

# Summit Scientific

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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 fluid and cursive, written in a professional 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

Summit Scientific

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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: Arapahoe Unit 255		PO/Billing Codes:	
Sampler Name: Max Dahlgren		Project Number:		Contact: Max Dahlgren/Ben Shoup	

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

Relinquished by:	Date/Time:	Received by:	Date/Time:	TAT Business Days	Field DO	Notes:
	8/21/24 1545			Same Day	Field EC	
Relinquished by:	Date/Time:	Received by:	Date/Time:	1 Day	Field ORP	
52	8/21/24 1630		8/21/24 1630	2 Days	Field pH	
Relinquished by:	Date/Time:	Received by:	Date/Time:	3 Days	Field Temp.	
				Standard	X Field Turb.	
Temperature Upon Receipt: 11.7		Corrected Temperature 8		IR gun #: 1	HNO3 lot #:	

S<sub>2</sub>

## Sample Receipt Checklist

S2 Work Order# 2408259Client: Citation Client Project ID: Arapahoe unit 25sShipped Via: H.D./P.U./FedEx/UPS/USPS/Other ☐ Airbill #: ☐

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Matrix (Check all that apply) Air ☐ Solid ☒ Water ☐ Other ☐Temp (°C) 11.7Thermometer # 1

	Yes	No	N/A	Comments (if any)
If samples require cooling, is the temperature < 6°C? <sup>(1)</sup> 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? <sup>(1)</sup>	<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 <sup>2+</sup> ), Hexavalent Chromium (Cr <sup>6+</sup> , 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? <sup>(1)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded? <sup>(1)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact? <sup>(1)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided? <sup>(1)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received? <sup>(1)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC? <sup>(1)</sup>	<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)? <sup>(1)</sup> Note the type of preservative in the comments column – HCl, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2? <sup>(1)</sup> 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): <u>uncertified bottlenecks, requires qualifiers (bags)</u>				
<sup>(1)</sup> 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**

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Houston TX., 77069-2212

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Project Number: [none]  
Project Manager: Ben Shoup

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**AV\_SS\_04F**  
**2408259-01 (Soil)**

**Summit Scientific**

**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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Project Number: [none]  
Project Manager: Ben Shoup

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**2408259-01 (Soil)**

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**Total Metals by EPA 6020B**

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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**AV\_SS\_04F**  
**2408259-01 (Soil)**

**Summit Scientific**

**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 Number: [none]  
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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### 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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Project Number: [none]  
Project Manager: Ben Shoup

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08/28/24 13:25

### Volatile Organic Compounds by EPA Method 8260B - Quality Control

#### Summit Scientific

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

#### 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	
Surrogate: 1,2-Dichloroethane-d4	0.0407		"	0.0400		102	50-150			
Surrogate: Toluene-d8	0.0393		"	0.0400		98.2	50-150			
Surrogate: 4-Bromofluorobenzene	0.0398		"	0.0400		99.4	50-150			

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**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**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: o-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: o-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: o-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: o-Terphenyl	14.6		"	12.5		117	30-150			

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Project Number: [none]  
Project Manager: Ben Shoup

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08/28/24 13:25

## PAH by EPA Method 8270D SIM - Quality Control

### Summit Scientific

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

#### 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 Level	Source		%REC		RPD	
	Result	Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**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		
Surrogate: 2-Methylnaphthalene-d10	0.0162		"	0.0333		48.6	40-150		
Surrogate: Fluoranthene-d10	0.0175		"	0.0333		52.4	40-150		

**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	
Surrogate: 2-Methylnaphthalene-d10	0.0157		"	0.0333		47.0	40-150			
Surrogate: Fluoranthene-d10	0.0162		"	0.0333		48.6	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

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

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

**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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### 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	QM-05
Barium	76.0	0.357	"	41.8	49.8	62.8	75-125	22.9	25	
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	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

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

**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 Level	Source		%REC		RPD	
		Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**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	

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	
		Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**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 Level	Source		%REC		RPD	
		Limit	Units		Result	%REC	Limits	RPD	Limit	Notes

**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