

# ORIGINS LABORATORY

Ensolum

Jeremy Espinoza

11049 W 44th Avenue, Suite 103

Wheat Ridge CO 80033

December 11, 2024

**Project Name - KMG - Madrigal 2-22 Wellhead**

**Project Number - 09A1417818**

Attached are your analytical results for KMG - Madrigal 2-22 Wellhead received by Origins Laboratory November 01, 2024. This project is associated with Origins project number E4K0019-01.

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



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

Jeremy Espinoza  
 Project Number: 09A1417818  
 Project: KMG - Madrigal 2-22 Wellhead

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FL03(2-22)@5	E4K0019-01	Soil	November 1, 2024 9:40	11/01/2024 16:36
FL03(2-22)@5-V	E4K0019-02	Soil	November 1, 2024 9:40	11/01/2024 16:36

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Project Number: 09A1417818  
Project: KMG - Madrigal 2-22 Wellhead

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

**Sample Receipt Checklist**

Origins Work Order: EY100019 Client: Ensolium  
Client Project ID: Madrigal

Checklist Completed by: ZAD MN Shipped Via: HO  
Date/time completed: 11/11/24 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
Airbill #: N/A

Matrix(s) Received: (Check all that apply): 0 Soil/Solid Water Other: \_\_\_\_\_  
(Describe)

Cooler Number/Temperature: 1 14.4 °C / \_\_\_\_\_ °C / \_\_\_\_\_ °C

Thermometer ID: 1007

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> ?	/			
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 <sup>(1)</sup> ?	/			
Was adequate sample volume provided <sup>(1)</sup> ?	/			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		/		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	/			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	/			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	/			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	/			
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 <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontraged analytes 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):				

<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) ZAD

Date/Time Reviewed 11/11/24

Origins Laboratory

*J. Bynon*

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 Project: KMG - Madrigal 2-22 Wellhead

FL03(2-22)@5'  
 11/1/2024 9:40:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory**  
**E4K0019-01 (Soil)**

**Boron (DTPA Sorbitol)**

Boron	0.111		0.100	mg/L	1	B4K0407	11/04/2024	11/05/2024	
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**DRO/ORO by EPA 8015D**

Diesel (C10-C28)	ND		25.0	mg/kg	1	B4K0135	11/01/2024	11/01/2024	Ua
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	Ua

Surrogate: o-Terphenyl	78.1 %		50-150			"	"	"	
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**GBTEX+TMBs by 8260D**

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B4K0136	11/01/2024	11/02/2024	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	117 %		70-130			"	"	"	
Surrogate: Toluene-d8	90.0 %		70-130			"	"	"	

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**FL03(2-22)@5'**  
**11/1/2024 9:40:00AM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory**  
**E4K0019-01 (Soil)**

**GBTEX+TMBs by 8260D**

Surrogate: 4-Bromofluorobenzene	93.2 %		70-130			B4K01 36	11/01/2024	11/02/2024	
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**Metals by Saturated Paste by EPA 6010**

Calcium	1.71		0.499	meq/L	10	[CALC]	11/04/2024	11/05/2024	
Magnesium	ND		0.823	"	"	"	"	"	
Sodium	ND		0.435	"	"	"	"	"	

**PAH by EPA 8270E extracted via 3580A**

1-Methylnaphthalene	ND		0.002	mg/kg	1	B4K0140	11/01/2024	11/06/2024	Ua
2-Methylnaphthalene	ND		0.002	"	"	"	"	"	Ua
Acenaphthene	ND		0.020	"	"	"	"	"	Ua
Anthracene	ND		0.020	"	"	"	"	"	Ua
Benzo (a) anthracene	0.023		0.005	"	"	"	"	"	
Benzo (a) pyrene	ND		0.020	"	"	"	"	"	Ua
Benzo (b) fluoranthene	ND		0.020	"	"	"	"	"	Ua
Benzo (k) fluoranthene	ND		0.020	"	"	"	"	"	Ua
Chrysene	0.023		0.020	"	"	"	"	"	
Dibenz (a,h) anthracene	ND		0.020	"	"	"	"	"	Ua
Fluoranthene	0.073		0.020	"	"	"	"	"	
Fluorene	ND		0.020	"	"	"	"	"	Ua

