



Absaroka
Max Dahlgren
112 High St.

December 16, 2024

Buffalo WY 82834

Project Name - KMG - Mulga 29C Small Eyed 14C HZ OSA Facility **Project Number - [none]**

Attached are your analytical results for KMG - Mulga 29C Small Eyed 14C HZ OSA Facility received by Origins Laboratory December 02, 2024. This project is associated with Origins project number E4L0033-01.

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

Absaroka
112 High St.
Buffalo


WY 82834

Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
REL-B02@8'	E4L0033-01	Soil	December 2, 2024 12:20	12/02/2024 15:00
REL-N02@4'	E4L0033-02	Soil	December 2, 2024 12:25	12/02/2024 15:00
REL-S02@4'	E4L0033-03	Soil	December 2, 2024 12:30	12/02/2024 15:00
REL-E02@4'	E4L0033-04	Soil	December 2, 2024 12:35	12/02/2024 15:00

Origins Laboratory



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WY 82834

Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

ORIGINS

640033

Page 1 of 1

Client: OXY / Absaroka
Address:

Telephone Number: 970-481-6909

Email Address: oxy.co.rem@absarokasolutions.com

Project Manager: Max Dahlgren
Project Name: Mulga 29C Small Eyed 14C HZ OSA Facility
Project Number:
Collected By: SE/CH
Invoice Billing Info: On File - Oxy
Key: W=Water
GW=Groundwater
SW=Surface Water
WW=Waste Water

Soil | SO₂-Sulfide | O₂-Oil | A-Air | G-Gas | VNP-Volatilized | HCL-Hydrochloric | HNO₃-Nitric | H₂SO₄-Sulfuric | NaOH-Sodium Hydroxide

Sample ID	Date Sampled	Time Sampled	# of Containers	Matrix	Preservative	Analysis											Comments
						BTX, TPH	TMBs	1-M, 2-M	B(a)a, Naph	Chrysene	Pyrene	Flourene	As, Ba, Cd	Cu, Pb, Ni	EC, SAR	Boron	
041-002081	12/12/14	12:20	3	S	VNP	X	X	X	X	X	X	X	X	X	X	X	
041-002041	12/12/14	12:25	3	S	VNP	X	X	X	X	X	X	X	X	X	X	X	
041-002041	12/12/14	12:30	3	S	VNP	X	X	X	X	X	X	X	X	X	X	X	
041-002041	12/12/14	12:35	3	S	VNP	X	X	X	X	X	X	X	X	X	X	X	

Temp Received: 55 Received On Ice? ☒ Yes ☐ No

Standard

48 Hr 72

Turnaround Time

X SAME DAY 24

Origins Laboratory

J. Bynon

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ORIGINS LABORATORY

Absaroka
112 High St.
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WY 82834

Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: E410083

Client: Absaroka

Client Project ID: Mulga

Checklist Completed by: EH

Shipped Via: HO

Date/time completed: 12/12/12

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

Airbill #: N/A

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

Cooler Number/Temperature: 1-13-5 °C 1 °C 1 °C 1 °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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH < 2 for samples preserved with HNO ₃ , HCl, H ₂ SO ₄) / (pH > 10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) EH

Date/Time Reviewed 12/12/12

Origins Laboratory

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Buffalo

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82834

Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-B02@8'

12/2/2024 12:20:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-01 (Soil)

Boron (DTPA Sorbitol)

Boron	0.571	0.0985	mg/L	1	B4L0315	12/03/2024	12/05/2024
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	448	25.0	mg/kg	1	B4L0239	12/02/2024	12/03/2024
Residual Range Organics (C28-C40)	409	100	"	"	"	"	"

