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.7	70-130			
Surrogate: 4-Bromofluorobenzene	0.11		"	0.125		89.8	70-130			

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Ensolum
 11049 W 44th Avenue, Suite 103
 Wheat Ridge CO 80033

Jeremy Espinoza
 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2034 - EPA 5030 (soil)

Matrix Spike Dup (B4I2034-MSD1)	Source: E409635-01			Prepared: 09/20/2024 Analyzed: 09/20/2024						
1,2,4-Trimethylbenzene	0.0679	0.00200	mg/kg	0.100	ND	67.9	70-130	10.0	20	QM-07
1,3,5-Trimethylbenzene	0.0706	0.00200	"	0.100	ND	70.6	70-130	11.9	20	
Benzene	0.0799	0.00200	"	0.100	ND	79.9	70-130	2.96	20	
Ethylbenzene	0.0767	0.00200	"	0.100	ND	76.7	70-130	9.04	20	
Naphthalene	0.0683	0.00380	"	0.100	ND	68.3	70-130	11.4	20	QM-07
Toluene	0.0741	0.00200	"	0.100	ND	74.1	70-130	5.31	20	
o-Xylene	0.0751	0.00200	"	0.100	ND	75.1	70-130	9.61	20	
m,p-Xylene	0.160	0.00400	"	0.200	0.00162	79.1	70-130	9.09	20	
Surrogate: 1,2-Dichloroethane-d4	0.10		"	0.125		80.9	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		93.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.11		"	0.125		89.7	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Metals by EPA 6000/7000 Series Methods - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2036 - EPA 3050B

Blank (B4I2036-BLK1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

Arsenic	ND	0.290	mg/kg							
Barium	ND	10.0	"							
Cadmium	ND	0.100	"							
Copper	ND	10.0	"							
Lead	ND	1.00	"							
Nickel	ND	1.00	"							
Selenium	ND	0.260	"							
Silver	ND	0.100	"							
Zinc	ND	37.0	"							

LCS (B4I2036-BS1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

Arsenic	4.95	0.290	mg/kg	5.00		99.1	80-120			
Barium	473	10.0	"	500		94.7	80-120			
Cadmium	5.02	0.100	"	5.00		100	80-120			
Copper	51.0	10.0	"	50.0		102	80-120			
Lead	4.86	1.00	"	5.00		97.3	80-120			
Nickel	5.21	1.00	"	5.00		104	80-120			
Selenium	4.86	0.260	"	5.00		97.2	80-120			
Silver	5.29	0.100	"	5.00		106	80-120			
Zinc	48.8	37.0	"	50.0		97.7	80-120			

Matrix Spike (B4I2036-MS1)

Source: E409641-01

Prepared: 09/20/2024 Analyzed: 09/21/2024

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Metals by EPA 6000/7000 Series Methods - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2036 - EPA 3050B

Matrix Spike (B4I2036-MS1)		Source: E409641-01			Prepared: 09/20/2024 Analyzed: 09/21/2024					
Arsenic	5.75	0.268	mg/kg	4.63	1.62	89.2	75-125			
Barium	498	9.26	"	463	59.6	94.7	75-125			
Cadmium	4.81	0.0926	"	4.63	0.118	101	75-125			
Copper	51.2	9.26	"	46.3	4.99	99.8	75-125			
Lead	14.3	0.926	"	4.63	8.78	120	75-125			
Nickel	9.01	0.926	"	4.63	5.00	86.6	75-125			
Selenium	4.45	0.241	"	4.63	0.0924	94.3	75-125			
Silver	4.85	0.0926	"	4.63	0.0168	104	75-125			
Zinc	63.9	34.2	"	46.3	22.5	89.6	75-125			

Matrix Spike Dup (B4I2036-MSD1)		Source: E409641-01			Prepared: 09/20/2024 Analyzed: 09/21/2024					
Arsenic	6.69	0.285	mg/kg	4.91	1.62	103	75-125	15.2	20	
Barium	557	9.82	"	491	59.6	101	75-125	11.1	20	
Cadmium	5.49	0.0982	"	4.91	0.118	109	75-125	13.2	20	
Copper	58.9	9.82	"	49.1	4.99	110	75-125	14.0	20	
Lead	14.4	0.982	"	4.91	8.78	113	75-125	0.218	20	
Nickel	10.2	0.982	"	4.91	5.00	105	75-125	12.1	20	
Selenium	5.56	0.255	"	4.91	0.0924	111	75-125	22.1	20	QR-02
Silver	5.54	0.0982	"	4.91	0.0168	112	75-125	13.3	20	
Zinc	73.0	36.3	"	49.1	22.5	103	75-125	13.2	20	