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**11/1/2024 9:40:00AM**

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory**  
**E4K0019-01 (Soil)**

**PAH by EPA 8270E extracted via 3580A**

Indeno (1,2,3-cd) pyrene	ND		0.020	mg/kg	1	B4K0140	11/01/2024	11/06/2024	Ua
Naphthalene	ND		0.002	"	"	"	"	"	Ua
Pyrene	<b>0.059</b>		0.020	"	"	"	"	"	

Surrogate: Fluorene-d10	98.6 %		60-130			"	"	"	
Surrogate: Anthracene-d10	99.3 %		60-130			"	"	"	
Surrogate: Pyrene-d10	95.3 %		60-130			"	"	"	
Surrogate: Benzo (a) pyrene-d12	101 %		60-130			"	"	"	

**pH in Soil by 9045D**

pH	<b>8.10</b>			pH Units	1	B4K0420	11/04/2024	11/05/2024	
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**SAR by 20B Saturated Paste**

SAR	<b>0.0820</b>		0.0100	SAR	1	B4K0415	11/04/2024	11/05/2024	
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**Specific Conductance Mod. 9050A**

Specific Conductance (EC)	<b>0.276</b>		0.00500	mmhos/cm	1	B4K0420	11/04/2024	11/05/2024	
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**Table 915 metals by EPA 6020B**

Arsenic	<b>3.64</b>		0.244	mg/kg	10	B4K0137	11/01/2024	11/02/2024	
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11/1/2024 9:40:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory**  
**E4K0019-01 (Soil)**

**Table 915 metals by EPA 6020B**

Barium	56.5		8.40	mg/kg	10	B4K0137	11/01/2024	11/02/2024	
Cadmium	0.112		0.0840	"	"	"	"	"	"
Copper	ND		8.40	"	"	"	"	"	"
Lead	7.40		0.840	"	"	"	"	"	"
Nickel	5.81		0.840	"	"	"	"	"	"
Selenium	ND		0.218	"	"	"	"	"	"
Silver	ND		0.0840	"	"	"	"	"	"
Zinc	ND		31.1	"	"	"	"	"	"

**Total Metals 7196A**

Hexavalent Chromium	ND	0.117	0.292	mg/kg dry	1	2712055	11/30/2024	12/05/2024	U
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FL03(2-22)@5'-V

11/1/2024 9:40:00AM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory**  
**E4K0019-02 (Soil)**

**pH in Soil by 9045D**

pH	8.04			pH Units	1	B4K0626	11/06/2024	11/07/2024	
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**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
<b>Batch B4K0135 - EPA 3550B</b>										
<b>Blank (B4K0135-BLK1)</b>										
					Prepared: 11/01/2024 Analyzed: 11/01/2024					
Diesel (C10-C28)	ND	25.0	mg/kg							Ua
Residual Range Organics (C28-C40)	ND	100	"							Ua
Surrogate: o-Terphenyl	19		"	24.9		76.4	50-150			

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**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 B4K0135 - EPA 3550B**

**LCS (B4K0135-BS1)**

Prepared: 11/01/2024 Analyzed: 11/01/2024

Diesel (C10-C28)	838	50.0	mg/kg	1000		83.8	70-130			
Residual Range Organics (C28-C40)	978	200	"	1000		97.8	70-130			
Surrogate: o-Terphenyl	42		"	49.8		84.0	50-150			

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**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
<b>Batch B4K0135 - EPA 3550B</b>										
<b>Matrix Spike (B4K0135-MS1)</b>			<b>Source: E4K0003-01</b>			Prepared: 11/01/2024 Analyzed: 11/01/2024				
Diesel (C10-C28)	841	50.0	mg/kg	1000	ND	84.1	70-130			
Residual Range Organics (C28-C40)	994	200	"	1000	ND	99.4	70-130			
Surrogate: o-Terphenyl	48		"	49.8		97.3	50-150			

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**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 B4K0135 - EPA 3550B**

**Matrix Spike Dup (B4K0135-MSD1)**

**Source: E4K0003-01**

Prepared: 11/01/2024 Analyzed: 11/01/2024

Diesel (C10-C28)	796	50.0	mg/kg	1000	ND	79.6	70-130	5.50	35	
Residual Range Organics (C28-C40)	937	200	"	1000	ND	93.7	70-130	5.94	35	
Surrogate: o-Terphenyl	37		"	49.8		73.9	50-150			