Surrogate: o-Terphenyl	88.6 %	50-150	"	"	"
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GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	3.12	0.0500	mg/kg	25	B4L0240	12/02/2024	12/03/2024
1,3,5-Trimethylbenzene	1.14	0.0500	"	"	"	"	"
Benzene	ND	0.0500	"	"	"	"	R-05, U
Ethylbenzene	ND	0.0500	"	"	"	"	R-05, U
Toluene	ND	0.0500	"	"	"	"	R-05, U
Xylenes, total	4.83	0.0500	"	"	"	"	"
Gasoline Range Hydrocarbons	146	5.00	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	96.9 %	70-130	"	"	"
Surrogate: Toluene-d8	103 %	70-130	"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	70-130	"	"	"

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OSA Facility

REL-B02@8'

12/2/2024 12:20:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-01 (Soil)

Metals by Saturated Paste by EPA 6010

Calcium	ND	0.499	meq/L	10	[CALC]	12/03/2024	12/05/2024
Magnesium	ND	0.823	"	"	"	"	"
Sodium	7.90	0.435	"	"	"	"	"

PAH by EPA 8270E extracted via 3580A

1-Methylnaphthalene	0.810	0.002	mg/kg	1	B4L0238	12/02/2024	12/03/2024
2-Methylnaphthalene	1.69	0.020	"	10	"	"	12/02/2024
Benzo (a) anthracene	ND	0.005	"	1	"	"	12/03/2024 U
Chrysene	ND	0.020	"	"	"	"	" U
Fluorene	0.142	0.020	"	"	"	"	"
Naphthalene	0.386	0.002	"	"	"	"	"
Pyrene	ND	0.020	"	"	"	"	" U

Surrogate: Fluorene-d10	113 %	60-130	"	"	"
Surrogate: Anthracene-d10	95.1 %	60-130	"	"	"
Surrogate: Pyrene-d10	107 %	60-130	"	"	"
Surrogate: Benzo (a) pyrene-d12	99.0 %	60-130	"	"	"

SAR by 20B Saturated Paste

SAR	19.9	0.0100	SAR	1	B4L0308	12/03/2024	12/05/2024
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OSA Facility

REL-B02@8'

12/2/2024 12:20:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-01 (Soil)

Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.799	0.00500	mmhos/cm	1	B4L0326	12/03/2024	12/04/2024
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Table 915 metals by EPA 6020B

Arsenic	2.43	0.266	mg/kg	10	B4L0245	12/02/2024	12/03/2024
Barium	77.5	9.17	"	"	"	"	"
Cadmium	ND	0.0917	"	"	"	"	"
Copper	ND	9.17	"	"	"	"	"
Lead	4.81	0.917	"	"	"	"	"
Nickel	8.57	0.917	"	"	"	"	"

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Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-N02@4'

12/2/2024 12:25:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-02 (Soil)

Boron (DTPA Sorbitol)

Boron	0.504	0.0991	mg/L	1	B4L0316	12/03/2024	12/05/2024	
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	ND	25.0	mg/kg	1	B4L0239	12/02/2024	12/02/2024	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	74.8 %	50-150	"	"	"
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GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	ND	0.00200	mg/kg	1	B4L0240	12/02/2024	12/02/2024	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	101 %	70-130	"	"	"
Surrogate: Toluene-d8	101 %	70-130	"	"	"

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OSA Facility

REL-N02@4'

12/2/2024 12:25:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-02 (Soil)

GBTEX+TMBs by 8260D

Surrogate: 4-Bromofluorobenzene	108 %	70-130				B4L02 40	12/02/2024	12/02/2024	
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Metals by Saturated Paste by EPA 6010

Calcium	2.71	0.499	meq/L	10	[CALC]		12/03/2024	12/05/2024	
Magnesium	1.03	0.823	"	"	"	"	"	"	
Sodium	8.97	0.435	"	"	"	"	"	"	

PAH by EPA 8270E extracted via 3580A

1-Methylnaphthalene	ND	0.002	mg/kg	1	B4L0238	12/02/2024	12/02/2024	U
2-Methylnaphthalene	ND	0.002	"	"	"	"	"	U
Benzo (a) anthracene	ND	0.005	"	"	"	"	"	U
Chrysene	ND	0.020	"	"	"	"	"	U
Fluorene	ND	0.020	"	"	"	"	"	U
Naphthalene	ND	0.002	"	"	"	"	"	U
Pyrene	ND	0.020	"	"	"	"	"	U