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

EPA 8270E (SW846) - Semivolatile Organic Compounds - Quality Control Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2039 - EPA 3580

Blank (B4I2039-BLK1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

1-Methylnaphthalene	ND	0.002	mg/kg							Ua
2-Methylnaphthalene	ND	0.002	"							Ua
Acenaphthene	ND	0.020	"							Ua
Anthracene	ND	0.020	"							Ua
Benzo (a) anthracene	ND	0.005	"							Ua
Benzo (a) pyrene	ND	0.020	"							Ua
Benzo (b) fluoranthene	ND	0.020	"							Ua
Benzo (g,h,i) perylene	ND	0.020	"							Ua
Benzo (k) fluoranthene	ND	0.020	"							Ua
Chrysene	ND	0.020	"							Ua
Dibenz (a,h) anthracene	ND	0.020	"							Ua
Fluoranthene	ND	0.020	"							Ua
Fluorene	ND	0.020	"							Ua
Indeno (1,2,3-cd) pyrene	ND	0.020	"							Ua
Naphthalene	ND	0.002	"							Ua
Phenanthrene	ND	0.020	"							Ua
Pyrene	ND	0.020	"							Ua

Surrogate: Fluorene-d10	200		ug/kg	200	101	60-130
Surrogate: Anthracene-d10	190		"	200	95.3	60-130
Surrogate: Pyrene-d10	190		"	200	96.8	60-130
Surrogate: Benzo (a) pyrene-d12	200		"	200	97.7	60-130

LCS (B4I2039-BS1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

1-Methylnaphthalene	0.174	0.002	mg/kg	0.200	86.8	70-130
2-Methylnaphthalene	0.173	0.002	"	0.200	86.7	70-130
Acenaphthene	0.174	0.020	"	0.200	86.9	70-130
Anthracene	0.170	0.020	"	0.200	84.9	70-130

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 Project Number: 09A1417861
 Project: KMG - Kerr McGee 23-13 Flowline

EPA 8270E (SW846) - Semivolatile Organic Compounds - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2039 - EPA 3580

LCS (B4I2039-BS1)

Prepared: 09/20/2024 Analyzed: 09/21/2024

Benzo (a) anthracene	0.182	0.005	mg/kg	0.200		90.8	70-130			
Benzo (a) pyrene	0.167	0.020	"	0.200		83.3	70-130			
Benzo (b) fluoranthene	0.164	0.020	"	0.200		82.0	70-130			
Benzo (g,h,i) perylene	0.162	0.020	"	0.200		81.2	70-130			
Benzo (k) fluoranthene	0.161	0.020	"	0.200		80.7	70-130			
Chrysene	0.167	0.020	"	0.200		83.6	70-130			
Dibenz (a,h) anthracene	0.165	0.020	"	0.200		82.3	70-130			
Fluoranthene	0.184	0.020	"	0.200		91.8	70-130			
Fluorene	0.174	0.020	"	0.200		87.0	70-130			
Indeno (1,2,3-cd) pyrene	0.164	0.020	"	0.200		81.9	70-130			
Naphthalene	0.171	0.002	"	0.200		85.7	70-130			
Phenanthrene	0.169	0.020	"	0.200		84.4	70-130			
Pyrene	0.173	0.020	"	0.200		86.4	70-130			
Surrogate: Fluorene-d10	200		ug/kg	200		101	60-130			
Surrogate: Anthracene-d10	190		"	200		96.9	60-130			
Surrogate: Pyrene-d10	200		"	200		97.8	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		93.9	60-130			

Matrix Spike (B4I2039-MS1)

