

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

June 28, 2024

Jacob Whritenour

Tasman Geosciences

6855 W. 119th Ave.

Broomfield, CO 80020

RE: Noble - Erickson A4-12 Flowline

Work Order #2406302

Enclosed are the results of analyses for samples received by Summit Scientific on 06/20/24 17:55. 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



Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline

Project Number: UWRWE-A4034-ABN

Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01



#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FL01R-W@4'	2406302-01	Soil	06/20/24 09:46	06/20/24 17:55
BKG01@3'	2406302-02	Soil	06/20/24 10:15	06/20/24 17:55

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Client: Noble/Tasman				Send Data To: Project Manager: Jake Whritenour				Send Invoice To: Company: Chevron													
Address: 6855 W 119th Ave				E-Mail: Jwhritenour@tasman-geo.com				Project Name/Location: Erickson A4-12 Flowline													
City/State/Zip: Broomfield / CO / 80020								AFE#: UWRWE-A4034-ABN													
Phone: 970-214-7901				Project Name: Erickson A4-12 Flowline				PO/Billing Codes:													
Sampler Name: Lillian Buck				Project Number:				Contact: <del>Dan Peterson</del> Mike Montoya													
				Preservative				Matrix				Analysis Requested				Special Instructions					
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	VOC - 915	TPH - 915	PAH - 915	pH, EC, SAR	Boron - HWS	Metals - 915	HOLD		
1	FL01R-W & 4'	6/20/24	0946	3			X			X			X	X	X	X	X	X			pH, EC, SAR by saturated paste
2	BKG01 & 3'	↓	1015	2			X			X						X	X	X			
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

Relinquished by: 	Date/Time: 6/20/24 1450	Received by: Tasman Lochbox	Date/Time: 6/20/24 1450	TAT Business Days	Field DO	Notes:	
Relinquished by: Tasman Lochbox	Date/Time: 6/20/24 1755	Received by: 	Date/Time: 6/20/24 1755	Same Day	Field EC		
Relinquished by:	Date/Time:	Received by:	Date/Time:	1 Day	Field ORP		
Relinquished by:	Date/Time:	Received by:	Date/Time:	2 Days	Field pH		
Relinquished by:	Date/Time:	Received by:	Date/Time:	3 Days	Field Temp.		
Temperature Upon Receipt: 9.0				Corrected Temperature: e	IR gun #: 1	HNO3 lot #:	

S<sub>2</sub>

## Sample Receipt Checklist

S2 Work Order# 2406302Client: Nadef Casman Client Project ID: Erickson A4-12 FlowlineShipped Via: H.D./P.U./FedEx/UPS/USPS/Other ☐ Airbill #: ☐
☐ ☐ ☐ ☐ ☐
Matrix (Check all that apply) Air ☐ Soil/Solid ☒ Water ☐ Other ☐Temp (°C) 9.6Thermometer # 1

	Yes	No	N/A	Comments (if any)
If samples require cooling, is the temperature < 6°C? <sup>(1)</sup> <b>NOTE:</b> 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"/>	<u>on ice</u>
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):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.
AS  
Custodian Printed Name

6/20/24  
Date/Time



Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**FL01R-W@4'**  
**2406302-01 (Soil)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	BHF0700	06/23/24	06/24/24	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: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	0.0517	129 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0386	96.6 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0416	104 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	BHF0706	06/23/24	06/23/24	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl	12.0	96.2 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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**2406302-01 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BHF0652	06/21/24	06/22/24	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: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0253	75.9 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0242	72.6 %	40-150		"	"	"	"	

**Total Metals by EPA 6020B Hot Water Soluble Extraction**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	2.00	mg/L	1	BHF0668	06/21/24	06/25/24	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**FL01R-W@4'**  
**2406302-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.37	0.200	mg/kg dry	1	BHF0670	06/21/24	06/25/24	EPA 6020B	
Barium	87.3	0.400	"	"	"	"	"	"	
Cadmium	0.340	0.200	"	"	"	"	"	"	
Copper	7.95	0.400	"	"	"	"	"	"	
Lead	11.6	0.200	"	"	"	"	"	"	
Nickel	5.83	0.400	"	"	"	"	"	"	
Silver	0.0312	0.0200	"	"	"	"	"	"	
Zinc	28.2	0.400	"	"	"	"	"	"	
Selenium	0.303	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BHF0730	06/24/24	06/25/24	EPA 7196A	