Surrogate: Fluorene-d10	100 %	60-130			"	"	"	
Surrogate: Anthracene-d10	92.5 %	60-130			"	"	"	
Surrogate: Pyrene-d10	114 %	60-130			"	"	"	
Surrogate: Benzo (a) pyrene-d12	101 %	60-130			"	"	"	

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Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-N02@4'

12/2/2024 12:25:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-02 (Soil)

SAR by 20B Saturated Paste

SAR	6.55	0.0100	SAR	1	B4L0308	12/03/2024	12/05/2024
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	1.56	0.00500	mmhos/cm	1	B4L0326	12/03/2024	12/04/2024
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Table 915 metals by EPA 6020B

Arsenic	2.30	0.277	mg/kg	10	B4L0245	12/02/2024	12/03/2024
Barium	53.6	9.56	"	"	"	"	"
Cadmium	ND	0.0956	"	"	"	"	"
Copper	ND	9.56	"	"	"	"	"
Lead	5.36	0.956	"	"	"	"	"
Nickel	7.11	0.956	"	"	"	"	"

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Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

REL-S02@4'

12/2/2024 12:30:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory E4L0033-03 (Soil)

Boron (DTPA Sorbitol)

Boron	ND	0.0986	mg/L	1	B4L0316	12/03/2024	12/05/2024	
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	ND	25.0	mg/kg	1	B4L0239	12/02/2024	12/02/2024	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	73.1 %	50-150	"	"	"
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GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	ND	0.00200	mg/kg	1	B4L0240	12/02/2024	12/02/2024	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	101 %	70-130	"	"	"
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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-S02@4'

12/2/2024 12:30:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-03 (Soil)

GBTEX+TMBs by 8260D

Surrogate: Toluene-d8	101 %	70-130				B4L02 40	12/02/2024	12/02/2024	
Surrogate: 4-Bromofluorobenzene	105 %	70-130				"	"	"	

Metals by Saturated Paste by EPA 6010

Calcium	0.672	0.499	meq/L	10	[CALC]		12/03/2024	12/05/2024	
Magnesium	ND	0.823	"	"	"		"	"	
Sodium	ND	0.435	"	"	"		"	"	

PAH by EPA 8270E extracted via 3580A

1-Methylnaphthalene	ND	0.002	mg/kg	1	B4L0238	12/02/2024	12/02/2024	U
2-Methylnaphthalene	ND	0.002	"	"	"	"	"	U
Benzo (a) anthracene	ND	0.005	"	"	"	"	"	U
Chrysene	ND	0.020	"	"	"	"	"	U
Fluorene	ND	0.020	"	"	"	"	"	U
Naphthalene	ND	0.002	"	"	"	"	"	U
Pyrene	ND	0.020	"	"	"	"	"	U

Surrogate: Fluorene-d10	103 %	60-130			"	"	"	
Surrogate: Anthracene-d10	91.9 %	60-130			"	"	"	
Surrogate: Pyrene-d10	138 %	60-130			"	"	"	S-04

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-S02@4'

12/2/2024 12:30:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-03 (Soil)

PAH by EPA 8270E extracted via 3580A

Surrogate: Benzo (a) pyrene-d12	95.3 %	60-130	B4L0238	12/02/2024	12/02/2024
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SAR by 20B Saturated Paste

SAR	0.446	0.0100	SAR	1	B4L0308	12/03/2024	12/05/2024
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.159	0.00500	mmhos/cm	1	B4L0326	12/03/2024	12/04/2024
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Table 915 metals by EPA 6020B

Arsenic	1.70	0.272	mg/kg	10	B4L0245	12/02/2024	12/03/2024
Barium	24.7	9.37	"	"	"	"	"
Cadmium	ND	0.0937	"	"	"	"	"
Copper	ND	9.37	"	"	"	"	"
Lead	3.01	0.937	"	"	"	"	"
Nickel	3.46	0.937	"	"	"	"	"