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**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 B4K0136 - EPA 5030 (soil)**

**Blank (B4K0136-BLK1)**

Prepared: 11/01/2024 Analyzed: 11/01/2024

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	0.14		"	0.125		110	70-130			
Surrogate: Toluene-d8	0.11		"	0.125		91.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		92.7	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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**Batch B4K0136 - EPA 5030 (soil)**

**LCS (B4K0136-BS1)**

Prepared: 11/01/2024 Analyzed: 11/01/2024

1,2,4-Trimethylbenzene	0.0944	0.00200	mg/kg	0.100		94.4	70-130			
1,3,5-Trimethylbenzene	0.0950	0.00200	"	0.100		95.0	70-130			
Benzene	0.113	0.00200	"	0.100		113	70-130			
Ethylbenzene	0.0940	0.00200	"	0.100		94.0	70-130			
Naphthalene	0.0889	0.00380	"	0.100		88.9	70-130			
Toluene	0.0937	0.00200	"	0.100		93.7	70-130			
o-Xylene	0.0928	0.00200	"	0.100		92.8	70-130			
m,p-Xylene	0.187	0.00400	"	0.200		93.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		108	70-130			
Surrogate: Toluene-d8	0.11		"	0.125		89.3	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.2	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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**Batch B4K0136 - EPA 5030 (soil)**

**Matrix Spike (B4K0136-MS1)**

**Source: E4K0003-01**

Prepared: 11/01/2024 Analyzed: 11/03/2024

1,2,4-Trimethylbenzene	0.0966	0.00200	mg/kg	0.100	ND	96.6	70-130			
1,3,5-Trimethylbenzene	0.0949	0.00200	"	0.100	ND	94.9	70-130			
Benzene	0.0946	0.00200	"	0.100	ND	94.6	70-130			
Ethylbenzene	0.0923	0.00200	"	0.100	ND	92.3	70-130			
Naphthalene	0.104	0.00380	"	0.100	ND	104	70-130			
Toluene	0.0909	0.00200	"	0.100	ND	90.9	70-130			
o-Xylene	0.0934	0.00200	"	0.100	ND	93.4	70-130			
m,p-Xylene	0.191	0.00400	"	0.200	ND	95.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		102	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.7	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		93.4	70-130			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B4K0136 - EPA 5030 (soil)**

**Matrix Spike Dup (B4K0136-MSD1)**

**Source: E4K0003-01**

Prepared: 11/01/2024 Analyzed: 11/01/2024

1,2,4-Trimethylbenzene	0.0838	0.00200	mg/kg	0.100	ND	83.8	70-130	14.2	20	
1,3,5-Trimethylbenzene	0.0851	0.00200	"	0.100	ND	85.1	70-130	10.8	20	
Benzene	0.101	0.00200	"	0.100	ND	101	70-130	6.21	20	
Ethylbenzene	0.0840	0.00200	"	0.100	ND	84.0	70-130	9.39	20	
Naphthalene	0.0821	0.00380	"	0.100	ND	82.1	70-130	23.2	20	QR-02
Toluene	0.0833	0.00200	"	0.100	ND	83.3	70-130	8.80	20	
o-Xylene	0.0839	0.00200	"	0.100	ND	83.9	70-130	10.7	20	
m,p-Xylene	0.168	0.00400	"	0.200	ND	84.0	70-130	12.7	20	
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		110	70-130			
Surrogate: Toluene-d8	0.11		"	0.125		88.8	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.9	70-130			

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

Jeremy Espinoza  
 Project Number: 09A1417818  
 Project: KMG - Madrigal 2-22 Wellhead

**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 B4K0137 - EPA 3050B**

Prepared: 11/01/2024 Analyzed: 11/02/2024

**Blank (B4K0137-BLK1)**

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	"							

Prepared: 11/01/2024 Analyzed: 11/02/2024

**LCS (B4K0137-BS1)**

Arsenic	5.64	0.290	mg/kg	5.00	113	80-120
Barium	580	10.0	"	500	116	80-120
Cadmium	5.82	0.100	"	5.00	116	80-120
Copper	56.9	10.0	"	50.0	114	80-120
Lead	5.60	1.00	"	5.00	112	80-120
Nickel	5.75	1.00	"	5.00	115	80-120
Selenium	5.44	0.260	"	5.00	109	80-120
Silver	5.80	0.100	"	5.00	116	80-120
Zinc	54.2	37.0	"	50.0	108	80-120

