



Ensolum

January 02, 2025

Jeremy Espinoza

11049 W 44th Avenue, Suite 103

Wheat Ridge CO 80033

Project Name - KMG - Pioneer 4-12

Project Number - 09A1417854

Attached are your analytical results for KMG - Pioneer 4-12 received by Origins Laboratory November 20, 2024. This project is associated with Origins project number E4K0608-01.

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: 09A1417854
Project: KMG - Pioneer 4-12

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FL01(4-12)@3'	E4K0608-01	Soil	November 20, 2024 13:57	11/20/2024 15:51
FL01(4-12)@3'-V	E4K0608-02	Soil	November 20, 2024 13:58	11/20/2024 15:51

Origins Laboratory



Jen Pellegrini, Project Manager

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Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12



ORIGINS WORK ORDER #
E4K0608

Page 1 of 1

Client: Ensolum
 Address: _____
 Project Manager: J Espinoza
 Project Name: Pioneer 4-12 Flowline
 Project Number: 09A1417854
 Telephone Number: _____
 Collected By: HK
 Invoice/Billing Info: Initial
 Email Address: KMGTEAM
 Key: _____
 W=Water
 GW=Groundwater
 SW=Surface Water
 WW=Waste Water
 L=Liquid

S=Soil | 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
						Full Lab	pH	
1	EL01(4-12)03	11/20/24	1357	3	5	unp.	X	
2	EL01(4-12)03-V	11/20/24	1358	3	5	unp.	X	
3								
4								
5								
6								
7								
8								
9								
10								

Relinquished By: [Signature] Date: 11/20/24 Time: 1551
 Received By: [Signature] Date: 11/20/24 Time: 1551

Turnaround Time
 SAME DAY
 24 Hr
 48 Hr
 72
 Standard

1725 Elk Place Denver, Co. 80221 | # 303.433.1322 | originslab.com | Temp Received 5.5 Received On Ice? Yes No

Origins Laboratory

[Signature]

Jen Pellegrini, Project Manager

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 Project: KMG - Pioneer 4-12

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: E4K0608

Client: Ensolum

Client Project ID: Pioneer 4-12

Checklist Completed by: VS /

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

Date/time completed: 11/20/24

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 95 °C _____ °C _____ °C _____ °C

Thermometer ID: T005

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 HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +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) [Signature] Date/Time Reviewed 11/20/24

Origins Laboratory

Jen Pellegrini

Jen Pellegrini, Project Manager

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Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

FL01(4-12)@3'
11/20/2024 1:57:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E4K0608-01 (Soil)

Boron (DTPA Sorbitol)

Boron	ND		0.0989	mg/L	1	B4K2122	11/21/2024	11/22/2024	U
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	ND		25.0	mg/kg	1	B4K2030	11/20/2024	11/20/2024	U
Residual Range Organics (C28-C40)	ND		100	"	"	"	"	"	U

Surrogate: *o*-Terphenyl 72.6 % 50-150 " " "

GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	ND		0.00200	mg/kg	1	B4K2032	11/20/2024	11/21/2024	U
1,3,5-Trimethylbenzene	ND		0.00200	"	"	"	"	"	U
Benzene	ND		0.00200	"	"	"	"	"	U
Ethylbenzene	ND		0.00200	"	"	"	"	"	U
Toluene	ND		0.00200	"	"	"	"	"	U
Xylenes, total	ND		0.00200	"	"	"	"	"	U
Gasoline Range Hydrocarbons	ND		0.200	"	"	"	"	"	U

Surrogate: 1,2-Dichloroethane-d4 113 % 70-130 " " "

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Project: KMG - Pioneer 4-12

FL01(4-12)@3'

11/20/2024 1:57:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory
E4K0608-01 (Soil)**

GBTEX+TMBs by 8260D

Surrogate: Toluene-d8	104 %		70-130			B4K20 32	11/20/2024	11/21/2024
Surrogate: 4-Bromofluorobenzene	97.0 %		70-130			"	"	"