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Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-E02@4'

12/2/2024 12:35:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-04 (Soil)

Boron (DTPA Sorbitol)

Boron	1.97	0.0988	mg/L	1	B4L0316	12/03/2024	12/05/2024	
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DRO/ORO by EPA 8015D

Diesel (C10-C28)	ND	25.0	mg/kg	1	B4L0239	12/02/2024	12/02/2024	U
Residual Range Organics (C28-C40)	ND	100	"	"	"	"	"	U

Surrogate: o-Terphenyl	89.4 %	50-150	"	"	"
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GBTEX+TMBs by 8260D

1,2,4-Trimethylbenzene	ND	0.00200	mg/kg	1	B4L0240	12/02/2024	12/02/2024	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	102 %	70-130	"	"	"
Surrogate: Toluene-d8	91.0 %	70-130	"	"	"

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Absaroka

112 High St.

Buffalo

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82834

Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-E02@4'

12/2/2024 12:35:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-04 (Soil)

GBTEX+TMBs by 8260D

Surrogate: 4-Bromofluorobenzene	109 %	70-130	B4L02 40	12/02/2024	12/02/2024
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Metals by Saturated Paste by EPA 6010

Calcium	ND	0.499	meq/L	10	[CALC]	12/03/2024	12/05/2024
Magnesium	ND	0.823	"	"	"	"	"
Sodium	8.56	0.435	"	"	"	"	"

PAH by EPA 8270E extracted via 3580A

1-Methylnaphthalene	ND	0.002	mg/kg	1	B4L0238	12/02/2024	12/02/2024	U
2-Methylnaphthalene	ND	0.002	"	"	"	"	"	U
Benzo (a) anthracene	ND	0.005	"	"	"	"	"	U
Chrysene	ND	0.020	"	"	"	"	"	U
Fluorene	ND	0.020	"	"	"	"	"	U
Naphthalene	ND	0.002	"	"	"	"	"	U
Pyrene	ND	0.020	"	"	"	"	"	U

Surrogate: Fluorene-d10	97.7 %	60-130	"	"	"
Surrogate: Anthracene-d10	90.6 %	60-130	"	"	"
Surrogate: Pyrene-d10	97.1 %	60-130	"	"	"
Surrogate: Benzo (a) pyrene-d12	91.3 %	60-130	"	"	"

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

REL-E02@4'

12/2/2024 12:35:00PM

Analyte	Result	Min Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory

E4L0033-04 (Soil)

SAR by 20B Saturated Paste

SAR	41.1	0.0100	SAR	1	B4L0308	12/03/2024	12/05/2024
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Specific Conductance Mod. 9050A

Specific Conductance (EC)	0.972	0.00500	mmhos/cm	1	B4L0326	12/03/2024	12/04/2024
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Table 915 metals by EPA 6020B

Arsenic	3.25	0.245	mg/kg	10	B4L0245	12/02/2024	12/03/2024
Barium	55.3	8.44	"	"	"	"	"
Cadmium	ND	0.0844	"	"	"	"	"
Copper	ND	8.44	"	"	"	"	"
Lead	5.16	0.844	"	"	"	"	"
Nickel	8.09	0.844	"	"	"	"	"

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OSA Facility

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 B4L0239 - EPA 3550B

Blank (B4L0239-BLK1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

Diesel (C10-C28)	ND	25.0	mg/kg							U
Residual Range Organics (C28-C40)	ND	100	"							U
Surrogate: o-Terphenyl	21		"	24.9		82.7	50-150			

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Jordan A. Bynon, Project Manager



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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

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 B4L0239 - EPA 3550B

LCS (B4L0239-BS1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

Diesel (C10-C28)	902	50.0	mg/kg	1000		90.2	70-130			
Residual Range Organics (C28-C40)	914	200	"	1000		91.4	70-130			
Surrogate: o-Terphenyl	48		"	49.8		95.9	50-150			