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

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	60.5	0.0500	mg/L dry	1	BHF0801	06/25/24	06/27/24	EPA 6020B	
Magnesium	4.90	0.0500	"	"	"	"	"	"	
Sodium	14.5	0.0500	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.482	0.00100	units	1	BHF0946	06/28/24	06/28/24	Calculation	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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06/28/24 11:01

**FL01R-W@4'**  
**2406302-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

% Solids	84.4	%	1	BHF0654	06/21/24	06/24/24	Calculation
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**Specific Conductance by EPA Method 120.1, Saturated Paste Extraction**

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.268	0.0100	mmhos/cm	1	BHF0811	06/25/24	06/26/24	EPA 120.1	

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

Date Sampled: **06/20/24 09:46**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.58		pH Units	1	BHF0810	06/25/24	06/26/24	EPA 9045D	

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**Reported:**  
06/28/24 11:01

**BKG01@3'**  
**2406302-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B Hot Water Soluble Extraction**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Boron	ND	2.00	mg/L	1	BHF0668	06/21/24	06/25/24	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Arsenic	2.24	0.200	mg/kg dry	1	BHF0670	06/21/24	06/25/24	EPA 6020B	
Barium	162	0.400	"	"	"	"	"	"	
Cadmium	0.588	0.200	"	"	"	"	"	"	
Copper	6.30	0.400	"	"	"	"	"	"	
Lead	18.4	0.200	"	"	"	"	"	"	
Nickel	8.04	0.400	"	"	"	"	"	"	
Silver	0.0371	0.0200	"	"	"	"	"	"	
Zinc	27.5	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BHF0730	06/24/24	06/25/24	EPA 7196A	

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

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Calcium	51.3	0.0500	mg/L dry	1	BHF0801	06/25/24	06/27/24	EPA 6020B	
Magnesium	17.1	0.0500	"	"	"	"	"	"	
Sodium	71.0	0.0500	"	"	"	"	"	"	

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Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**BKG01@3'**  
**2406302-02 (Soil)**

**Summit Scientific**

**Calculated Analysis**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	2.19	0.00100	units	1	BHF0946	06/28/24	06/28/24	Calculation	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	87.4		%	1	BHF0654	06/21/24	06/24/24	Calculation	

**Specific Conductance by EPA Method 120.1, Saturated Paste Extraction**

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.719	0.0100	mmhos/cm	1	BHF0811	06/25/24	06/26/24	EPA 120.1	

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

Date Sampled: **06/20/24 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.36		pH Units	1	BHF0810	06/25/24	06/26/24	EPA 9045D	

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Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

## 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 BHF0700 - EPA 5030 Soil MS

##### Blank (BHF0700-BLK1)

Prepared: 06/23/24 Analyzed: 06/24/24

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	0.0495		"	0.0400		124	50-150			
Surrogate: Toluene-d8	0.0387		"	0.0400		96.8	50-150			
Surrogate: 4-Bromofluorobenzene	0.0407		"	0.0400		102	50-150			

##### LCS (BHF0700-BS1)

Prepared: 06/23/24 Analyzed: 06/24/24

Benzene	0.104	0.0020	mg/kg	0.100		104	70-130			
Toluene	0.107	0.0050	"	0.100		107	70-130			
Ethylbenzene	0.105	0.0050	"	0.100		105	70-130			
m,p-Xylene	0.206	0.010	"	0.200		103	70-130			
o-Xylene	0.102	0.0050	"	0.100		102	70-130			
1,2,4-Trimethylbenzene	0.101	0.0050	"	0.100		101	70-130			
1,3,5-Trimethylbenzene	0.100	0.0050	"	0.100		100	70-130			
Naphthalene	0.0977	0.0038	"	0.100		97.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0525		"	0.0400		131	50-150			
Surrogate: Toluene-d8	0.0418		"	0.0400		104	50-150			
Surrogate: 4-Bromofluorobenzene	0.0416		"	0.0400		104	50-150			