Prepared: 11/01/2024 Analyzed: 11/02/2024

**Matrix Spike (B4K0137-MS1)**

Source: E4K0006-05

Prepared: 11/01/2024 Analyzed: 11/02/2024

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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 B4K0137 - EPA 3050B**

**Matrix Spike (B4K0137-MS1)**

**Source: E4K0006-05**

Prepared: 11/01/2024 Analyzed: 11/02/2024

Arsenic	7.14	0.280	mg/kg	4.82	2.07	105	75-125			
Barium	609	9.64	"	482	61.7	114	75-125			
Cadmium	5.46	0.0964	"	4.82	0.0773	112	75-125			
Copper	58.5	9.64	"	48.2	5.29	110	75-125			
Lead	10.3	0.964	"	4.82	5.89	91.9	75-125			
Nickel	9.88	0.964	"	4.82	4.93	103	75-125			
Selenium	4.99	0.251	"	4.82	ND	104	75-125			
Silver	5.39	0.0964	"	4.82	0.0202	111	75-125			
Zinc	71.6	35.7	"	48.2	23.0	101	75-125			

**Matrix Spike Dup (B4K0137-MSD1)**

**Source: E4K0006-05**

Prepared: 11/01/2024 Analyzed: 11/02/2024

Arsenic	6.48	0.249	mg/kg	4.30	2.07	103	75-125	9.73	20	
Barium	541	8.59	"	430	61.7	112	75-125	11.8	20	
Cadmium	4.79	0.0859	"	4.30	0.0773	110	75-125	13.0	20	
Copper	51.2	8.59	"	43.0	5.29	107	75-125	13.3	20	
Lead	10.6	0.859	"	4.30	5.89	110	75-125	3.00	20	
Nickel	9.69	0.859	"	4.30	4.93	111	75-125	1.89	20	
Selenium	4.50	0.223	"	4.30	ND	105	75-125	10.3	20	
Silver	4.68	0.0859	"	4.30	0.0202	108	75-125	14.1	20	
Zinc	66.2	31.8	"	43.0	23.0	100	75-125	7.89	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 B4K0140 - EPA 3580**

**Blank (B4K0140-BLK1)**

Prepared: 11/01/2024 Analyzed: 11/06/2024

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		100	60-130			
Surrogate: Anthracene-d10	200		"	200		100	60-130			
Surrogate: Pyrene-d10	180		"	200		90.7	60-130			
Surrogate: Benzo (a) pyrene-d12	200		"	200		100	60-130			

**LCS (B4K0140-BS1)**

Prepared: 11/01/2024 Analyzed: 11/06/2024

1-Methylnaphthalene	0.190	0.002	mg/kg	0.200		95.0	70-130			
2-Methylnaphthalene	0.183	0.002	"	0.200		91.6	70-130			
Acenaphthene	0.186	0.020	"	0.200		92.9	70-130			
Anthracene	0.180	0.020	"	0.200		90.2	70-130			

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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 B4K0140 - EPA 3580**

**LCS (B4K0140-BS1)**

Prepared: 11/01/2024 Analyzed: 11/06/2024

Benzo (a) anthracene	0.192	0.005	mg/kg	0.200		96.0	70-130			
Benzo (a) pyrene	0.199	0.020	"	0.200		99.5	70-130			
Benzo (b) fluoranthene	0.192	0.020	"	0.200		96.0	70-130			
Benzo (g,h,i) perylene	0.179	0.020	"	0.200		89.6	70-130			
Benzo (k) fluoranthene	0.187	0.020	"	0.200		93.6	70-130			
Chrysene	0.178	0.020	"	0.200		89.1	70-130			
Dibenz (a,h) anthracene	0.214	0.020	"	0.200		107	70-130			
Fluoranthene	0.180	0.020	"	0.200		89.8	70-130			
Fluorene	0.182	0.020	"	0.200		91.1	70-130			
Indeno (1,2,3-cd) pyrene	0.220	0.020	"	0.200		110	70-130			
Naphthalene	0.189	0.002	"	0.200		94.3	70-130			
Phenanthrene	0.199	0.020	"	0.200		99.4	70-130			
Pyrene	0.175	0.020	"	0.200		87.6	70-130			