Source: E409640-01

Prepared: 09/20/2024 Analyzed: 09/21/2024

1-Methylnaphthalene	0.197	0.002	mg/kg	0.200	0.007	95.4	70-130			
2-Methylnaphthalene	0.203	0.002	"	0.200	0.010	96.4	70-130			
Acenaphthene	0.196	0.020	"	0.200	ND	97.9	70-130			
Anthracene	0.185	0.020	"	0.200	0.001	91.7	70-130			
Benzo (a) anthracene	0.190	0.005	"	0.200	ND	95.1	70-130			
Benzo (a) pyrene	0.171	0.020	"	0.200	0.003	84.2	70-130			
Benzo (b) fluoranthene	0.177	0.020	"	0.200	ND	88.3	70-130			
Benzo (g,h,i) perylene	0.169	0.020	"	0.200	ND	84.5	70-130			

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Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

EPA 8270E (SW846) - Semivolatile Organic Compounds - Quality Control Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2039 - EPA 3580

Matrix Spike (B4I2039-MS1)	Source: E409640-01			Prepared: 09/20/2024 Analyzed: 09/21/2024						
Benzo (k) fluoranthene	0.165	0.020	mg/kg	0.200	ND	82.5	70-130			
Chrysene	0.186	0.020	"	0.200	ND	93.2	70-130			
Dibenz (a,h) anthracene	0.173	0.020	"	0.200	ND	86.4	70-130			
Fluoranthene	0.197	0.020	"	0.200	0.0008	97.9	70-130			
Fluorene	0.196	0.020	"	0.200	0.006	95.0	70-130			
Indeno (1,2,3-cd) pyrene	0.171	0.020	"	0.200	ND	85.6	70-130			
Naphthalene	0.182	0.002	"	0.200	0.0008	90.6	70-130			
Phenanthrene	0.191	0.020	"	0.200	0.009	91.0	70-130			
Pyrene	0.180	0.020	"	0.200	0.006	86.8	70-130			
Surrogate: Fluorene-d10	200		ug/kg	200		101	60-130			
Surrogate: Anthracene-d10	200		"	200		98.6	60-130			
Surrogate: Pyrene-d10	190		"	200		95.1	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		94.6	60-130			

Matrix Spike Dup (B4I2039-MSD1)	Source: E409640-01			Prepared: 09/20/2024 Analyzed: 09/21/2024						
1-Methylnaphthalene	0.209	0.002	mg/kg	0.200	0.007	101	70-130	5.56	20	
2-Methylnaphthalene	0.218	0.002	"	0.200	0.010	104	70-130	7.35	20	
Acenaphthene	0.184	0.020	"	0.200	ND	91.9	70-130	6.38	20	
Anthracene	0.179	0.020	"	0.200	0.001	88.7	70-130	3.39	20	
Benzo (a) anthracene	0.180	0.005	"	0.200	ND	90.2	70-130	5.24	20	
Benzo (a) pyrene	0.170	0.020	"	0.200	0.003	83.8	70-130	0.506	20	
Benzo (b) fluoranthene	0.172	0.020	"	0.200	ND	86.2	70-130	2.43	20	
Benzo (g,h,i) perylene	0.175	0.020	"	0.200	ND	87.7	70-130	3.79	20	
Benzo (k) fluoranthene	0.166	0.020	"	0.200	ND	82.9	70-130	0.523	20	
Chrysene	0.179	0.020	"	0.200	ND	89.7	70-130	3.78	20	
Dibenz (a,h) anthracene	0.175	0.020	"	0.200	ND	87.3	70-130	1.09	20	
Fluoranthene	0.191	0.020	"	0.200	0.0008	94.9	70-130	3.17	20	

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EPA 8270E (SW846) - Semivolatile Organic Compounds - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2039 - EPA 3580

Matrix Spike Dup (B4I2039-MSD1)	Source: E409640-01			Prepared: 09/20/2024 Analyzed: 09/21/2024						
Fluorene	0.198	0.020	mg/kg	0.200	0.006	95.7	70-130	0.627	20	
Indeno (1,2,3-cd) pyrene	0.174	0.020	"	0.200	ND	87.0	70-130	1.62	20	
Naphthalene	0.182	0.002	"	0.200	0.0008	90.7	70-130	0.0107	20	
Phenanthrene	0.198	0.020	"	0.200	0.009	94.4	70-130	3.43	20	
Pyrene	0.180	0.020	"	0.200	0.006	86.6	70-130	0.138	20	
Surrogate: Fluorene-d10	200		ug/kg	200		101	60-130			
Surrogate: Anthracene-d10	200		"	200		98.6	60-130			
Surrogate: Pyrene-d10	190		"	200		94.9	60-130			
Surrogate: Benzo (a) pyrene-d12	200		"	200		99.0	60-130			