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0239 - EPA 3550B

Matrix Spike (B4L0239-MS1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
Diesel (C10-C28)	2100	50.0	mg/kg	1000	1110	98.9	70-130			
Residual Range Organics (C28-C40)	1930	200	"	1000	975	95.3	70-130			
Surrogate: o-Terphenyl	60		"	49.8		121	50-150			

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Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

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 B4L0239 - EPA 3550B

Matrix Spike Dup (B4L0239-MSD1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
Diesel (C10-C28)	2210	50.0	mg/kg	1000	1110	110	70-130	5.12	35	
Residual Range Organics (C28-C40)	2100	200	"	1000	975	112	70-130	8.32	35	
Surrogate: o-Terphenyl	72		"	49.8		144	50-150			

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Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

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 B4L0240 - EPA 5030 (soil)										
Blank (B4L0240-BLK1)					Prepared: 12/02/2024 Analyzed: 12/02/2024					
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	0.12		"	0.125		99.1	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.8	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		107	70-130			

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Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0240 - EPA 5030 (soil)

LCS (B4L0240-BS1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

1,2,4-Trimethylbenzene	0.0980	0.00200	mg/kg	0.100		98.0	70-130			
1,3,5-Trimethylbenzene	0.102	0.00200	"	0.100		102	70-130			
Benzene	0.0999	0.00200	"	0.100		99.9	70-130			
Ethylbenzene	0.0894	0.00200	"	0.100		89.4	70-130			
Naphthalene	0.109	0.00380	"	0.100		109	70-130			
Toluene	0.0985	0.00200	"	0.100		98.5	70-130			
o-Xylene	0.0939	0.00200	"	0.100		93.9	70-130			
m,p-Xylene	0.184	0.00400	"	0.200		91.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		97.4	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.5	70-130			
Surrogate: 4-Bromofluorobenzene	0.11		"	0.125		87.3	70-130			

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Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0240 - EPA 5030 (soil)

Matrix Spike (B4L0240-MS1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
1,2,4-Trimethylbenzene	0.0976	0.00200	mg/kg	0.100	0.00122	96.4	70-130			
1,3,5-Trimethylbenzene	0.0998	0.00200	"	0.100	0.00170	98.1	70-130			
Benzene	0.115	0.00200	"	0.100	0.00986	105	70-130			
Ethylbenzene	0.108	0.00200	"	0.100	0.00338	104	70-130			
Naphthalene	0.100	0.00380	"	0.100	0.00364	96.8	70-130			
Toluene	0.157	0.00200	"	0.100	0.0387	119	70-130			
o-Xylene	0.117	0.00200	"	0.100	0.0105	107	70-130			
m,p-Xylene	0.220	0.00400	"	0.200	0.00682	107	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		101	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.8	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.1	70-130			

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

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 B4L0240 - EPA 5030 (soil)

Matrix Spike Dup (B4L0240-MSD1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
1,2,4-Trimethylbenzene	0.0923	0.00200	mg/kg	0.100	0.00122	91.1	70-130	5.56	20	
1,3,5-Trimethylbenzene	0.0937	0.00200	"	0.100	0.00170	92.0	70-130	6.35	20	
Benzene	0.106	0.00200	"	0.100	0.00986	96.3	70-130	7.81	20	
Ethylbenzene	0.0998	0.00200	"	0.100	0.00338	96.5	70-130	7.56	20	
Naphthalene	0.110	0.00380	"	0.100	0.00364	106	70-130	9.09	20	
Toluene	0.142	0.00200	"	0.100	0.0387	104	70-130	9.98	20	
o-Xylene	0.111	0.00200	"	0.100	0.0105	100	70-130	5.68	20	
m,p-Xylene	0.205	0.00400	"	0.200	0.00682	99.0	70-130	7.07	20	
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		101	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.0	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.8	70-130			

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Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0245 - EPA 3050B

Blank (B4L0245-BLK1)