Metals by Saturated Paste by EPA 6010

Calcium	ND		0.499	meq/L	10	[CALC]	11/21/2024	11/22/2024
Magnesium	ND		0.823	"	"	"	"	"
Sodium	ND		0.435	"	"	"	"	"

PAH by 8270D SIM

1-Methylnaphthalene	ND	0.00109	0.00201	mg/Kg	1	L786932	11/27/2024	11/30/2024
2-Methylnaphthalene	ND	0.00194	0.00201	"	"	"	"	"
Acenaphthene	ND	0.000304	0.00067	"	"	"	"	"
Anthracene	ND	0.000334	0.00067	"	"	"	"	"
Benzo(a)anthracene	ND	0.000493	0.00067	"	"	"	"	"
Benzo(a)pyrene	0.00126	0.000468	0.00067	"	"	"	"	"
Benzo(b)fluoranthene	0.00143	0.000585	0.00067	"	"	"	"	"
Benzo(k)fluoranthene	0.0012	0.000437	0.00067	"	"	"	"	"
Chrysene	ND	0.000624	0.00067	"	"	"	"	"
Dibenz(a,h)anthracene	ND	0.000614	0.00067	"	"	"	"	"
Fluoranthene	0.000476	0.000394	0.00067	"	"	"	"	"

J

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FL01(4-12)@3'
11/20/2024 1:57:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Waypoint Analytical, LLC.
E4K0608-01 (Soil)

PAH by 8270D SIM

Fluorene	ND	0.000286	0.00067	mg/Kg	1	L786932	11/27/2024	11/30/2024
Indeno(1,2,3-cd)pyrene	0.00166	0.000627	0.00067	"	"	"	"	"
Naphthalene	ND	0.00145	0.00201	"	"	"	"	"
Pyrene	0.000715	0.000643	0.00067	"	"	"	"	"

Surrogate: 2-Fluorobiphenyl	35.1 %		33-115			"	"	"
Surrogate: 4-Terphenyl-d14	39.9 %		33-122			"	"	"
Surrogate: Nitrobenzene-d5	58.2 %		29-110			"	"	"

pH in Soil by 9045D

pH	6.55			pH Units	1	B4K2130	11/21/2024	11/22/2024
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SAR by 20B Saturated Paste

SAR	0.145		0.0100	SAR	1	B4K2115	11/21/2024	11/22/2024
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.0883		0.00500	mmhos/cm	1	B4K2130	11/21/2024	11/22/2024
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Table 915 metals by EPA 6020B

Arsenic	1.25		0.283	mg/kg	10	B4K2053	11/20/2024	11/21/2024
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FL01(4-12)@3'
11/20/2024 1:57:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E4K0608-01 (Soil)

Table 915 metals by EPA 6020B

Barium	36.5		9.76	mg/kg	10	B4K2053	11/20/2024	11/21/2024	
Cadmium	0.120		0.0976	"	"	"	"	"	
Copper	ND		9.76	"	"	"	"	"	U
Lead	3.84		0.976	"	"	"	"	"	
Nickel	2.62		0.976	"	"	"	"	"	
Selenium	ND		0.254	"	"	"	"	"	U
Silver	ND		0.0976	"	"	"	"	"	U
Zinc	ND		36.1	"	"	"	"	"	U

Total Metals by 7196A

Chromium, Hexavalent	ND	0.244	0.5	mg/Kg	1	L786860	11/20/2024	11/27/2024	
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 Project: KMG - Pioneer 4-12

FL01(4-12)@3'-V

11/20/2024 1:58:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory
E4K0608-02 (Soil)

pH in Soil by 9045D

pH	7.01			pH Units	1	B4K2135	11/21/2024	11/22/2024	
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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
Batch B4K2030 - EPA 3550B										
Blank (B4K2030-BLK1)										
					Prepared: 11/20/2024 Analyzed: 11/20/2024					
Diesel (C10-C28)	ND	25.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	100	"							U
Surrogate: o-Terphenyl	20		"	24.9		78.4	50-150			