Surrogate: Fluorene-d10	200		ug/kg	200		99.9	60-130			
Surrogate: Anthracene-d10	190		"	200		97.0	60-130			
Surrogate: Pyrene-d10	190		"	200		93.6	60-130			
Surrogate: Benzo (a) pyrene-d12	200		"	200		102	60-130			

**Matrix Spike (B4K0140-MS1)**

**Source: E4K0002-01**

Prepared: 11/01/2024 Analyzed: 11/06/2024

1-Methylnaphthalene	0.187	0.002	mg/kg	0.200	ND	93.3	70-130			
2-Methylnaphthalene	0.185	0.002	"	0.200	ND	92.3	70-130			
Acenaphthene	0.204	0.020	"	0.200	ND	102	70-130			
Anthracene	0.190	0.020	"	0.200	0.0008	94.7	70-130			
Benzo (a) anthracene	0.198	0.005	"	0.200	0.001	98.2	70-130			
Benzo (a) pyrene	0.210	0.020	"	0.200	0.003	104	70-130			
Benzo (b) fluoranthene	0.210	0.020	"	0.200	0.003	104	70-130			
Benzo (g,h,i) perylene	0.205	0.020	"	0.200	0.003	101	70-130			

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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 B4K0140 - EPA 3580**

<b>Matrix Spike (B4K0140-MS1)</b>		<b>Source: E4K0002-01</b>			Prepared: 11/01/2024 Analyzed: 11/06/2024					
Benzo (k) fluoranthene	0.196	0.020	mg/kg	0.200	0.002	96.8	70-130			
Chrysene	0.204	0.020	"	0.200	0.002	101	70-130			
Dibenz (a,h) anthracene	0.226	0.020	"	0.200	0.006	110	70-130			
Fluoranthene	0.208	0.020	"	0.200	ND	104	70-130			
Fluorene	0.208	0.020	"	0.200	ND	104	70-130			
Indeno (1,2,3-cd) pyrene	0.226	0.020	"	0.200	0.006	110	70-130			
Naphthalene	0.216	0.002	"	0.200	ND	108	70-130			
Phenanthrene	0.217	0.020	"	0.200	0.0006	108	70-130			
Pyrene	0.198	0.020	"	0.200	0.0005	99.0	70-130			
Surrogate: Fluorene-d10	210		ug/kg	200		106	60-130			
Surrogate: Anthracene-d10	200		"	200		102	60-130			
Surrogate: Pyrene-d10	190		"	200		93.9	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		97.2	60-130			

<b>Matrix Spike Dup (B4K0140-MSD1)</b>		<b>Source: E4K0002-01</b>			Prepared: 11/01/2024 Analyzed: 11/06/2024					
1-Methylnaphthalene	0.201	0.002	mg/kg	0.200	ND	100	70-130	7.42	20	
2-Methylnaphthalene	0.204	0.002	"	0.200	ND	102	70-130	10.2	20	
Acenaphthene	0.216	0.020	"	0.200	ND	108	70-130	6.06	20	
Anthracene	0.223	0.020	"	0.200	0.0008	111	70-130	15.8	20	
Benzo (a) anthracene	0.214	0.005	"	0.200	0.001	107	70-130	8.09	20	
Benzo (a) pyrene	0.234	0.020	"	0.200	0.003	116	70-130	10.8	20	
Benzo (b) fluoranthene	0.224	0.020	"	0.200	0.003	110	70-130	6.43	20	
Benzo (g,h,i) perylene	0.224	0.020	"	0.200	0.003	110	70-130	8.58	20	
Benzo (k) fluoranthene	0.239	0.020	"	0.200	0.002	119	70-130	20.0	20	
Chrysene	0.208	0.020	"	0.200	0.002	103	70-130	1.79	20	
Dibenz (a,h) anthracene	0.251	0.020	"	0.200	0.006	122	70-130	10.8	20	
Fluoranthene	0.205	0.020	"	0.200	ND	103	70-130	1.33	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 B4K0140 - EPA 3580**