Prepared: 12/02/2024 Analyzed: 12/03/2024

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 (B4L0245-BS1)

Prepared: 12/02/2024 Analyzed: 12/03/2024

Arsenic	5.41	0.290	mg/kg	5.00	108	80-120
Barium	583	10.0	"	500	117	80-120
Cadmium	5.45	0.100	"	5.00	109	80-120
Copper	56.1	10.0	"	50.0	112	80-120
Lead	5.61	1.00	"	5.00	112	80-120
Nickel	5.63	1.00	"	5.00	113	80-120
Selenium	5.57	0.260	"	5.00	111	80-120
Silver	5.58	0.100	"	5.00	112	80-120
Zinc	54.9	37.0	"	50.0	110	80-120

Matrix Spike (B4L0245-MS1)

Source: E4L0035-01

Prepared: 12/02/2024 Analyzed: 12/03/2024

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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 B4L0245 - EPA 3050B

Matrix Spike (B4L0245-MS1)		Source: E4L0035-01			Prepared: 12/02/2024 Analyzed: 12/03/2024					
Arsenic	7.16	0.247	mg/kg	4.26	3.18	93.4	75-125			
Barium	588	8.52	"	426	119	110	75-125			
Cadmium	4.63	0.0852	"	4.26	0.132	106	75-125			
Copper	53.4	8.52	"	42.6	7.54	108	75-125			
Lead	10.9	0.852	"	4.26	7.18	88.0	75-125			
Nickel	11.3	0.852	"	4.26	7.94	78.4	75-125			
Selenium	4.70	0.221	"	4.26	0.0978	108	75-125			
Silver	4.70	0.0852	"	4.26	0.0344	110	75-125			
Zinc	71.1	31.5	"	42.6	29.5	97.7	75-125			
Matrix Spike Dup (B4L0245-MSD1)		Source: E4L0035-01			Prepared: 12/02/2024 Analyzed: 12/03/2024					
Arsenic	8.31	0.272	mg/kg	4.70	3.18	109	75-125	14.9	20	
Barium	616	9.39	"	470	119	106	75-125	4.59	20	
Cadmium	5.01	0.0939	"	4.70	0.132	104	75-125	7.70	20	
Copper	61.0	9.39	"	47.0	7.54	114	75-125	13.4	20	
Lead	10.9	0.939	"	4.70	7.18	79.4	75-125	0.160	20	
Nickel	12.4	0.939	"	4.70	7.94	95.3	75-125	9.61	20	
Selenium	4.94	0.244	"	4.70	0.0978	103	75-125	5.03	20	
Silver	5.12	0.0939	"	4.70	0.0344	108	75-125	8.48	20	
Zinc	77.7	34.8	"	47.0	29.5	103	75-125	8.84	20	

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Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0238 - EPA 3580

Blank (B4L0238-BLK1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

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

Surrogate: Fluorene-d10	200		ug/kg	200	98.7	60-130
Surrogate: Anthracene-d10	190		"	200	95.1	60-130
Surrogate: Pyrene-d10	190		"	200	94.2	60-130
Surrogate: Benzo (a) pyrene-d12	190		"	200	95.0	60-130

LCS (B4L0238-BS1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

1-Methylnaphthalene	0.221	0.002	mg/kg	0.200	110	70-130
2-Methylnaphthalene	0.215	0.002	"	0.200	107	70-130
Acenaphthene	0.199	0.020	"	0.200	99.6	70-130
Anthracene	0.175	0.020	"	0.200	87.7	70-130

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ

OSA Facility

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 B4L0238 - EPA 3580

LCS (B4L0238-BS1)