##### Matrix Spike (BHF0700-MS1)

Source: 2406287-01

Prepared: 06/23/24 Analyzed: 06/24/24

Benzene	0.0652	0.0020	mg/kg	0.100	ND	65.2	70-130			QM-07
Toluene	0.0729	0.0050	"	0.100	ND	72.9	70-130			
Ethylbenzene	0.0944	0.0050	"	0.100	ND	94.4	70-130			
m,p-Xylene	0.193	0.010	"	0.200	ND	96.7	70-130			
o-Xylene	0.0873	0.0050	"	0.100	ND	87.3	70-130			
1,2,4-Trimethylbenzene	0.0919	0.0050	"	0.100	ND	91.9	70-130			
1,3,5-Trimethylbenzene	0.0946	0.0050	"	0.100	ND	94.6	70-130			
Naphthalene	0.0794	0.0038	"	0.100	ND	79.4	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0514		"	0.0400		129	50-150			
Surrogate: Toluene-d8	0.0396		"	0.0400		99.0	50-150			
Surrogate: 4-Bromofluorobenzene	0.0419		"	0.0400		105	50-150			

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**Reported:**  
06/28/24 11:01

**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 BHF0700 - EPA 5030 Soil MS**

Matrix Spike Dup (BHF0700-MSD1)		Source: 2406287-01			Prepared: 06/23/24 Analyzed: 06/24/24					
Benzene	0.0594	0.0020	mg/kg	0.100	ND	59.4	70-130	9.39	30	QM-07
Toluene	0.0694	0.0050	"	0.100	ND	69.4	70-130	4.98	30	QM-07
Ethylbenzene	0.0931	0.0050	"	0.100	ND	93.1	70-130	1.38	30	
m,p-Xylene	0.190	0.010	"	0.200	ND	94.9	70-130	1.96	30	
o-Xylene	0.0840	0.0050	"	0.100	ND	84.0	70-130	3.92	30	
1,2,4-Trimethylbenzene	0.0921	0.0050	"	0.100	ND	92.1	70-130	0.261	30	
1,3,5-Trimethylbenzene	0.0948	0.0050	"	0.100	ND	94.8	70-130	0.285	30	
Naphthalene	0.0743	0.0038	"	0.100	ND	74.3	70-130	6.56	30	
Surrogate: 1,2-Dichloroethane-d4		0.0537	"	0.0400		134	50-150			
Surrogate: Toluene-d8		0.0399	"	0.0400		99.8	50-150			
Surrogate: 4-Bromofluorobenzene		0.0422	"	0.0400		105	50-150			

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0706 - EPA 3550A**

**Blank (BHF0706-BLK1)**

Prepared & Analyzed: 06/23/24

C10-C28 (DRO)	ND	50	mg/kg							
C28-C36 (ORO)	ND	50	"							
Surrogate: o-Terphenyl	14.8		"	12.5	119	30-150				

**LCS (BHF0706-BS1)**

Prepared & Analyzed: 06/23/24

C10-C28 (DRO)	534	50	mg/kg	500	107	70-130				
Surrogate: o-Terphenyl	14.7		"	12.5	118	30-150				

**Matrix Spike (BHF0706-MS1)**

Source: 2406287-01

Prepared & Analyzed: 06/23/24

C10-C28 (DRO)	510	50	mg/kg	500	18.9	98.2	70-130			
Surrogate: o-Terphenyl	17.4		"	12.5	139	30-150				

**Matrix Spike Dup (BHF0706-MSD1)**

Source: 2406287-01

Prepared & Analyzed: 06/23/24

C10-C28 (DRO)	455	50	mg/kg	500	18.9	87.2	70-130	11.4	20	
Surrogate: o-Terphenyl	9.68		"	12.5	77.4	30-150				

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

## 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 BHF0652 - EPA 5030 Soil MS

##### Blank (BHF0652-BLK1)

Prepared & Analyzed: 06/21/24

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	0.0201		"	0.0333		60.3	40-150			
Surrogate: Fluoranthene-d10	0.0196		"	0.0333		58.7	40-150			

##### LCS (BHF0652-BS1)

Prepared & Analyzed: 06/21/24

Acenaphthene	0.0233	0.00500	mg/kg	0.0333		70.0	31-137			
Anthracene	0.0232	0.00500	"	0.0333		69.5	30-120			
Benzo (a) anthracene	0.0237	0.00500	"	0.0333		71.2	30-120			
Benzo (a) pyrene	0.0239	0.00500	"	0.0333		71.6	30-120			
Benzo (b) fluoranthene	0.0257	0.00500	"	0.0333		77.2	30-120			
Benzo (k) fluoranthene	0.0259	0.00500	"	0.0333		77.6	30-120			
Chrysene	0.0243	0.00500	"	0.0333		72.9	30-120			
Dibenz (a,h) anthracene	0.0202	0.00500	"	0.0333		60.6	30-120			
Fluoranthene	0.0252	0.00500	"	0.0333		75.7	30-120			
Fluorene	0.0229	0.00500	"	0.0333		68.6	30-120			
Indeno (1,2,3-cd) pyrene	0.0196	0.00500	"	0.0333		58.8	30-120			
Pyrene	0.0201	0.00500	"	0.0333		60.2	35-142			
1-Methylnaphthalene	0.0207	0.00500	"	0.0333		62.1	35-142			
2-Methylnaphthalene	0.0206	0.00500	"	0.0333		61.7	35-142			
Surrogate: 2-Methylnaphthalene-d10	0.0207		"	0.0333		62.1	40-150			
Surrogate: Fluoranthene-d10	0.0256		"	0.0333		76.9	40-150			

