

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

August 28, 2024

Ben Shoup

Citation Oil & Gas

14077 Cutten Rd

Houston, TX. 77069-2212

RE: Absaroka - Arapahoe Unit 255

Work Order #2408259

Enclosed are the results of analyses for samples received by Summit Scientific on 08/21/24 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Natalie Tessier". The signature is written in a cursive, flowing style.

Natalie Tessier For Paul Shrewsbury
President



Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AV_SS_04F	2408259-01	Soil	08/21/24 08:20	08/21/24 16:30



4653 Table Mountain Drive
 Golden, CO 80403
 303-277-9310

Lab ID	Page 1 of 1
2408259	

	Send Data To:	Send Invoice To:
Client: Citation	Project Manager: Max Dahlgren/Ben Shoup	Company: Absaroka Energy and Environmental Solutions
Address: On File	E-Mail: ben.shoup@absarokasolutions.com	Project Name/Location:
City/State/Zip:	max.dahlgren@absarokasolutions.com	AFE#:
Phone: 970-481-6909	Project Name: <i>Arpahee Unit 255</i>	PO/Billing Codes:
Sampler Name: <i>Max Dahlgren</i>	Project Number:	Contact: Max Dahlgren/Ben Shoup

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix			Analysis Requested				Special Instructions
					HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	Full 915 Suite	915 - pH, EC, SAR	915 - Boron - HWS	
1	<i>AU-SS-04F</i>	<i>8/21/24</i>	<i>820</i>	<i>3</i>			<i>X</i>				<i>X</i>					
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

Relinquished by: <i>[Signature]</i>	Date/Time: <i>8/21/24 1545</i>	Received by:	Date/Time:	TAT Business Days	Field DO	Notes:
				Same Day	Field EC	
Relinquished by: <i>SL</i>	Date/Time: <i>8/21/24 1630</i>	Received by: <i>[Signature]</i>	Date/Time: <i>8/21/24 1630</i>	1 Day	Field ORP	
				2 Days	Field pH	
Relinquished by:	Date/Time:	Received by:	Date/Time:	3 Days	Field Temp.	
				Standard	<i>X</i> Field Turb.	
Temperature Upon Receipt: <i>11.7</i>	Corrected Temperature: <i>6</i>	IR gun #:	<i>1</i>	HNO3 lot #:		

S₂

Sample Receipt Checklist

S2 Work Order# 2408259

Client: Citation Client Project ID: Arapahoe unit 25s

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other Airbill #: _____

-

Matrix (Check all that apply) Air Soil/Solid Water Other

Temp (°C)

Thermometer #

	Yes	No	N/A	Comments (if any)
If samples require cooling, is the temperature < 6°C? ⁽¹⁾ NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on ice
If custody seals are present, are they intact? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are samples due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are water samples with short hold times present? Note the short hold analysis in the comments column - pH, Nitrate/Nitrite, Ferrous Iron (Fe ²⁺), Hexavalent Chromium (Cr ⁶⁺ , Cr VI), COD/BOD, Total Coliform, E. Coli, Total Residual Chlorine (TRC), Dissolved Oxygen	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out Completely? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC? ⁽¹⁾	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling)? ⁽¹⁾ Note the type of preservative in the comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2? ⁽¹⁾ Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):
uncertified bottle/care, requires qualifiers (bags)

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.

AS
Custodian Printed Name

8/21/24
Date/Time



Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

AV_SS_04F
2408259-01 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	0.0020		mg/kg	1	BHH0655	08/22/24	08/23/24	EPA 8260B	
Toluene	ND	0.0050		"	"	"	"	"	"	
Ethylbenzene	ND	0.0050		"	"	"	"	"	"	
Xylenes (total)	ND	0.010		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050		"	"	"	"	"	"	
Naphthalene	ND	0.0038		"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50		"	"	"	"	"	"	

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4	0.0403	101 %		50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0393	98.2 %		50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0389	97.4 %		50-150		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
C10-C28 (DRO)	ND	50		mg/kg	1	BHH0659	08/22/24	08/25/24	EPA 8015M	
C28-C36 (ORO)	ND	50		"	"	"	"	"	"	