Prepared: 12/02/2024 Analyzed: 12/02/2024

Benzo (a) anthracene	0.195	0.005	mg/kg	0.200		97.7	70-130			
Benzo (a) pyrene	0.196	0.020	"	0.200		98.0	70-130			
Benzo (b) fluoranthene	0.199	0.020	"	0.200		99.5	70-130			
Benzo (g,h,i) perylene	0.231	0.020	"	0.200		116	70-130			
Benzo (k) fluoranthene	0.193	0.020	"	0.200		96.5	70-130			
Chrysene	0.220	0.020	"	0.200		110	70-130			
Dibenz (a,h) anthracene	0.232	0.020	"	0.200		116	70-130			
Fluoranthene	0.214	0.020	"	0.200		107	70-130			
Fluorene	0.200	0.020	"	0.200		99.8	70-130			
Indeno (1,2,3-cd) pyrene	0.238	0.020	"	0.200		119	70-130			
Naphthalene	0.205	0.002	"	0.200		102	70-130			
Phenanthrene	0.192	0.020	"	0.200		95.8	70-130			
Pyrene	0.218	0.020	"	0.200		109	70-130			
Surrogate: Fluorene-d10	200		ug/kg	200		99.2	60-130			
Surrogate: Anthracene-d10	180		"	200		90.3	60-130			
Surrogate: Pyrene-d10	220		"	200		111	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		94.2	60-130			

Matrix Spike (B4L0238-MS1)

Source: E4L0017-05

Prepared: 12/02/2024 Analyzed: 12/02/2024

1-Methylnaphthalene	0.488	0.002	mg/kg	0.200	0.271	108	70-130			
2-Methylnaphthalene	0.464	0.002	"	0.200	0.262	101	70-130			
Acenaphthene	0.583	0.020	"	0.200	0.357	113	70-130			
Anthracene	0.323	0.020	"	0.200	ND	161	70-130			QM-07
Benzo (a) anthracene	0.267	0.005	"	0.200	ND	133	70-130			QM-07
Benzo (a) pyrene	0.212	0.020	"	0.200	ND	106	70-130			
Benzo (b) fluoranthene	0.206	0.020	"	0.200	0.033	86.5	70-130			
Benzo (g,h,i) perylene	0.213	0.020	"	0.200	0.009	102	70-130			

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Absaroka
112 High St.
Buffalo

WY 82834

Max Dahlgren
Project Number: [none]
Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

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 B4L0238 - EPA 3580

Matrix Spike (B4L0238-MS1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
Benzo (k) fluoranthene	0.204	0.020	mg/kg	0.200	ND	102	70-130			
Chrysene	0.491	0.020	"	0.200	0.136	178	70-130			QM-07
Dibenz (a,h) anthracene	0.231	0.020	"	0.200	0.003	114	70-130			
Fluoranthene	0.222	0.020	"	0.200	0.041	90.5	70-130			
Fluorene	0.882	0.020	"	0.200	0.649	117	70-130			
Indeno (1,2,3-cd) pyrene	0.233	0.020	"	0.200	ND	116	70-130			
Naphthalene	0.233	0.002	"	0.200	0.009	112	70-130			
Phenanthrene	1.35	0.200	"	0.200	1.43	NR	70-130			QM-07
Pyrene	0.290	0.020	"	0.200	0.097	96.3	70-130			
Surrogate: Fluorene-d10	180		ug/kg	200		91.2	60-130			
Surrogate: Anthracene-d10	210		"	200		105	60-130			
Surrogate: Pyrene-d10	200		"	200		102	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		93.2	60-130			

Matrix Spike Dup (B4L0238-MSD1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
1-Methylnaphthalene	0.542	0.002	mg/kg	0.200	0.271	135	70-130	10.4	20	QM-07
2-Methylnaphthalene	0.505	0.002	"	0.200	0.262	121	70-130	8.37	20	
Acenaphthene	0.579	0.020	"	0.200	0.357	111	70-130	0.751	20	
Anthracene	0.305	0.020	"	0.200	ND	153	70-130	5.51	20	QM-07
Benzo (a) anthracene	0.275	0.005	"	0.200	ND	137	70-130	2.88	20	QM-07
Benzo (a) pyrene	0.175	0.020	"	0.200	ND	87.6	70-130	19.2	20	
Benzo (b) fluoranthene	0.213	0.020	"	0.200	0.033	90.1	70-130	3.49	20	
Benzo (g,h,i) perylene	0.230	0.020	"	0.200	0.009	110	70-130	7.28	20	
Benzo (k) fluoranthene	0.210	0.020	"	0.200	ND	105	70-130	2.50	20	
Chrysene	0.491	0.020	"	0.200	0.136	178	70-130	0.0141	20	QM-07
Dibenz (a,h) anthracene	0.237	0.020	"	0.200	0.003	117	70-130	2.59	20	
Fluoranthene	0.230	0.020	"	0.200	0.041	94.4	70-130	3.44	20	