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Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

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

### Summit Scientific

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

#### Batch BHF0652 - EPA 5030 Soil MS

##### Matrix Spike (BHF0652-MS1)

Source: 2406288-01

Prepared & Analyzed: 06/21/24

Acenaphthene	0.0231	0.00500	mg/kg	0.0333	ND	69.4	31-137		
Anthracene	0.0226	0.00500	"	0.0333	ND	67.7	30-120		
Benzo (a) anthracene	0.0310	0.00500	"	0.0333	0.00682	72.7	30-120		
Benzo (a) pyrene	0.0301	0.00500	"	0.0333	0.0103	59.4	30-120		
Benzo (b) fluoranthene	0.0303	0.00500	"	0.0333	0.0140	48.9	30-120		
Benzo (k) fluoranthene	0.0261	0.00500	"	0.0333	0.00808	54.1	30-120		
Chrysene	0.0342	0.00500	"	0.0333	0.00945	74.2	30-120		
Dibenz (a,h) anthracene	0.0190	0.00500	"	0.0333	ND	57.0	30-120		
Fluoranthene	0.0355	0.00500	"	0.0333	0.00905	79.4	30-120		
Fluorene	0.0226	0.00500	"	0.0333	ND	67.7	30-120		
Indeno (1,2,3-cd) pyrene	0.0264	0.00500	"	0.0333	ND	79.1	30-120		
Pyrene	0.0437	0.00500	"	0.0333	0.0111	98.0	35-142		
1-Methylnaphthalene	0.0223	0.00500	"	0.0333	ND	66.8	15-130		
2-Methylnaphthalene	0.0220	0.00500	"	0.0333	ND	66.1	15-130		
Surrogate: 2-Methylnaphthalene-d10	0.0225		"	0.0333		67.4	40-150		
Surrogate: Fluoranthene-d10	0.0211		"	0.0333		63.3	40-150		

##### Matrix Spike Dup (BHF0652-MSD1)

Source: 2406288-01

Prepared & Analyzed: 06/21/24

Acenaphthene	0.0233	0.00500	mg/kg	0.0333	ND	69.9	31-137	0.642	30
Anthracene	0.0216	0.00500	"	0.0333	ND	64.7	30-120	4.43	30
Benzo (a) anthracene	0.0307	0.00500	"	0.0333	0.00682	71.6	30-120	1.22	30
Benzo (a) pyrene	0.0321	0.00500	"	0.0333	0.0103	65.3	30-120	6.36	30
Benzo (b) fluoranthene	0.0327	0.00500	"	0.0333	0.0140	56.0	30-120	7.56	30
Benzo (k) fluoranthene	0.0284	0.00500	"	0.0333	0.00808	60.9	30-120	8.30	30
Chrysene	0.0341	0.00500	"	0.0333	0.00945	73.9	30-120	0.269	30
Dibenz (a,h) anthracene	0.0202	0.00500	"	0.0333	ND	60.5	30-120	5.94	30
Fluoranthene	0.0327	0.00500	"	0.0333	0.00905	71.0	30-120	8.17	30
Fluorene	0.0221	0.00500	"	0.0333	ND	66.4	30-120	2.04	30
Indeno (1,2,3-cd) pyrene	0.0257	0.00500	"	0.0333	ND	77.2	30-120	2.40	30
Pyrene	0.0396	0.00500	"	0.0333	0.0111	85.6	35-142	9.89	30
1-Methylnaphthalene	0.0223	0.00500	"	0.0333	ND	66.9	15-130	0.200	50
2-Methylnaphthalene	0.0221	0.00500	"	0.0333	ND	66.4	15-130	0.430	50
Surrogate: 2-Methylnaphthalene-d10	0.0226		"	0.0333		67.9	40-150		
Surrogate: Fluoranthene-d10	0.0219		"	0.0333		65.8	40-150		