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: o-Terphenyl	11.9	95.1 %		30-150		"	"	"	"	

PAH by EPA Method 8270D SIM

Summit Scientific

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AV_SS_04F
2408259-01 (Soil)

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PAH by EPA Method 8270D SIM

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BHH0687	08/23/24	08/23/24	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0175	52.5 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0189	56.7 %	40-150		"	"	"	"	

Total Metals by EPA 6020B Hot Water Soluble Extraction

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	2.00	mg/L	1	BHH0660	08/22/24	08/23/24	EPA 6020B	

Total Metals by EPA 6020B

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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2408259-01 (Soil)

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Total Metals by EPA 6020B

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Arsenic	2.81	0.200	mg/kg dry	1	BHH0644	08/22/24	08/28/24	EPA 6020B
Barium	110	0.400	"	"	"	"	"	"
Cadmium	0.230	0.200	"	"	"	"	"	"
Copper	6.75	0.400	"	"	"	"	"	"
Lead	7.36	0.200	"	"	"	"	"	"
Nickel	6.74	0.400	"	"	"	"	"	"
Silver	0.0331	0.0200	"	"	"	"	"	"
Zinc	28.4	0.400	"	"	"	"	"	"
Selenium	ND	0.260	"	"	"	"	"	"

Hexavalent Chromium by EPA Method 7196

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BHH0639	08/22/24	08/22/24	EPA 7196A	

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	93.3	0.0500	mg/L dry	1	BHH0680	08/22/24	08/27/24	EPA 6020B	
Magnesium	6.58	0.0500	"	"	"	"	"	"	
Sodium	9.55	0.0500	"	"	"	"	"	"	

Calculated Analysis

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.258	0.00100	units	1	BHH0860	08/28/24	08/28/24	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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2408259-01 (Soil)

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Physical Parameters by APHA/ASTM/EPA Methods

% Solids	92.9	%	1	BHH0652	08/22/24	08/23/24	Calculation
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Specific Conductance by EPA Method 120.1, Saturated Paste Extraction

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.630	0.0100	mmhos/cm	1	BHH0681	08/22/24	08/26/24	EPA 120.1	

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction

Date Sampled: **08/21/24 08:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.05		pH Units	1	BHH0682	08/22/24	08/26/24	EPA 9045D	

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Project Manager: Ben Shoup

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

Batch BHH0655 - EPA 5030 Soil MS

Blank (BHH0655-BLK1)

Prepared & Analyzed: 08/22/24

Benzene	ND	0.0020	mg/kg								
Toluene	ND	0.0050	"								
Ethylbenzene	ND	0.0050	"								
Xylenes (total)	ND	0.010	"								
1,2,4-Trimethylbenzene	ND	0.0050	"								
1,3,5-Trimethylbenzene	ND	0.0050	"								
Naphthalene	ND	0.0038	"								
Gasoline Range Hydrocarbons	ND	0.50	"								
Surrogate: 1,2-Dichloroethane-d4	0.0404		"	0.0400		101	50-150				
Surrogate: Toluene-d8	0.0396		"	0.0400		99.0	50-150				
Surrogate: 4-Bromofluorobenzene	0.0394		"	0.0400		98.6	50-150				

LCS (BHH0655-BS1)

Prepared & Analyzed: 08/22/24

Benzene	0.120	0.0020	mg/kg	0.100		120	70-130				
Toluene	0.111	0.0050	"	0.100		111	70-130				
Ethylbenzene	0.117	0.0050	"	0.100		117	70-130				
m,p-Xylene	0.227	0.010	"	0.200		114	70-130				
o-Xylene	0.118	0.0050	"	0.100		118	70-130				
1,2,4-Trimethylbenzene	0.117	0.0050	"	0.100		117	70-130				
1,3,5-Trimethylbenzene	0.118	0.0050	"	0.100		118	70-130				
Naphthalene	0.113	0.0038	"	0.100		113	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0385		"	0.0400		96.3	50-150				
Surrogate: Toluene-d8	0.0393		"	0.0400		98.3	50-150				
Surrogate: 4-Bromofluorobenzene	0.0396		"	0.0400		98.9	50-150				