**Matrix Spike Dup (B4K0140-MSD1)**

**Source: E4K0002-01**

Prepared: 11/01/2024 Analyzed: 11/06/2024

Fluorene	0.206	0.020	mg/kg	0.200	ND	103	70-130	0.759	20	
Indeno (1,2,3-cd) pyrene	0.244	0.020	"	0.200	0.006	119	70-130	7.56	20	
Naphthalene	0.214	0.002	"	0.200	ND	107	70-130	0.573	20	
Phenanthrene	0.236	0.020	"	0.200	0.0006	118	70-130	8.53	20	
Pyrene	0.210	0.020	"	0.200	0.0005	105	70-130	5.48	20	
Surrogate: Fluorene-d10	200		ug/kg	200		99.2	60-130			
Surrogate: Anthracene-d10	200		"	200		100	60-130			
Surrogate: Pyrene-d10	200		"	200		98.7	60-130			
Surrogate: Benzo (a) pyrene-d12	200		"	200		98.7	60-130			

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**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 B4K0407 - DTPA Sorbitol Preparation**

**Blank (B4K0407-BLK1)**

Prepared: 11/04/2024 Analyzed: 11/05/2024

Boron ND 0.100 mg/L

**Duplicate (B4K0407-DUP1)**

**Source: E4K0002-01**

Prepared: 11/04/2024 Analyzed: 11/05/2024

Boron 0.236 0.0993 mg/L 0.200 16.4 50

**Batch B4K0415 - Saturated Paste Metals**

**Blank (B4K0415-BLK1)**

Prepared: 11/04/2024 Analyzed: 11/05/2024

SAR ND 0.0100 SAR

Calcium PPM ND 10.0 mg/L

Magnesium PPM ND 10.0 "

Sodium PPM ND 10.0 "

**Duplicate (B4K0415-DUP1)**

**Source: E4K0002-01**

Prepared: 11/04/2024 Analyzed: 11/05/2024

Calcium PPM 150 10.0 mg/L 254 51.3 50 QR-DUP

SAR ND 0.0100 SAR 0.455 200

Magnesium PPM 45.4 10.0 mg/L 69.5 41.9 50

Sodium PPM 19.0 10.0 " 31.7 50.4 50 QR-DUP

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**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 B4K0420 - Saturated Paste pH/EC**

**Blank (B4K0420-BLK1)**

Prepared: 11/04/2024 Analyzed: 11/05/2024

Specific Conductance (EC) ND 0.00500 mmhos/cm

**Duplicate (B4K0420-DUP1)**

**Source: E4K0002-01**

Prepared: 11/04/2024 Analyzed: 11/05/2024

**QR-DUP**

Specific Conductance (EC) 1.17 0.00500 mmhos/cm 1.69 36.5 25

pH 8.00 pH Units 7.93 0.879 25

**Batch B4K0626 - Saturated Paste pH/EC**

**Duplicate (B4K0626-DUP1)**

**Source: E4K0019-02**

Prepared: 11/06/2024 Analyzed: 11/07/2024

pH 7.96 pH Units 8.04 1.00 25

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 2712055 - SW846 3060A</b>										
<b>BLANK (1205932060-BLK)</b>										
Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	ND	0.354	mg/kg				-			U
<b>LCS (1205932061-BKS)</b>										
Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	2.81	0.286	mg/kg	2.86		98.3	80-120			
<b>DUP (1205932062 D)</b>										
Source: 693867001 Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	ND	0.398	mg/kg dry		<0.159		0-50	N/A	50	U
<b>MS (1205932063 S)</b>										
Source: 693867001 Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	1.79	0.421	mg/kg dry	4.21	<0.168	40.4	75-125			
<b>DUP (1205932064 D)</b>										
Source: 695105008 Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	ND	0.314	mg/kg dry		<0.126		0-50	N/A	50	U
<b>MS (1205932065 S)</b>										
Source: 695105008 Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	2.17	0.329	mg/kg dry	3.29	<0.132	63.3	75-125			
<b>ILCS (1205932066-ILCS)</b>										
Prepared: 11/30/2024 Analyzed: 12/05/2024										
Hexavalent Chromium	5.68	0.265	mg/kg	5.34		106	80-120			

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### Notes and Definitions

Ua Sample is Non-Detect.

U Result not detected above the detection limit

QR-DUP RPD exceeds QC acceptance criteria, this indicates source sample is not homogenous.

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.

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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