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0668 - EPA 3050B**

**Blank (BHF0668-BLK1)**

Prepared: 06/21/24 Analyzed: 06/25/24

Boron ND 2.00 mg/L

**LCS (BHF0668-BS1)**

Prepared: 06/21/24 Analyzed: 06/25/24

Boron 5.63 2.00 mg/L 5.00 113 80-120

**Duplicate (BHF0668-DUP1)**

Source: 2405004-01RE1

Prepared: 06/21/24 Analyzed: 06/25/24

Boron 5.81 2.00 mg/L 5.03 14.3 20

**Matrix Spike (BHF0668-MS1)**

Source: 2405004-01RE1

Prepared: 06/21/24 Analyzed: 06/25/24

Boron 11.6 2.00 mg/L 4.98 5.03 131 75-125 QM-01

**Matrix Spike Dup (BHF0668-MSD1)**

Source: 2405004-01RE1

Prepared: 06/21/24 Analyzed: 06/25/24

Boron 12.6 2.00 mg/L 4.98 5.03 153 75-125 8.96 25 QM-01

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0670 - EPA 3050B**

**Blank (BHF0670-BLK1)**

Prepared: 06/21/24 Analyzed: 06/25/24

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 (BHF0670-BS1)**

Prepared: 06/21/24 Analyzed: 06/25/24

Arsenic	42.6	0.200	mg/kg wet	40.0	106	80-120
Barium	40.6	0.400	"	40.0	101	80-120
Cadmium	1.98	0.200	"	2.00	98.9	80-120
Copper	42.7	0.400	"	40.0	107	80-120
Lead	20.3	0.200	"	20.0	101	80-120
Nickel	42.5	0.400	"	40.0	106	80-120
Silver	1.99	0.0200	"	2.00	99.6	80-120
Zinc	42.4	0.400	"	40.0	106	80-120
Selenium	4.57	0.260	"	4.00	114	80-120

**Duplicate (BHF0670-DUP1)**

Source: 2406290-10

Prepared: 06/21/24 Analyzed: 06/25/24

Arsenic	3.21	0.200	mg/kg dry	2.23	35.8	20	QR-04
Barium	105	0.400	"	108	3.27	20	
Cadmium	0.349	0.200	"	0.192	58.0	20	QR-01
Copper	4.54	0.400	"	3.38	29.4	20	QR-04
Lead	10.7	0.200	"	7.04	41.3	20	QR-04
Nickel	4.87	0.400	"	3.62	29.5	20	QR-04
Silver	0.0606	0.0200	"	0.0404	40.0	20	QR-01
Zinc	20.1	0.400	"	15.8	24.0	20	QR-04
Selenium	0.303	0.260	"	0.222	30.9	20	QR-01

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline

Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

### 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 BHF0670 - EPA 3050B

Matrix Spike (BHF0670-MS1)			Source: 2406290-10		Prepared: 06/21/24 Analyzed: 06/25/24						
Arsenic	32.2	0.200	mg/kg dry	43.9	2.23	68.4	75-125				QM-07
Barium	153	0.400	"	43.9	108	102	75-125				
Cadmium	2.51	0.200	"	2.19	0.192	106	75-125				
Copper	32.1	0.400	"	43.9	3.38	65.6	75-125				QM-07
Lead	30.2	0.200	"	21.9	7.04	106	75-125				
Nickel	32.8	0.400	"	43.9	3.62	66.6	75-125				QM-07
Silver	2.30	0.0200	"	2.19	0.0404	103	75-125				
Zinc	47.4	0.400	"	43.9	15.8	71.9	75-125				QM-07
Selenium	5.81	0.260	"	4.39	0.222	127	75-125				QM-07

Matrix Spike Dup (BHF0670-MSD1)			Source: 2406290-10		Prepared: 06/21/24 Analyzed: 06/25/24						
Arsenic	31.7	0.200	mg/kg dry	45.2	2.23	65.1	75-125	1.82	25		QM-07
Barium	162	0.400	"	45.2	108	119	75-125	5.62	25		
Cadmium	2.56	0.200	"	2.26	0.192	105	75-125	1.78	25		
Copper	32.5	0.400	"	45.2	3.38	64.5	75-125	1.22	25		QM-07
Lead	29.2	0.200	"	22.6	7.04	97.9	75-125	3.58	25		
Nickel	33.3	0.400	"	45.2	3.62	65.7	75-125	1.53	25		QM-07
Silver	2.37	0.0200	"	2.26	0.0404	103	75-125	3.09	25		
Zinc	47.0	0.400	"	45.2	15.8	69.0	75-125	0.730	25		QM-07
Selenium	5.66	0.260	"	4.52	0.222	120	75-125	2.63	25		