Matrix Spike (BHH0655-MS1)

Source: 2408234-21

Prepared & Analyzed: 08/22/24

Benzene	0.110	0.0020	mg/kg	0.100	ND	110	70-130				
Toluene	0.102	0.0050	"	0.100	ND	102	70-130				
Ethylbenzene	0.102	0.0050	"	0.100	ND	102	70-130				
m,p-Xylene	0.199	0.010	"	0.200	ND	99.4	70-130				
o-Xylene	0.0917	0.0050	"	0.100	ND	91.7	70-130				
1,2,4-Trimethylbenzene	0.0886	0.0050	"	0.100	ND	88.6	70-130				
1,3,5-Trimethylbenzene	0.0904	0.0050	"	0.100	ND	90.4	70-130				
Naphthalene	0.0860	0.0038	"	0.100	ND	86.0	70-130				
Surrogate: 1,2-Dichloroethane-d4	0.0397		"	0.0400		99.2	50-150				
Surrogate: Toluene-d8	0.0398		"	0.0400		99.5	50-150				
Surrogate: 4-Bromofluorobenzene	0.0397		"	0.0400		99.2	50-150				

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch BHH0655 - EPA 5030 Soil MS

Matrix Spike Dup (BHH0655-MSD1)	Source: 2408234-21			Prepared & Analyzed: 08/22/24						
Benzene	0.107	0.0020	mg/kg	0.100	ND	107	70-130	2.21	30	
Toluene	0.0988	0.0050	"	0.100	ND	98.8	70-130	3.08	30	
Ethylbenzene	0.0979	0.0050	"	0.100	ND	97.9	70-130	3.67	30	
m,p-Xylene	0.190	0.010	"	0.200	ND	95.0	70-130	4.52	30	
o-Xylene	0.0876	0.0050	"	0.100	ND	87.6	70-130	4.62	30	
1,2,4-Trimethylbenzene	0.0825	0.0050	"	0.100	ND	82.5	70-130	7.05	30	
1,3,5-Trimethylbenzene	0.0860	0.0050	"	0.100	ND	86.0	70-130	5.00	30	
Naphthalene	0.0760	0.0038	"	0.100	ND	76.0	70-130	12.4	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0407</i>		<i>"</i>	<i>0.0400</i>		<i>102</i>	<i>50-150</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0393</i>		<i>"</i>	<i>0.0400</i>		<i>98.2</i>	<i>50-150</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0398</i>		<i>"</i>	<i>0.0400</i>		<i>99.4</i>	<i>50-150</i>			

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Project Number: [none]
Project Manager: Ben Shoup

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Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BHH0659 - EPA 3550A

Blank (BHH0659-BLK1)

Prepared: 08/22/24 Analyzed: 08/25/24

C10-C28 (DRO)	ND	50	mg/kg								
C28-C36 (ORO)	ND	50	"								
Surrogate: <i>o</i> -Terphenyl	12.3		"	12.5		98.7	30-150				

LCS (BHH0659-BS1)

Prepared: 08/22/24 Analyzed: 08/25/24

C10-C28 (DRO)	571	50	mg/kg	500		114	70-130				
Surrogate: <i>o</i> -Terphenyl	12.9		"	12.5		103	30-150				

Matrix Spike (BHH0659-MS1)

Source: 2408234-21

Prepared: 08/22/24 Analyzed: 08/25/24

C10-C28 (DRO)	563	50	mg/kg	500	ND	113	70-130				
Surrogate: <i>o</i> -Terphenyl	14.8		"	12.5		118	30-150				

Matrix Spike Dup (BHH0659-MSD1)

Source: 2408234-21

Prepared: 08/22/24 Analyzed: 08/25/24

C10-C28 (DRO)	531	50	mg/kg	500	ND	106	70-130	5.85	20		
Surrogate: <i>o</i> -Terphenyl	14.6		"	12.5		117	30-150				

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Project Number: [none]
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PAH by EPA Method 8270D SIM - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch BHH0687 - EPA 5030 Soil MS

Blank (BHH0687-BLK1)