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OSA Facility

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 B4L0238 - EPA 3580

Matrix Spike Dup (B4L0238-MSD1)		Source: E4L0017-05			Prepared: 12/02/2024 Analyzed: 12/02/2024					
Fluorene	0.824	0.020	mg/kg	0.200	0.649	87.3	70-130	6.89	20	
Indeno (1,2,3-cd) pyrene	0.218	0.020	"	0.200	ND	109	70-130	6.65	20	
Naphthalene	0.230	0.002	"	0.200	0.009	111	70-130	1.19	20	
Phenanthrene	1.49	0.200	"	0.200	1.43	28.8	70-130	9.74	20	QM-07
Pyrene	0.304	0.020	"	0.200	0.097	104	70-130	4.94	20	
Surrogate: Fluorene-d10	180		ug/kg	200		92.4	60-130			
Surrogate: Anthracene-d10	200		"	200		102	60-130			
Surrogate: Pyrene-d10	220		"	200		110	60-130			
Surrogate: Benzo (a) pyrene-d12	190		"	200		94.6	60-130			

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Jordan A. Bynon, Project Manager

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Max Dahlgren
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OSA Facility

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 B4L0308 - Saturated Paste Metals

Blank (B4L0308-BLK1)

Prepared: 12/03/2024 Analyzed: 12/05/2024

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

Duplicate (B4L0308-DUP1)

Source: E4L0033-01

Prepared: 12/03/2024 Analyzed: 12/05/2024

SAR	ND	0.0100	SAR	19.9			200
Calcium PPM	5.59	10.0	mg/L	5.68		1.60	50
Magnesium PPM	0.430	10.0	"	ND			50
Sodium PPM	211	10.0	"	182		14.9	50

Batch B4L0315 - DTPA Sorbitol Preparation

Blank (B4L0315-BLK1)

Prepared: 12/03/2024 Analyzed: 12/05/2024

Boron	ND	0.100	mg/L
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Duplicate (B4L0315-DUP1)

Source: E4L0017-01

Prepared: 12/03/2024 Analyzed: 12/06/2024

Boron	0.286	0.994	mg/L	0.408		35.1	50
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Batch B4L0316 - DTPA Sorbitol Preparation

Blank (B4L0316-BLK1)

Prepared: 12/03/2024 Analyzed: 12/05/2024

Boron	ND	0.100	mg/L
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Duplicate (B4L0316-DUP1)

Source: E4L0033-02

Prepared: 12/03/2024 Analyzed: 12/05/2024

Boron	0.530	0.0988	mg/L	0.504		5.10	50
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Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

Saturated Paste - Quality Control
Origins Laboratory

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B4L0326 - Saturated Paste pH/EC										
Blank (B4L0326-BLK1)					Prepared: 12/03/2024 Analyzed: 12/04/2024					
Specific Conductance (EC)	ND	0.00500	mmhos/cm							
Duplicate (B4L0326-DUP1)					Source: E4L0033-01 Prepared: 12/03/2024 Analyzed: 12/04/2024					
Specific Conductance (EC)	0.980	0.00500	mmhos/cm		0.799			20.3	25	

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Max Dahlgren

Project Number: [none]

Project: KMG - Mulga 29C Small Eyed 14C HZ
OSA Facility

Notes and Definitions

U Sample is Non-Detect.

S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

R-05 The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.

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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