Post Spike (BHF0670-PS1)			Source: 2406290-10		Prepared: 06/21/24 Analyzed: 06/25/24						
Arsenic	84.4		ug/l	100	4.98	79.4	75-125				
Barium	339		"	100	242	97.9	75-125				
Cadmium	5.75		"	5.00	0.428	106	75-125				
Copper	85.4		"	100	7.54	77.9	75-125				
Lead	67.1		"	50.0	15.7	103	75-125				
Nickel	86.7		"	100	8.06	78.6	75-125				
Silver	5.37		"	5.00	0.0900	106	75-125				
Zinc	116		"	100	35.2	80.4	75-125				
Selenium	13.0		"	10.0	0.494	125	75-125				

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0730 - 3060A Mod**

**Blank (BHF0730-BLK1)**

Prepared: 06/24/24 Analyzed: 06/25/24

Chromium, Hexavalent ND 0.30 mg/kg wet

**LCS (BHF0730-BS1)**

Prepared: 06/24/24 Analyzed: 06/25/24

Chromium, Hexavalent 25.2 0.30 mg/kg wet 25.0 101 80-120

**Duplicate (BHF0730-DUP1)**

**Source: 2406285-01**

Prepared: 06/24/24 Analyzed: 06/25/24

Chromium, Hexavalent ND 0.30 mg/kg dry ND 20

**Matrix Spike (BHF0730-MS1)**

**Source: 2406285-01**

Prepared: 06/24/24 Analyzed: 06/25/24

Chromium, Hexavalent 28.7 0.30 mg/kg dry 29.2 ND 98.4 75-125

**Matrix Spike Dup (BHF0730-MSD1)**

**Source: 2406285-01**

Prepared: 06/24/24 Analyzed: 06/25/24

Chromium, Hexavalent 28.8 0.30 mg/kg dry 29.2 ND 98.6 75-125 0.203 20

Summit Scientific

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6855 W. 119th Ave.  
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Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

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

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

**Batch BHF0801 - General Preparation**

**Blank (BHF0801-BLK1)**

Prepared: 06/25/24 Analyzed: 06/27/24

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

**LCS (BHF0801-BS1)**

Prepared: 06/25/24 Analyzed: 06/27/24

Calcium	5.57	0.0500	mg/L wet	5.00	111	70-130
Magnesium	4.89	0.0500	"	5.00	97.8	70-130
Sodium	4.43	0.0500	"	5.00	88.6	70-130

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Project: Noble - Erickson A4-12 Flowline

Project Number: UWRWE-A4034-ABN

Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0654 - General Preparation**

Duplicate (BHF0654-DUP1)		Source: 2406290-01			Prepared: 06/21/24 Analyzed: 06/24/24					
% Solids	78.1		%		92.3			16.6	20	

Summit Scientific

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Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline  
Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0811 - General Preparation**

**Blank (BHF0811-BLK1)**

Prepared: 06/25/24 Analyzed: 06/26/24

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (BHF0811-BS1)**

Prepared: 06/25/24 Analyzed: 06/26/24

Specific Conductance (EC) 0.150 0.0100 mmhos/cm 0.150 100 95-105

**Duplicate (BHF0811-DUP1)**

**Source: 2406301-01**

Prepared: 06/25/24 Analyzed: 06/26/24

Specific Conductance (EC) 0.0520 0.0100 mmhos/cm 0.0519 0.154 20

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline

Project Number: UWRWE-A4034-ABN  
Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

**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 BHF0810 - General Preparation**

**LCS (BHF0810-BS1)**

Prepared: 06/25/24 Analyzed: 06/26/24

pH	9.15	pH Units	9.18	99.7	95-105
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**Duplicate (BHF0810-DUP1)**

**Source: 2406301-01**

Prepared: 06/25/24 Analyzed: 06/26/24

pH	7.04	pH Units	7.14	1.41	20
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Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Erickson A4-12 Flowline

Project Number: UWRWE-A4034-ABN

Project Manager: Jacob Whritenour

**Reported:**  
06/28/24 11:01

### Notes and Definitions

QR-04	The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
QR-01	Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit. QC batch accepted based on LCS and/or LCSD QC results.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
QM-01	The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.
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