Prepared & Analyzed: 08/23/24

Acenaphthene	ND	0.00500	mg/kg							
Anthracene	ND	0.00500	"							
Benzo (a) anthracene	ND	0.00500	"							
Benzo (a) pyrene	ND	0.00500	"							
Benzo (b) fluoranthene	ND	0.00500	"							
Benzo (k) fluoranthene	ND	0.00500	"							
Chrysene	ND	0.00500	"							
Dibenz (a,h) anthracene	ND	0.00500	"							
Fluoranthene	ND	0.00500	"							
Fluorene	ND	0.00500	"							
Indeno (1,2,3-cd) pyrene	ND	0.00500	"							
Pyrene	ND	0.00500	"							
1-Methylnaphthalene	ND	0.00500	"							
2-Methylnaphthalene	ND	0.00500	"							
Surrogate: 2-Methylnaphthalene-d10	0.0202		"	0.0333	60.5	40-150				
Surrogate: Fluoranthene-d10	0.0274		"	0.0333	82.2	40-150				

LCS (BHH0687-BS1)

Prepared & Analyzed: 08/23/24

Acenaphthene	0.0246	0.00500	mg/kg	0.0333	73.8	31-137				
Anthracene	0.0240	0.00500	"	0.0333	72.1	30-120				
Benzo (a) anthracene	0.0252	0.00500	"	0.0333	75.5	30-120				
Benzo (a) pyrene	0.0188	0.00500	"	0.0333	56.5	30-120				
Benzo (b) fluoranthene	0.0179	0.00500	"	0.0333	53.8	30-120				
Benzo (k) fluoranthene	0.0173	0.00500	"	0.0333	51.9	30-120				
Chrysene	0.0247	0.00500	"	0.0333	74.1	30-120				
Dibenz (a,h) anthracene	0.0220	0.00500	"	0.0333	66.0	30-120				
Fluoranthene	0.0236	0.00500	"	0.0333	70.7	30-120				
Fluorene	0.0245	0.00500	"	0.0333	73.5	30-120				
Indeno (1,2,3-cd) pyrene	0.0159	0.00500	"	0.0333	47.6	30-120				
Pyrene	0.0285	0.00500	"	0.0333	85.5	35-142				
1-Methylnaphthalene	0.0213	0.00500	"	0.0333	63.9	35-142				
2-Methylnaphthalene	0.0209	0.00500	"	0.0333	62.7	35-142				
Surrogate: 2-Methylnaphthalene-d10	0.0216		"	0.0333	64.8	40-150				
Surrogate: Fluoranthene-d10	0.0239		"	0.0333	71.6	40-150				

Summit Scientific

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Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

PAH by EPA Method 8270D SIM - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch BHH0687 - EPA 5030 Soil MS

Matrix Spike (BHH0687-MS1)	Source: 2408239-23			Prepared & Analyzed: 08/23/24								
Acenaphthene	0.0181	0.00500	mg/kg	0.0333	ND	54.4	31-137					
Anthracene	0.0179	0.00500	"	0.0333	ND	53.8	30-120					
Benzo (a) anthracene	0.0185	0.00500	"	0.0333	ND	55.5	30-120					
Benzo (a) pyrene	0.0135	0.00500	"	0.0333	ND	40.6	30-120					
Benzo (b) fluoranthene	0.0158	0.00500	"	0.0333	ND	47.5	30-120					
Benzo (k) fluoranthene	0.0153	0.00500	"	0.0333	ND	45.8	30-120					
Chrysene	0.0184	0.00500	"	0.0333	ND	55.2	30-120					
Dibenz (a,h) anthracene	0.0150	0.00500	"	0.0333	ND	44.9	30-120					
Fluoranthene	0.0174	0.00500	"	0.0333	ND	52.2	30-120					
Fluorene	0.0183	0.00500	"	0.0333	ND	54.9	30-120					
Indeno (1,2,3-cd) pyrene	0.0166	0.00500	"	0.0333	ND	49.8	30-120					
Pyrene	0.0220	0.00500	"	0.0333	ND	65.9	35-142					
1-Methylnaphthalene	0.0170	0.00500	"	0.0333	ND	51.1	15-130					
2-Methylnaphthalene	0.0160	0.00500	"	0.0333	ND	48.1	15-130					
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0162</i>		<i>"</i>	<i>0.0333</i>		<i>48.6</i>	<i>40-150</i>					
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0175</i>		<i>"</i>	<i>0.0333</i>		<i>52.4</i>	<i>40-150</i>					