Origins Laboratory



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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 B4K2030 - EPA 3550B

LCS (B4K2030-BS1)

Prepared: 11/20/2024 Analyzed: 11/20/2024

Diesel (C10-C28)	951	50.0	mg/kg	1000		95.1	70-130			
Residual Range Organics (C28-C40)	966	200	"	1000		96.6	70-130			
Surrogate: o-Terphenyl	50		"	49.8		101	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 B4K2030 - EPA 3550B

Matrix Spike (B4K2030-MS1)	Source: E4K0591-01			Prepared: 11/20/2024 Analyzed: 11/20/2024						
Diesel (C10-C28)	959	50.0	mg/kg	1000	ND	95.9	70-130			
Residual Range Organics (C28-C40)	989	200	"	1000	ND	98.9	70-130			
Surrogate: o-Terphenyl	46		"	49.8		93.0	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
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Batch B4K2030 - EPA 3550B

Matrix Spike Dup (B4K2030-MSD1)	Source: E4K0591-01			Prepared: 11/20/2024 Analyzed: 11/20/2024						
Diesel (C10-C28)	980	50.0	mg/kg	1000	ND	98.0	70-130	2.18	35	
Residual Range Organics (C28-C40)	1010	200	"	1000	ND	101	70-130	2.41	35	
<i>Surrogate: o-Terphenyl</i>	48		"	49.8		95.9	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 B4K2032 - EPA 5030 (soil)

Blank (B4K2032-BLK1)

Prepared: 11/20/2024 Analyzed: 11/20/2024

1,2,4-Trimethylbenzene	ND	0.00200	mg/kg							U
1,3,5-Trimethylbenzene	ND	0.00200	"							U
Benzene	ND	0.00200	"							U
Ethylbenzene	ND	0.00200	"							U
Naphthalene	ND	0.00380	"							U
Toluene	ND	0.00200	"							U
Xylenes, total	ND	0.00200	"							U
Gasoline Range Hydrocarbons	ND	0.200	"							U
Surrogate: 1,2-Dichloroethane-d4	0.15		"	0.125	120		70-130			
Surrogate: Toluene-d8	0.13		"	0.125	101		70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125	96.1		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 B4K2032 - EPA 5030 (soil)

LCS (B4K2032-BS1)

Prepared: 11/20/2024 Analyzed: 11/20/2024

1,2,4-Trimethylbenzene	0.0969	0.00200	mg/kg	0.100		96.9	70-130			
1,3,5-Trimethylbenzene	0.0974	0.00200	"	0.100		97.4	70-130			
Benzene	0.0931	0.00200	"	0.100		93.1	70-130			
Ethylbenzene	0.0943	0.00200	"	0.100		94.3	70-130			
Naphthalene	0.117	0.00380	"	0.100		117	70-130			
Toluene	0.0923	0.00200	"	0.100		92.3	70-130			
o-Xylene	0.0936	0.00200	"	0.100		93.6	70-130			
m,p-Xylene	0.186	0.00400	"	0.200		92.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		114	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		102	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 B4K2032 - EPA 5030 (soil)

Matrix Spike (B4K2032-MS1)	Source: E4K0591-01			Prepared: 11/20/2024 Analyzed: 11/20/2024						
1,2,4-Trimethylbenzene	0.0835	0.00200	mg/kg	0.100	ND	83.5	70-130			
1,3,5-Trimethylbenzene	0.0835	0.00200	"	0.100	ND	83.5	70-130			
Benzene	0.0835	0.00200	"	0.100	ND	83.5	70-130			
Ethylbenzene	0.0839	0.00200	"	0.100	ND	83.9	70-130			
Naphthalene	0.0991	0.00380	"	0.100	ND	99.1	70-130			
Toluene	0.0833	0.00200	"	0.100	ND	83.3	70-130			
o-Xylene	0.0833	0.00200	"	0.100	ND	83.3	70-130			
m,p-Xylene	0.165	0.00400	"	0.200	ND	82.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.15		"	0.125		119	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.7	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		102	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 B4K2032 - EPA 5030 (soil)