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 Project: KMG - Kerr McGee 23-13 Flowline

Classical Chemistry Parameters - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2316 - Saturated Paste Metals

Blank (B4I2316-BLK1)

Prepared: 09/23/2024 Analyzed: 09/24/2024

SAR	ND	0.0100	SAR						
Calcium PPM	ND	10.0	mg/L						
Magnesium PPM	ND	10.0	"						
Sodium PPM	ND	10.0	"						

Duplicate (B4I2316-DUP1)

Source: E409640-09

Prepared: 09/23/2024 Analyzed: 09/24/2024

SAR	ND	0.0100	SAR		1.39				200
Calcium PPM	25.7	10.0	mg/L		26.0			1.27	50
Magnesium PPM	8.43	10.0	"		7.99			5.36	50
Sodium PPM	35.6	10.0	"		31.6			12.1	50

Batch B4I2328 - DTPA Sorbitol Preparation

Blank (B4I2328-BLK1)

Prepared: 09/23/2024 Analyzed: 09/24/2024

Boron	ND	0.100	mg/L						
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Duplicate (B4I2328-DUP1)

Source: E409639-13

Prepared: 09/23/2024 Analyzed: 09/24/2024

Boron	0.0246	0.101	mg/L		ND				50
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Batch B4I2329 - DTPA Sorbitol Preparation

Blank (B4I2329-BLK1)

Prepared: 09/23/2024 Analyzed: 09/24/2024

Boron	ND	0.100	mg/L						
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Duplicate (B4I2329-DUP1)

Source: E409641-08

Prepared: 09/23/2024 Analyzed: 09/24/2024

Boron	0.321	0.101	mg/L		0.297			7.59	50
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 Project: KMG - Kerr McGee 23-13 Flowline

Saturated Paste - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B4I2322 - Saturated Paste pH/EC

Blank (B4I2322-BLK1)

Prepared: 09/23/2024 Analyzed: 09/24/2024

Specific Conductance (EC) ND 0.00500 mmhos/cm

Duplicate (B4I2322-DUP1)

Source: E409640-09

Prepared: 09/23/2024 Analyzed: 09/24/2024

Specific Conductance (EC)	0.366	0.00500	mmhos/cm	0.302		19.2	25
pH	8.19		pH Units	8.17		0.244	25

Batch B4J0115 - Saturated Paste pH/EC

Duplicate (B4J0115-DUP1)

Source: E409634-01

Prepared: 10/01/2024 Analyzed: 10/02/2024

pH	8.07		pH Units	8.22		1.84	25
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Jeremy Espinoza
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Project: KMG - Kerr McGee 23-13 Flowline

**Total Metals 7196A - Quality Control
GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2685731 - SW846 3060A										
BLANK (1205881987-BLK)					Prepared: 10/10/2024 Analyzed: 10/10/2024					
Hexavalent Chromium	ND	0.356	mg/kg				-			U
LCS (1205881988-BKS)					Prepared: 10/10/2024 Analyzed: 10/10/2024					
Hexavalent Chromium	3.77	0.376	mg/kg	3.76		100	80-120			
DUP (1205881989 D)					Source: E409641-01 Prepared: 10/10/2024 Analyzed: 10/10/2024					
Hexavalent Chromium	ND	0.402	mg/kg dry		<0.161		0-50	N/A	50	U
MS (1205881990 S)					Source: E409641-01 Prepared: 10/10/2024 Analyzed: 10/10/2024					
Hexavalent Chromium	3.85	0.402	mg/kg dry	4.02	<0.161	93.8	75-125			
ILCS (1205881991-ILCS)					Prepared: 10/10/2024 Analyzed: 10/10/2024					
Hexavalent Chromium	4.35	0.211	mg/kg	4.26		102	80-120			

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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.

Ensolum
11049 W 44th Avenue, Suite 103
Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417861
Project: KMG - Kerr McGee 23-13 Flowline

Notes and Definitions

Ua Sample is Non-Detect.

U Result not detected above the detection limit

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.

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 on a wet weight basis.

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