Matrix Spike Dup (BHH0687-MSD1)	Source: 2408239-23			Prepared & Analyzed: 08/23/24								
Acenaphthene	0.0169	0.00500	mg/kg	0.0333	ND	50.7	31-137	7.00	30			
Anthracene	0.0168	0.00500	"	0.0333	ND	50.3	30-120	6.75	30			
Benzo (a) anthracene	0.0173	0.00500	"	0.0333	ND	52.0	30-120	6.64	30			
Benzo (a) pyrene	0.0186	0.00500	"	0.0333	ND	55.9	30-120	31.8	30			QR-02
Benzo (b) fluoranthene	0.0147	0.00500	"	0.0333	ND	44.2	30-120	7.18	30			
Benzo (k) fluoranthene	0.0142	0.00500	"	0.0333	ND	42.7	30-120	7.14	30			
Chrysene	0.0171	0.00500	"	0.0333	ND	51.3	30-120	7.47	30			
Dibenz (a,h) anthracene	0.0227	0.00500	"	0.0333	ND	68.0	30-120	40.9	30			QR-02
Fluoranthene	0.0162	0.00500	"	0.0333	ND	48.7	30-120	6.96	30			
Fluorene	0.0170	0.00500	"	0.0333	ND	51.1	30-120	7.17	30			
Indeno (1,2,3-cd) pyrene	0.0180	0.00500	"	0.0333	ND	54.1	30-120	8.42	30			
Pyrene	0.0198	0.00500	"	0.0333	ND	59.5	35-142	10.2	30			
1-Methylnaphthalene	0.0156	0.00500	"	0.0333	ND	46.7	15-130	8.97	50			
2-Methylnaphthalene	0.0149	0.00500	"	0.0333	ND	44.7	15-130	7.24	50			
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0157</i>		<i>"</i>	<i>0.0333</i>		<i>47.0</i>	<i>40-150</i>					
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0162</i>		<i>"</i>	<i>0.0333</i>		<i>48.6</i>	<i>40-150</i>					

Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Total Metals by EPA 6020B Hot Water Soluble Extraction - Quality Control
Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BHH0660 - EPA 3050B

Blank (BHH0660-BLK1)

Prepared: 08/22/24 Analyzed: 08/23/24

Boron ND 2.00 mg/L

LCS (BHH0660-BS1)

Prepared: 08/22/24 Analyzed: 08/23/24

Boron 5.27 2.00 mg/L 5.00 105 80-120

Duplicate (BHH0660-DUP1)

Source: 2408254-01

Prepared: 08/22/24 Analyzed: 08/23/24

Boron 0.0327 2.00 mg/L 0.0453 32.4 20 QR-01

Matrix Spike (BHH0660-MS1)

Source: 2408254-01

Prepared: 08/22/24 Analyzed: 08/23/24

Boron 4.88 2.00 mg/L 5.02 0.0453 96.4 75-125

Matrix Spike Dup (BHH0660-MSD1)

Source: 2408254-01

Prepared: 08/22/24 Analyzed: 08/23/24

Boron 4.98 2.00 mg/L 5.02 0.0453 98.4 75-125 2.07 25

Summit Scientific

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Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

Total Metals by EPA 6020B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch BHH0644 - EPA 3050B

Blank (BHH0644-BLK1)

Prepared: 08/22/24 Analyzed: 08/27/24

Arsenic	ND	0.200	mg/kg wet							
Barium	ND	0.400	"							
Cadmium	ND	0.200	"							
Copper	ND	0.400	"							
Lead	ND	0.200	"							
Nickel	ND	0.400	"							
Silver	ND	0.0200	"							
Zinc	ND	0.400	"							
Selenium	ND	0.260	"							

LCS (BHH0644-BS1)