Matrix Spike Dup (B4K2032-MSD1)	Source: E4K0591-01		Prepared: 11/20/2024 Analyzed: 11/20/2024							
1,2,4-Trimethylbenzene	0.0829	0.00200	mg/kg	0.100	ND	82.9	70-130	0.793	20	
1,3,5-Trimethylbenzene	0.0836	0.00200	"	0.100	ND	83.6	70-130	0.0958	20	
Benzene	0.0851	0.00200	"	0.100	ND	85.1	70-130	1.97	20	
Ethylbenzene	0.0831	0.00200	"	0.100	ND	83.1	70-130	0.982	20	
Naphthalene	0.101	0.00380	"	0.100	ND	101	70-130	1.46	20	
Toluene	0.0852	0.00200	"	0.100	ND	85.2	70-130	2.28	20	
o-Xylene	0.0830	0.00200	"	0.100	ND	83.0	70-130	0.361	20	
m,p-Xylene	0.164	0.00400	"	0.200	ND	81.8	70-130	1.12	20	
Surrogate: 1,2-Dichloroethane-d4	0.15		"	0.125		122	70-130			
Surrogate: Toluene-d8	0.13		"	0.125		100	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

Origins Laboratory



Jen Pellegrini, Project Manager

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

Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

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 B4K2053 - EPA 3050B

Blank (B4K2053-BLK1)

Prepared: 11/20/2024 Analyzed: 11/21/2024

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

LCS (B4K2053-BS1)

Prepared: 11/20/2024 Analyzed: 11/21/2024

Arsenic	5.09	0.290	mg/kg	5.00		102	80-120
Barium	528	10.0	"	500		106	80-120
Cadmium	5.36	0.100	"	5.00		107	80-120
Copper	50.6	10.0	"	50.0		101	80-120
Lead	5.03	1.00	"	5.00		101	80-120
Nickel	5.30	1.00	"	5.00		106	80-120
Selenium	5.30	0.260	"	5.00		106	80-120
Silver	5.53	0.100	"	5.00		111	80-120
Zinc	52.0	37.0	"	50.0		104	80-120

Matrix Spike (B4K2053-MS1)

Source: E4K0609-01

Prepared: 11/20/2024 Analyzed: 11/21/2024

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Ensolum
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 Project: KMG - Pioneer 4-12

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 B4K2053 - EPA 3050B

Matrix Spike (B4K2053-MS1)	Source: E4K0609-01			Prepared: 11/20/2024 Analyzed: 11/21/2024						
Arsenic	6.85	0.272	mg/kg	4.69	2.54	91.9	75-125			
Barium	611	9.37	"	469	46.2	121	75-125			
Cadmium	5.51	0.0937	"	4.69	0.121	115	75-125			
Copper	56.1	9.37	"	46.9	4.29	111	75-125			
Lead	11.4	0.937	"	4.69	5.07	136	75-125			QM-07
Nickel	8.98	0.937	"	4.69	5.49	74.4	75-125			QM-07
Selenium	5.43	0.244	"	4.69	0.103	114	75-125			
Silver	5.59	0.0937	"	4.69	0.0204	119	75-125			
Zinc	72.1	34.7	"	46.9	27.1	96.2	75-125			

Matrix Spike Dup (B4K2053-MSD1)	Source: E4K0609-01			Prepared: 11/20/2024 Analyzed: 11/21/2024						
Arsenic	6.53	0.243	mg/kg	4.19	2.54	95.2	75-125	4.78	20	
Barium	511	8.37	"	419	46.2	111	75-125	17.8	20	
Cadmium	4.65	0.0837	"	4.19	0.121	108	75-125	17.0	20	
Copper	49.4	8.37	"	41.9	4.29	108	75-125	12.6	20	
Lead	9.26	0.837	"	4.19	5.07	100	75-125	20.9	20	QM-07, QR-DUP
Nickel	9.36	0.837	"	4.19	5.49	92.4	75-125	4.16	20	
Selenium	4.48	0.218	"	4.19	0.103	105	75-125	19.1	20	
Silver	4.76	0.0837	"	4.19	0.0204	113	75-125	16.1	20	
Zinc	66.8	31.0	"	41.9	27.1	95.0	75-125	7.64	20	

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Ensolum
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Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

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 B4K2115 - Saturated Paste Metals

Blank (B4K2115-BLK1)

Prepared: 11/21/2024 Analyzed: 11/22/2024

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

Duplicate (B4K2115-DUP1)

Source: E4K0606-04

Prepared: 11/21/2024 Analyzed: 11/22/2024

Calcium PPM	16.0	10.0	mg/L		19.1			18.1	50	
SAR	ND	0.0100	SAR		0.578				200	U
Magnesium PPM	9.33	10.0	mg/L		11.4			20.4	50	U
Sodium PPM	11.2	10.0	"		13.0			14.7	50	

Batch B4K2122 - DTPA Sorbitol Preparation

Blank (B4K2122-BLK1)

Prepared: 11/21/2024 Analyzed: 11/22/2024

Boron	ND	0.100	mg/L							U
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Duplicate (B4K2122-DUP1)

Source: E4K0606-06

Prepared: 11/21/2024 Analyzed: 11/22/2024

Boron	1.33	0.100	mg/L		1.36			2.23	50	
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Jen Pellegrini, Project Manager

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Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

**Saturated Paste - Quality Control
 Origins Laboratory**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B4K2130 - Saturated Paste pH/EC										
Blank (B4K2130-BLK1)					Prepared: 11/21/2024 Analyzed: 11/22/2024					
Specific Conductance (EC)	ND	0.00500	mmhos/cm							U
Duplicate (B4K2130-DUP1)					Source: E4K0606-04 Prepared: 11/21/2024 Analyzed: 11/22/2024					
pH	8.37		pH Units		8.31		0.719		25	
Specific Conductance (EC)	0.245	0.00500	mmhos/cm		0.272		10.6		25	
Batch B4K2135 - Saturated Paste pH/EC										
Duplicate (B4K2135-DUP1)					Source: E4K0571-02 Prepared: 11/21/2024 Analyzed: 11/22/2024					
pH	8.04		pH Units		8.08		0.496		25	

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Jeremy Espinoza
Project Number: 09A1417854
Project: KMG - Pioneer 4-12

PAH by 8270D SIM - Quality Control
Waypoint Analytical, LLC.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch L786932 - 3550B

MSD (L 87278-MSD-L786932)	Source: 87278			Prepared: 11/27/2024 Analyzed: 11/30/2024						
Benzo(k)fluoranthene	0.105	0.00067	mg/Kg	0.165	0.000899	63	30-130	0.9	30	
Pyrene	0.11	0.00067	"	0.165	<0.000643	66.6	30-130	0	30	
Naphthalene	0.0823	0.00201	"	0.165	<0.00145	49.8	30-130	3.5	30	
Indeno(1,2,3-cd)pyrene	0.162	0.00067	"	0.165	0.00128	97.4	30-130	3.1	30	
Fluorene	0.0944	0.00067	"	0.165	<0.000286	57.2	30-130	0.1	30	
Fluoranthene	0.109	0.00067	"	0.165	0.000443	65.7	30-130	1.8	30	
Dibenz(a,h)anthracene	0.151	0.00067	"	0.165	<0.000614	91.5	30-130	5.4	30	
Chrysene	0.0955	0.00067	"	0.165	<0.000624	57.8	30-130	5.4	30	
Anthracene	0.106	0.00067	"	0.165	<0.000334	64.2	30-130	5.5	30	
1-Methylnaphthalene	0.0812	0.00201	"	0.165	<0.00109	49.2	30-130	2.4	30	
Benzo(b)fluoranthene	0.132	0.00067	"	0.165	0.00116	79.2	30-130	3.8	30	
2-Methylnaphthalene	0.0764	0.00201	"	0.165	<0.00194	46.3	30-130	1	30	
Acenaphthene	0.0983	0.00067	"	0.165	<0.000304	59.5	30-130	1.4	30	
Benzo(a)anthracene	0.111	0.00067	"	0.165	<0.000493	67.2	30-130	1.8	30	
Benzo(a)pyrene	0.118	0.00067	"	0.165	0.00122	70.7	30-130	3.4	30	
Surrogate: 4-Terphenyl-d14	47.8		"	0.33	165	47.8	33-122			
Surrogate: Nitrobenzene-d5	47.8		"	0.33	196	47.8	29-110			
Surrogate: 2-Fluorobiphenyl	34.8		"	0.33	117	34.8	33-115			

MS (L 87278-MS-L786932)	Source: 87278			Prepared: 11/27/2024 Analyzed: 11/30/2024						
Benzo(k)fluoranthene	0.106	0.00067	mg/Kg	0.162	0.000899	64.8	30-130			
Benzo(b)fluoranthene	0.127	0.00067	"	0.162	0.00116	77.6	30-130			
Naphthalene	0.0853	0.00201	"	0.162	<0.00145	52.6	30-130			
Indeno(1,2,3-cd)pyrene	0.157	0.00067	"	0.162	0.00128	96.1	30-130			
Fluorene	0.0945	0.00067	"	0.162	<0.000286	58.3	30-130			
Fluoranthene	0.107	0.00067	"	0.162	0.000443	65.7	30-130			
Pyrene	0.11	0.00067	"	0.162	<0.000643	67.9	30-130			

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Ensolum
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Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

PAH by 8270D SIM - Quality Control
Waypoint Analytical, LLC.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch L786932 - 3550B

MS (L 87278-MS-L786932)	Source: 87278			Prepared: 11/27/2024 Analyzed: 11/30/2024						
Chrysene	0.0904	0.00067	mg/Kg	0.162	<0.000624	55.8	30-130			
1-Methylnaphthalene	0.0832	0.00201	"	0.162	<0.00109	51.3	30-130			
Benzo(a)anthracene	0.109	0.00067	"	0.162	<0.000493	67.2	30-130			
Anthracene	0.112	0.00067	"	0.162	<0.000334	69.1	30-130			
Acenaphthene	0.0997	0.00067	"	0.162	<0.000304	61.5	30-130			
2-Methylnaphthalene	0.0772	0.00201	"	0.162	<0.00194	47.6	30-130			
Benzo(a)pyrene	0.114	0.00067	"	0.162	0.00122	69.6	30-130			
Dibenz(a,h)anthracene	0.143	0.00067	"	0.162	<0.000614	88.2	30-130			
Surrogate: Nitrobenzene-d5	48.6		"	0.325	196	48.6	29-110			
Surrogate: 4-Terphenyl-d14	48.3		"	0.325	165	48.3	33-122			
Surrogate: 2-Fluorobiphenyl	35.6		"	0.325	117	35.6	33-115			

LCS (LCS-L786932)	Prepared: 11/27/2024 Analyzed: 11/30/2024									
Benzo(b)fluoranthene	0.138	0.00067	mg/Kg	0.167		82.6	30-130			
Benzo(k)fluoranthene	0.112	0.00067	"	0.167		67	30-130			
Chrysene	0.1	0.00067	"	0.167		59.8	30-130			
Fluoranthene	0.12	0.00067	"	0.167		71.8	30-130			
Indeno(1,2,3-cd)pyrene	0.164	0.00067	"	0.167		98.2	30-130			
Benzo(a)pyrene	0.123	0.00067	"	0.167		73.6	30-130			
Dibenz(a,h)anthracene	0.152	0.00067	"	0.167		91	30-130			
Pyrene	0.123	0.00067	"	0.167		73.6	30-130			
Naphthalene	0.0876	0.00201	"	0.167		52.4	30-130			
Anthracene	0.116	0.00067	"	0.167		69.4	30-130			
Acenaphthene	0.106	0.00067	"	0.167		63.4	30-130			
2-Methylnaphthalene	0.0811	0.00201	"	0.167		48.5	30-130			
1-Methylnaphthalene	0.0882	0.00201	"	0.167		52.8	30-130			
Fluorene	0.102	0.00067	"	0.167		61	30-130			

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Jeremy Espinoza
Project Number: 09A1417854
Project: KMG - Pioneer 4-12

**PAH by 8270D SIM - Quality Control
Waypoint Analytical, LLC.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch L786932 - 3550B

LCS (LCS-L786932)

Prepared: 11/27/2024 Analyzed: 11/30/2024

Benzo(a)anthracene	0.113	0.00067	mg/Kg	0.167		67.6	30-130			
Surrogate: Nitrobenzene-d5	46.5		"	0.333		46.5	29-110			
Surrogate: 4-Terphenyl-d14	59.4		"	0.333		59.4	33-122			
Surrogate: 2-Fluorobiphenyl	40.2		"	0.333		40.2	33-115			

LRB (LRB-L786932)

Prepared: 11/27/2024 Analyzed: 11/30/2024

Naphthalene	ND	0.00201	mg/Kg				-			
Benzo(b)fluoranthene	ND	0.00067	"				-			
Benzo(k)fluoranthene	ND	0.00067	"				-			
Chrysene	ND	0.00067	"				-			
Dibenz(a,h)anthracene	ND	0.00067	"				-			
Fluoranthene	ND	0.00067	"				-			
Benzo(a)pyrene	ND	0.00067	"				-			
Indeno(1,2,3-cd)pyrene	ND	0.00067	"				-			
2-Methylnaphthalene	ND	0.00201	"				-			
Fluorene	ND	0.00067	"				-			
Benzo(a)anthracene	ND	0.00067	"				-			
Anthracene	ND	0.00067	"				-			
1-Methylnaphthalene	ND	0.00201	"				-			
Pyrene	ND	0.00067	"				-			
Acenaphthene	ND	0.00067	"				-			
Surrogate: Nitrobenzene-d5	70.8		"	0.333		70.8	29-110			
Surrogate: 4-Terphenyl-d14	53.1		"	0.333		53.1	33-122			
Surrogate: 2-Fluorobiphenyl	36.3		"	0.333		36.3	33-115			

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

Jeremy Espinoza
 Project Number: 09A1417854
 Project: KMG - Pioneer 4-12

Total Metals by 7196A - Quality Control
Waypoint Analytical, LLC.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch L786860 -										
DUP (L 85477-DUP)		Source: 85477			Prepared: Analyzed: 11/27/2024					
Chromium, Hexavalent	ND	0.5	mg/Kg		<0.500		-	0	20	
MS (L 85477-MS)		Source: 85477			Prepared: Analyzed: 11/27/2024					
Chromium, Hexavalent	30.5	2.5	mg/Kg	39.7	< 0.244	77	75-125			
LCS (LCS)					Prepared: Analyzed: 11/27/2024					
Chromium, Hexavalent	6.13	0.5	mg/Kg	8		77	75-125			
LRB (LRB)					Prepared: Analyzed: 11/27/2024					
Chromium, Hexavalent	ND	0.5	mg/Kg				-			

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Ensolum
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Wheat Ridge CO 80033

Jeremy Espinoza
Project Number: 09A1417854
Project: KMG - Pioneer 4-12

Notes and Definitions

U Sample is Non-Detect.

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

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

J Estimated Value. Analyte below reported quantitation limit.

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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