Prepared: 08/22/24 Analyzed: 08/27/24

Arsenic	36.5	0.200	mg/kg wet	39.7	91.9	80-120
Barium	36.9	0.400	"	39.7	93.0	80-120
Cadmium	1.87	0.200	"	1.98	94.4	80-120
Copper	37.3	0.400	"	39.7	94.0	80-120
Lead	18.8	0.200	"	19.8	94.6	80-120
Nickel	38.0	0.400	"	39.7	95.8	80-120
Silver	1.87	0.0200	"	1.98	94.2	80-120
Zinc	37.1	0.400	"	39.7	93.6	80-120
Selenium	3.91	0.260	"	3.97	98.6	80-120

Duplicate (BHH0644-DUP1)

Source: 2408245-01

Prepared: 08/22/24 Analyzed: 08/27/24

Arsenic	4.88	0.200	mg/kg dry	4.09	17.6	20	
Barium	63.7	0.400	"	49.8	24.5	20	QR-02
Cadmium	0.363	0.200	"	0.297	20.1	20	QR-01
Copper	12.8	0.400	"	11.3	12.6	20	
Lead	6.82	0.200	"	5.89	14.7	20	
Nickel	10.9	0.400	"	9.54	13.3	20	
Silver	0.0714	0.0200	"	0.0617	14.6	20	
Zinc	52.7	0.400	"	47.0	11.6	20	
Selenium	ND	0.260	"	ND		20	

Summit Scientific

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Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

Total Metals by EPA 6020B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

Batch BHH0644 - EPA 3050B

Matrix Spike (BHH0644-MS1)

Source: 2408245-01

Prepared: 08/22/24 Analyzed: 08/27/24

Arsenic	48.4	0.200	mg/kg dry	46.4	4.09	95.6	75-125			
Barium	95.7	0.400	"	46.4	49.8	98.9	75-125			
Cadmium	2.49	0.200	"	2.32	0.297	94.7	75-125			
Copper	54.2	0.400	"	46.4	11.3	92.5	75-125			
Lead	28.4	0.200	"	23.2	5.89	97.0	75-125			
Nickel	55.1	0.400	"	46.4	9.54	98.2	75-125			
Silver	2.21	0.0200	"	2.32	0.0617	92.5	75-125			
Zinc	94.7	0.400	"	46.4	47.0	103	75-125			
Selenium	4.16	0.260	"	4.64	ND	89.8	75-125			

Matrix Spike Dup (BHH0644-MSD1)

Source: 2408245-01

Prepared: 08/22/24 Analyzed: 08/27/24

Arsenic	42.3	0.179	mg/kg dry	41.8	4.09	91.5	75-125	13.5	25	
Barium	76.0	0.357	"	41.8	49.8	62.8	75-125	22.9	25	QM-05
Cadmium	2.21	0.179	"	2.09	0.297	91.5	75-125	12.2	25	
Copper	48.9	0.357	"	41.8	11.3	90.0	75-125	10.4	25	
Lead	24.9	0.179	"	20.9	5.89	91.0	75-125	13.2	25	
Nickel	48.4	0.357	"	41.8	9.54	93.0	75-125	13.0	25	
Silver	1.99	0.0179	"	2.09	0.0617	92.5	75-125	10.1	25	
Zinc	79.4	0.357	"	41.8	47.0	77.6	75-125	17.6	25	
Selenium	3.87	0.232	"	4.18	ND	92.6	75-125	7.41	25	

Post Spike (BHH0644-PS1)

Source: 2408245-01

Prepared: 08/22/24 Analyzed: 08/28/24

Arsenic	102		ug/l	100	8.74	93.5	75-125			
Barium	193		"	100	107	86.7	75-125			
Cadmium	5.48		"	5.00	0.635	97.0	75-125			
Copper	114		"	100	24.1	90.3	75-125			
Lead	60.6		"	50.0	12.6	95.9	75-125			
Nickel	115		"	100	20.4	94.1	75-125			
Silver	4.91		"	5.00	0.132	95.6	75-125			
Zinc	191		"	100	100	90.6	75-125			
Selenium	9.10		"	10.0	0.216	88.8	75-125			

Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Hexavalent Chromium by EPA Method 7196 - Quality Control
Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BHH0639 - 3060A Mod

Blank (BHH0639-BLK1)

Prepared & Analyzed: 08/22/24

Chromium, Hexavalent ND 0.30 mg/kg wet

LCS (BHH0639-BS1)

Prepared & Analyzed: 08/22/24

Chromium, Hexavalent 25.4 0.30 mg/kg wet 25.0 102 80-120

Duplicate (BHH0639-DUP1)

Source: 2408222-01

Prepared & Analyzed: 08/22/24

Chromium, Hexavalent ND 0.30 mg/kg dry ND 20

Matrix Spike (BHH0639-MS1)

Source: 2408222-01

Prepared & Analyzed: 08/22/24

Chromium, Hexavalent 29.5 0.30 mg/kg dry 29.1 ND 101 75-125

Matrix Spike Dup (BHH0639-MSD1)

Source: 2408222-01

Prepared & Analyzed: 08/22/24

Chromium, Hexavalent 30.0 0.30 mg/kg dry 29.1 ND 103 75-125 1.76 20

Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike	Source		%REC		RPD		Notes
		Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

Batch BHH0680 - General Preparation

Blank (BHH0680-BLK1)

Prepared: 08/22/24 Analyzed: 08/27/24

Calcium	ND	0.0500	mg/L wet							
Magnesium	ND	0.0500	"							
Sodium	ND	0.0500	"							

LCS (BHH0680-BS1)

Prepared: 08/22/24 Analyzed: 08/27/24

Calcium	5.32	0.0500	mg/L wet	5.00	106	70-130
Magnesium	4.96	0.0500	"	5.00	99.2	70-130
Sodium	5.02	0.0500	"	5.00	100	70-130

Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike	Source		%REC		RPD		Notes
		Limit	Units	Level	Result	%REC	Limits	RPD	Limit		

Batch BHH0652 - General Preparation

Duplicate (BHH0652-DUP1)

Source: 2408257-01

Prepared: 08/22/24 Analyzed: 08/23/24

% Solids	92.2		%		92.1			0.102		20	
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Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Specific Conductance by EPA Method 120.1, Saturated Paste Extraction - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike Level	Source		%REC		RPD		Notes
		Limit	Units		Result	%REC	Limits	RPD	Limit		

Batch BHH0681 - General Preparation

Blank (BHH0681-BLK1)

Prepared: 08/22/24 Analyzed: 08/26/24

Specific Conductance (EC) ND 0.0100 mmhos/cm

LCS (BHH0681-BS1)

Prepared: 08/22/24 Analyzed: 08/26/24

Specific Conductance (EC) 0.156 0.0100 mmhos/cm 0.150 104 95-105

Duplicate (BHH0681-DUP1)

Source: 2408255-01

Prepared: 08/22/24 Analyzed: 08/26/24

Specific Conductance (EC) 0.130 0.0100 mmhos/cm 0.133 2.35 20

Summit Scientific

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Citation Oil & Gas
 14077 Cutten Rd
 Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
 Project Manager: Ben Shoup

Reported:
 08/28/24 13:25

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike	Source	%REC		RPD		Notes
		Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch BHH0682 - General Preparation

LCS (BHH0682-BS1)

Prepared: 08/22/24 Analyzed: 08/26/24

pH	9.04	pH Units	9.18	98.5	95-105
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Duplicate (BHH0682-DUP1)

Source: 2408255-01

Prepared: 08/22/24 Analyzed: 08/26/24

pH	9.01	pH Units	9.08	0.774	20
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Summit Scientific

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Citation Oil & Gas
14077 Cutten Rd
Houston TX., 77069-2212

Project: Absaroka - Arapahoe Unit 255

Project Number: [none]
Project Manager: Ben Shoup

Reported:
08/28/24 13:25

Notes and Definitions

- 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.
- QR-01 Analyses are not controlled on RPD values from sample concentrations below the reporting limit. QC batch accepted based on LCS and/or LCSD QC results.
- QM-05 The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The associated LCS and/or LCSD were within acceptance limits, therefore the data are considered valid.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference