



Third Party Removal Date									
Sample taken? Location/ Sample									
PID Readings									
Photo Number(s)									
<b>Other Facility Equipment</b>									
Equipment type									
Equipment Condition Age									
Soil impacts									
PID Readings									
Sample taken? Location/ Sample									
Photo Number(s)									
Other observations regarding other facility or third party equipment:									
<b>Summary</b>									
Was impacted soil identified? <b>No</b> Yes - less than 10 cubic yards                      Yes - more than 10 cubic yards									
Total number of samples field screened: 5					Total number of samples collected: 5				
Highest PID Reading: 0.0					Total number of samples submitted to lab for analysis: 5				
If more than 10 cubic yards of impacted soil were observed:									
Vertical extent:					Estimated spill volume:				
Lateral extent:					Volume of soil removed:				
Is additional investigation required?									
Was groundwater encountered during the investigation? <b>No</b> Yes - not impacted or in contact with impacted soils                      Yes - groundwater impacted and/or in contact with impacted soils									
Measured depth to groundwater:					Was remedial groundwater removal conducted?      Yes      No				
Date Groundwater was encountered:					Commencement date of removal:				
Sheen on groundwater?                      Yes                      No					Volume of groundwater removed prior to sampling:				
Free product observed?                      Yes                      No					Volume of groundwater removed post sampling:				
Total number of samples collected:					Total Volume of groundwater removed:				
Total number of samples submitted to lab for analysis:									

**Photographic Log**


<b>Equipment ID:</b> FS01@3'		<b>Equipment Type:</b>		<b>Equipment ID:</b> SS01@2.5'		<b>Equipment Type:</b>	
<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>		<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>	
<b>Notes/Conditions:</b> Base				<b>Notes/Conditions:</b> North			

## Photographic Log



<b>Equipment ID:</b> SS02@2.5'		<b>Equipment Type:</b>		<b>Equipment ID:</b> SS03@2.5'		<b>Equipment Type:</b>	
<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>		<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>	
<b>Notes/Conditions:</b> West				<b>Notes/Conditions:</b> South			



<b>Equipment ID:</b> SS04@2.5'		<b>Equipment Type:</b>		<b>Equipment ID:</b>		<b>Equipment Type:</b>	
<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>		<b>Material:</b>	<b>Volume:</b>	<b>Contents:</b>	
<b>Notes/Conditions:</b> East				<b>Notes/Conditions:</b>			

**TABLE 1**  
**SOIL SAMPLE LOCATIONS**  
**NOBLE ENERGY, INC. - CASTOR FEDERAL LD13-78HN**

Soil Sample ID	Date	PID (ppm)	Visual	Olfactory	Sample Type (Grab/Lab)	Latitude <sup>1</sup>	Longitude	PDOP
FS01@3'	11/20/23	0.0	No Staining	No Odor	Lab	40.759422	-103.820200	1.0
SS01@2.5'	11/20/23	0.0	No Staining	No Odor	Lab	40.759430	-103.820200	NC
SS02@2.5'	11/20/23	0.0	No Staining	No Odor	Lab	40.759420	-103.820212	NC
SS03@2.5'	11/20/23	0.0	No Staining	No Odor	Lab	40.759415	-103.820198	NC
SS04@2.5'	11/20/23	0.0	No Staining	No Odor	Lab	40.759424	-103.820190	NC

Notes:

PID = Photoionization detector

ppm = parts per million

PDOP = Position dilution of precision

HC = Hydrocarbon

1.) Latitude and longitude coordinates will be provided in decimal degrees with an accuracy and precision of 5 decimals of a degree using the North American Datum ("NAD") of 1983

TABLE 2  
SOIL ANALYTICAL DATA  
NOBLE ENERGY, INC. - CASTOR FEDERAL LD13-78HN

Soil Sample ID	Date	<sup>1</sup> Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	1,2,4 - TMB (mg/kg)	1,3,5 - TMB (mg/kg)	Naphthalene (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TPH-ORO (mg/kg)	Acenaphthene (mg/kg)	Anthracene (mg/kg)	Benz(a) (mg/kg)	Benzo(a) (mg/kg)	Benzo(b) (mg/kg)	Benzo(k) (mg/kg)	Chrysene (mg/kg)	A,H (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1,2,3-CD (mg/kg)	Pyrene (mg/kg)	1-M (mg/kg)	2-M (mg/kg)
Residential SSL <sup>1,2</sup>		1.2	490	5.8	58	30	27	2	500			360	1,800	1.1	0.11	1.1	11	110	0.11	240	240	1.1	180	18	24
Protection of Groundwater SSL <sup>1,2,3</sup>		0.0026	0.69	0.78	9.9	0.0081	0.0087	0.0038	500			0.55	6	0.011	0.24	0.3	2.9	9	0.096	8.9	0.54	0.98	1.3	0.006	0.019
FS01@3'	11/20/23	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<0.50	<50	<50	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
SS01@2.5'	11/20/23	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<0.50	60	<50	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500

Soil Sample ID	Date	pH	SAR	EC (mmhos/cm)	Boron (mg/L)
SSR <sup>1,2</sup>		6 - 8.3	<6	<4mmhos/cm	2
FS01@3'	11/20/23	9.16	0.955	0.281	<2.00
SS01@2.5'	11/20/23	9.38	0.499	0.156	<2.00
SS02@2.5'	11/20/23	9.00	NA	NA	NA
SS03@2.5'	11/20/23	8.88	NA	NA	NA
SS04@2.5'	11/20/23	8.41	NA	NA	NA

Soil Sample ID	Date	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
Residential SSL <sup>1,2</sup>		0.68	15,000	71	0.3	3,100	400	1,500	390	390	23,000
Protection of Groundwater SSL <sup>1,2,3</sup>		0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
FS01@3'	11/20/23	1.00	123	<0.200	<0.30	1.83	5.80	1.38	<0.260	<0.0200	6.42
SS01@2.5'	11/20/23	1.03	105	<0.200	<0.30	1.95	6.53	1.53	<0.260	<0.0200	7.04
SS02@2.5'	11/20/23	0.562	151	<0.200	<0.30	0.919	7.00	0.696	<0.260	<0.0200	3.21
SS03@2.5'	11/20/23	0.579	69.5	<0.200	<0.30	1.69	7.57	1.28	<0.260	<0.0200	5.85
SS04@2.5'	11/20/23	1.14	186	<0.200	<0.30	1.52	8.41	1.11	<0.260	<0.0200	5.60

Notes:

- Compounds referenced from 2 CCR 404-1, Table 915-1, effective January 15, 2021.
- Soil Screening Levels (SSL) and Soil Suitability for Reclamation (SSR) standards referenced from EPA Regional Screening Levels (EPA RSLs) for Chemical Contaminants at Superfund Sites,
- SSLs are applicable if a pathway for communication with groundwater is present.

Definitions:

ECMC = Energy and Carbon Management Commission

TPH-GRO = Total petroleum hydrocarbons - gasoline range organics

TPH-DRO = Total petroleum hydrocarbons - diesel range organics

TPH-ORO = Total petroleum hydrocarbons - oil range organics

mg/kg = Milligrams per kilogram

SAR = Sodium Adsorption Ratio

EC = Electrical Conductivity

mmhos/cm = Millimhos per centimeter

mg/L = Milligrams per liter

< = Analytical result is less than the indicated laboratory reporting limit

Highlighted results are equal to or exceed the ECMC Table 915-1 standard

1,2,4 - TMB = 1,2,4 Trimethylbenzene

1,3,5 - TMB = 1,3,5 Trimethylbenzene

Benzo(a) = Benzo(a)anthracene

Benzo(b) = Benzo(b)fluoranthene

Benzo(k) = Benzo(k)fluoranthene

Benzo(a) = Benzo(a)pyrene

A,H = Dibenzo(a,h)anthracene

1,2,3-CD = Indeno(1,2,3-cd)pyrene

1-M = 1-methylnaphthalene

2-M = 2-methylnaphthalene

NA = Not Analyzed



DATE: 02/27/2024

DESIGNED BY: JW

DRAWN BY: HM



**Noble Energy, Inc. – DJ Basin**  
**Castor Federal LD13-78HN**  
 SWSW, Section 12, Township 9 North, Range 58 West  
 Weld County, Colorado

Excavation Soil  
 Analytical Results Map  
 (11/20/2023)

FIGURE  
 1

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

December 28, 2023

Jacob Whritenour

Tasman Geosciences

6855 W. 119th Ave.

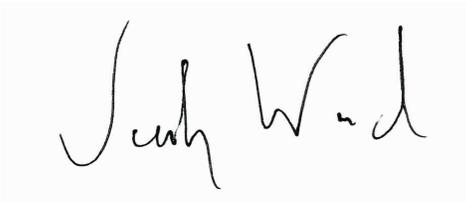
Broomfield, CO 80020

RE: Noble - Castor Federal LD13-78HN

Work Order #2311422

Enclosed are the results of analyses for samples received by Summit Scientific on 11/20/23 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Jacob Wood". The signature is written in a cursive style with a large initial "J" and a distinct "W".

Jacob Wood For Ben Shrewsbury  
Laboratory Manager



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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FS01@3'	2311422-01	Soil	11/20/23 11:00	11/20/23 17:30
SS01@2.5'	2311422-02	Soil	11/20/23 11:02	11/20/23 17:30
SS02@2.5'	2311422-03	Soil	11/20/23 11:04	11/20/23 17:30
SS03@2.5'	2311422-04	Soil	11/20/23 11:06	11/20/23 17:30
SS04@2.5'	2311422-05	Soil	11/20/23 11:08	11/20/23 17:30

### Case Narrative

Sarah Quattrochi requested 915 Metals & pH be added to SS02 - SS04 samples on 12/6/2023.  
This report includes those results.

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		Project Manager: Jake Whritenour		Company:	
Address: 6855 W. 119th Ave.		E-Mail: Jwhritenour@tasman-geo.com		Project Name/Location:	
City/State/Zip: Broomfield/CO/ 80020				AFE#:	
Phone: 602-881-5716		Project Name: <u>Caster Federal LD13-784N</u>		PO/Billing Codes:	
Sampler Name: <u>Dennis Gray</u> <sup>OR</sup> <u>David Vigi</u>		Project Number:		Contact:	

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix		Analysis Requested							Special Instructions			
					HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	Metals - 915	VOC - 915	TPH - 915	PAH - 915	SAR, EC, pH		Boron - HWS	HOLD	
1	F501 @ 3'	11/20/23	1100	2			X			X			X	X	X	X	X	X		SAR, EC, pH by saturated paste	
2	SS01 @ 2.5'		1102				X						X	X	X	X	X	X			
3	SS02 @ 2.5'		1104				X											X			
4	SS03 @ 2.5'		1106				X											X			
5	SS04 @ 2.5'		1108				X											X			
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					

Relinquished by: <u>[Signature]</u>	Date/Time: 11/20/23 1430	Received by: <b>Tasman Lock Box</b>	Date/Time: 11/20/23 1430	TAT Business Days	Field DO	Notes:
				Same Day	Field EC	
Relinquished by: <u>Tasman Lock Box</u>	Date/Time: 11/20/23 1730	Received by: <u>[Signature]</u>	Date/Time: 11/20/23 1730	1 Day	Field ORP	
				2 Days	Field pH	
Relinquished by:	Date/Time:	Received by:	Date/Time:	3 Days	Field Temp.	
				Standard	Field Turb. <input checked="" type="checkbox"/>	
Temperature Upon Receipt: <u>9.8</u>	Corrected Temperature: <u>6</u>	IR gun #:		HNO3 lot #:		





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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**FS01@3'**  
**2311422-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	0.0020		mg/kg	1	BGK0843	11/21/23	11/21/23	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: **11/20/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4	0.0443	111 %		50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0412	103 %		50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0421	105 %		50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
C10-C28 (DRO)	ND	50		mg/kg	1	BGK0845	11/21/23	11/21/23	EPA 8015M	
C28-C36 (ORO)	ND	50		"	"	"	"	"	"	

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: o-Terphenyl	8.64	69.1 %		30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

Summit Scientific

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**FS01@3'**  
**2311422-01 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BGK0823	11/21/23	11/23/23	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: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0169	50.8 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0218	65.5 %	40-150		"	"	"	"	

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

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	2.00	mg/L	1	BGK0871	11/22/23	11/23/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**FS01@3'**  
**2311422-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.00	0.200	mg/kg dry	1	BGK0937	11/27/23	11/28/23	EPA 6020B	
Barium	123	0.400	"	"	"	"	"	"	
Cadmium	ND	0.200	"	"	"	"	"	"	
Copper	1.83	0.400	"	"	"	"	"	"	
Lead	5.80	0.200	"	"	"	"	"	"	
Nickel	1.38	0.400	"	"	"	"	"	"	
Silver	ND	0.0200	"	"	"	"	"	"	
Zinc	6.42	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: 11/20/23 11:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGK0885	11/22/23	11/27/23	EPA 7196A	

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

Date Sampled: 11/20/23 11:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	74.4	0.0500	mg/L dry	1	BGK0898	11/22/23	11/27/23	EPA 6020B	
Magnesium	7.47	0.0500	"	"	"	"	"	"	
Sodium	32.3	0.0500	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: 11/20/23 11:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.955	0.00100	units	1	BGK1026	11/28/23	11/28/23	Calculation	

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

Summit Scientific

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**FS01@3'**  
**2311422-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	86.6		%	1	BGK0875	11/22/23	11/22/23	Calculation	

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

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.281	0.0100	mmhos/cm	1	BGK0970	11/27/23	11/27/23	EPA 120.1	

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

Date Sampled: **11/20/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	9.16		pH Units	1	BGK0971	11/27/23	11/27/23	EPA 9045D	

Summit Scientific

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS01@2.5'**  
**2311422-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	BGK0843	11/21/23	11/22/23	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: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	0.0452	113 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0420	105 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0434	109 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>60</b>	50	mg/kg	1	BGK0845	11/21/23	11/21/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl	9.07	72.5 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

Summit Scientific

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS01@2.5'**  
**2311422-02 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BGK0823	11/21/23	11/23/23	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: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0156	46.9 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0221	66.3 %	40-150		"	"	"	"	

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

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	2.00	mg/L	1	BGK0871	11/22/23	11/23/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS01@2.5'**  
**2311422-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.03	0.200	mg/kg dry	1	BGK0937	11/27/23	11/28/23	EPA 6020B	
Barium	105	0.400	"	"	"	"	"	"	
Cadmium	ND	0.200	"	"	"	"	"	"	
Copper	1.95	0.400	"	"	"	"	"	"	
Lead	6.53	0.200	"	"	"	"	"	"	
Nickel	1.53	0.400	"	"	"	"	"	"	
Silver	ND	0.0200	"	"	"	"	"	"	
Zinc	7.04	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: 11/20/23 11:02

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGK0885	11/22/23	11/27/23	EPA 7196A	

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

Date Sampled: 11/20/23 11:02

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	133	0.0500	mg/L dry	1	BGK0898	11/22/23	11/27/23	EPA 6020B	
Magnesium	12.7	0.0500	"	"	"	"	"	"	
Sodium	22.5	0.0500	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: 11/20/23 11:02

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.499	0.00100	units	1	BGK1026	11/28/23	11/28/23	Calculation	

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

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS01@2.5'**  
**2311422-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	84.6		%	1	BGK0875	11/22/23	11/22/23	Calculation	

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

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.156	0.0100	mmhos/cm	1	BGK0970	11/27/23	11/27/23	EPA 120.1	

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

Date Sampled: **11/20/23 11:02**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	9.38		pH Units	1	BGK0971	11/27/23	11/27/23	EPA 9045D	

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Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS02@2.5'**  
**2311422-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **11/20/23 11:04**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Arsenic</b>	<b>0.562</b>	0.200	mg/kg dry	1	BGL0587	12/15/23	12/27/23	EPA 6020B	
<b>Barium</b>	<b>151</b>	0.400	"	"	"	"	"	"	
Cadmium	ND	0.200	"	"	"	"	"	"	
<b>Copper</b>	<b>0.919</b>	0.400	"	"	"	"	"	"	
<b>Lead</b>	<b>7.00</b>	0.200	"	"	"	"	"	"	
<b>Nickel</b>	<b>0.696</b>	0.400	"	"	"	"	"	"	
Silver	ND	0.0200	"	"	"	"	"	"	
<b>Zinc</b>	<b>3.21</b>	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **11/20/23 11:04**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGL0498	12/13/23	12/13/23	EPA 7196A	

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

Date Sampled: **11/20/23 11:04**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>% Solids</b>	<b>84.9</b>		%	1	BGL0639	12/18/23	12/18/23	Calculation	

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

Date Sampled: **11/20/23 11:04**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>pH</b>	<b>9.00</b>		pH Units	1	BGL0387	12/11/23	12/11/23	EPA 9045D	

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Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS03@2.5'**  
**2311422-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **11/20/23 11:06**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Arsenic</b>	<b>0.579</b>	0.200	mg/kg dry	1	BGL0587	12/15/23	12/27/23	EPA 6020B	
<b>Barium</b>	<b>69.5</b>	0.400	"	"	"	"	"	"	
Cadmium	ND	0.200	"	"	"	"	"	"	
<b>Copper</b>	<b>1.69</b>	0.400	"	"	"	"	"	"	
<b>Lead</b>	<b>7.57</b>	0.200	"	"	"	"	"	"	
<b>Nickel</b>	<b>1.28</b>	0.400	"	"	"	"	"	"	
Silver	ND	0.0200	"	"	"	"	"	"	
<b>Zinc</b>	<b>5.85</b>	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **11/20/23 11:06**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGL0498	12/13/23	12/13/23	EPA 7196A	

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

Date Sampled: **11/20/23 11:06**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>% Solids</b>	<b>83.5</b>		%	1	BGL0639	12/18/23	12/18/23	Calculation	

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

Date Sampled: **11/20/23 11:06**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>pH</b>	<b>8.88</b>		pH Units	1	BGL0387	12/11/23	12/11/23	EPA 9045D	

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Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**SS04@2.5'**  
**2311422-05 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Date Sampled: **11/20/23 11:08**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Arsenic</b>	<b>1.14</b>	0.200	mg/kg dry	1	BGL0587	12/15/23	12/27/23	EPA 6020B	
<b>Barium</b>	<b>186</b>	0.400	"	"	"	"	"	"	
Cadmium	ND	0.200	"	"	"	"	"	"	
<b>Copper</b>	<b>1.52</b>	0.400	"	"	"	"	"	"	
<b>Lead</b>	<b>8.41</b>	0.200	"	"	"	"	"	"	
<b>Nickel</b>	<b>1.11</b>	0.400	"	"	"	"	"	"	
Silver	ND	0.0200	"	"	"	"	"	"	
<b>Zinc</b>	<b>5.60</b>	0.400	"	"	"	"	"	"	
Selenium	ND	0.260	"	"	"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **11/20/23 11:08**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGL0498	12/13/23	12/13/23	EPA 7196A	

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

Date Sampled: **11/20/23 11:08**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>% Solids</b>	<b>82.2</b>		%	1	BGL0639	12/18/23	12/18/23	Calculation	

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

Date Sampled: **11/20/23 11:08**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>pH</b>	<b>8.41</b>		pH Units	1	BGL0387	12/11/23	12/11/23	EPA 9045D	

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

### 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 BGK0843 - EPA 5030 Soil MS

##### Blank (BGK0843-BLK1)

Prepared: 11/21/23 Analyzed: 11/22/23

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	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	0.0432		"	0.0400		108	50-150			
<i>Surrogate: Toluene-d8</i>	0.0405		"	0.0400		101	50-150			
<i>Surrogate: 4-Bromofluorobenzene</i>	0.0430		"	0.0400		107	50-150			

##### LCS (BGK0843-BS1)

Prepared: 11/21/23 Analyzed: 11/22/23

Benzene	0.116	0.0020	mg/kg	0.100		116	70-130			
Toluene	0.114	0.0050	"	0.100		114	70-130			
Ethylbenzene	0.0987	0.0050	"	0.100		98.7	70-130			
m,p-Xylene	0.194	0.010	"	0.200		97.1	70-130			
o-Xylene	0.0941	0.0050	"	0.100		94.1	70-130			
1,2,4-Trimethylbenzene	0.0968	0.0050	"	0.100		96.8	70-130			
1,3,5-Trimethylbenzene	0.0952	0.0050	"	0.100		95.2	70-130			
Naphthalene	0.101	0.0038	"	0.100		101	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	0.0434		"	0.0400		109	50-150			
<i>Surrogate: Toluene-d8</i>	0.0419		"	0.0400		105	50-150			
<i>Surrogate: 4-Bromofluorobenzene</i>	0.0419		"	0.0400		105	50-150			

##### Matrix Spike (BGK0843-MS1)

Source: 2311433-21

Prepared: 11/21/23 Analyzed: 11/22/23

Benzene	0.121	0.0020	mg/kg	0.100	ND	121	70-130			
Toluene	0.111	0.0050	"	0.100	ND	111	70-130			
Ethylbenzene	0.0871	0.0050	"	0.100	ND	87.1	70-130			
m,p-Xylene	0.168	0.010	"	0.200	ND	84.2	70-130			
o-Xylene	0.0796	0.0050	"	0.100	ND	79.6	70-130			
1,2,4-Trimethylbenzene	0.0862	0.0050	"	0.100	ND	86.2	70-130			
1,3,5-Trimethylbenzene	0.0846	0.0050	"	0.100	ND	84.6	70-130			
Naphthalene	0.0838	0.0038	"	0.100	ND	83.8	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	0.0529		"	0.0400		132	50-150			
<i>Surrogate: Toluene-d8</i>	0.0502		"	0.0400		125	50-150			
<i>Surrogate: 4-Bromofluorobenzene</i>	0.0491		"	0.0400		123	50-150			

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0843 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (BGK0843-MSD1)</b>	<b>Source: 2311433-21</b>			<b>Prepared: 11/21/23 Analyzed: 11/22/23</b>						
Benzene	0.102	0.0020	mg/kg	0.100	ND	102	70-130	16.9	30	
Toluene	0.0955	0.0050	"	0.100	ND	95.5	70-130	15.4	30	
Ethylbenzene	0.0791	0.0050	"	0.100	ND	79.1	70-130	9.53	30	
m,p-Xylene	0.153	0.010	"	0.200	ND	76.5	70-130	9.52	30	
o-Xylene	0.0732	0.0050	"	0.100	ND	73.2	70-130	8.33	30	
1,2,4-Trimethylbenzene	0.0808	0.0050	"	0.100	ND	80.8	70-130	6.57	30	
1,3,5-Trimethylbenzene	0.0862	0.0050	"	0.100	ND	86.2	70-130	1.90	30	
Naphthalene	0.0872	0.0038	"	0.100	ND	87.2	70-130	4.07	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0530</i>		<i>"</i>	<i>0.0400</i>		<i>133</i>	<i>50-150</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0512</i>		<i>"</i>	<i>0.0400</i>		<i>128</i>	<i>50-150</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0515</i>		<i>"</i>	<i>0.0400</i>		<i>129</i>	<i>50-150</i>			

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Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0845 - EPA 3550A**

**Blank (BGK0845-BLK1)**

Prepared: 11/21/23 Analyzed: 11/22/23

C10-C28 (DRO)	ND	50	mg/kg								
C28-C36 (ORO)	ND	50	"								
Surrogate: <i>o</i> -Terphenyl	12.0		"	12.5		95.7	30-150				

**LCS (BGK0845-BS1)**

Prepared: 11/21/23 Analyzed: 11/22/23

C10-C28 (DRO)	623	50	mg/kg	500		125	70-130				
Surrogate: <i>o</i> -Terphenyl	12.7		"	12.5		102	30-150				

**Matrix Spike (BGK0845-MS1)**

Source: 2311433-21

Prepared: 11/21/23 Analyzed: 11/22/23

C10-C28 (DRO)	616	50	mg/kg	500	ND	123	70-130				
Surrogate: <i>o</i> -Terphenyl	9.23		"	12.5		73.8	30-150				

**Matrix Spike Dup (BGK0845-MSD1)**

Source: 2311433-21

Prepared: 11/21/23 Analyzed: 11/22/23

C10-C28 (DRO)	548	50	mg/kg	500	ND	110	70-130	11.7	20		
Surrogate: <i>o</i> -Terphenyl	10.1		"	12.5		81.2	30-150				

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6855 W. 119th Ave.  
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Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0823 - EPA 5030 Soil MS**

**Blank (BGK0823-BLK1)**

Prepared: 11/21/23 Analyzed: 11/23/23

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	"							
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0269</i>		<i>"</i>	<i>0.0333</i>		<i>80.6</i>	<i>40-150</i>			
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0324</i>		<i>"</i>	<i>0.0333</i>		<i>97.2</i>	<i>40-150</i>			

**LCS (BGK0823-BS1)**

Prepared: 11/21/23 Analyzed: 11/23/23

Acenaphthene	0.0270	0.00500	mg/kg	0.0333	81.0	31-137
Anthracene	0.0262	0.00500	"	0.0333	78.6	30-120
Benzo (a) anthracene	0.0269	0.00500	"	0.0333	80.8	30-120
Benzo (a) pyrene	0.0244	0.00500	"	0.0333	73.3	30-120
Benzo (b) fluoranthene	0.0230	0.00500	"	0.0333	69.1	30-120
Benzo (k) fluoranthene	0.0216	0.00500	"	0.0333	64.7	30-120
Chrysene	0.0254	0.00500	"	0.0333	76.1	30-120
Dibenz (a,h) anthracene	0.0264	0.00500	"	0.0333	79.1	30-120
Fluoranthene	0.0237	0.00500	"	0.0333	71.0	30-120
Fluorene	0.0253	0.00500	"	0.0333	75.9	30-120
Indeno (1,2,3-cd) pyrene	0.0178	0.00500	"	0.0333	53.5	30-120
Pyrene	0.0245	0.00500	"	0.0333	73.6	35-142
1-Methylnaphthalene	0.0246	0.00500	"	0.0333	73.9	35-142
2-Methylnaphthalene	0.0255	0.00500	"	0.0333	76.5	35-142
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0238</i>		<i>"</i>	<i>0.0333</i>	<i>71.5</i>	<i>40-150</i>
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0226</i>		<i>"</i>	<i>0.0333</i>	<i>67.8</i>	<i>40-150</i>

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0823 - EPA 5030 Soil MS**

**Matrix Spike (BGK0823-MS1)**

Source: 2311396-01

Prepared: 11/21/23 Analyzed: 11/23/23

Acenaphthene	0.0185	0.00500	mg/kg	0.0333	ND	55.4	31-137			
Anthracene	0.0179	0.00500	"	0.0333	ND	53.6	30-120			
Benzo (a) anthracene	0.0186	0.00500	"	0.0333	ND	55.7	30-120			
Benzo (a) pyrene	0.0173	0.00500	"	0.0333	ND	51.8	30-120			
Benzo (b) fluoranthene	0.0164	0.00500	"	0.0333	ND	49.3	30-120			
Benzo (k) fluoranthene	0.0152	0.00500	"	0.0333	ND	45.5	30-120			
Chrysene	0.0174	0.00500	"	0.0333	ND	52.1	30-120			
Dibenz (a,h) anthracene	0.0185	0.00500	"	0.0333	ND	55.4	30-120			
Fluoranthene	0.0168	0.00500	"	0.0333	ND	50.4	30-120			
Fluorene	0.0170	0.00500	"	0.0333	ND	51.1	30-120			
Indeno (1,2,3-cd) pyrene	0.0206	0.00500	"	0.0333	ND	61.7	30-120			
Pyrene	0.0180	0.00500	"	0.0333	ND	54.0	35-142			
1-Methylnaphthalene	0.0182	0.00500	"	0.0333	ND	54.7	15-130			
2-Methylnaphthalene	0.0188	0.00500	"	0.0333	ND	56.5	15-130			
Surrogate: 2-Methylnaphthalene-d10	0.0168		"	0.0333		50.5	40-150			
Surrogate: Fluoranthene-d10	0.0156		"	0.0333		46.9	40-150			

**Matrix Spike Dup (BGK0823-MSD1)**

Source: 2311396-01

Prepared: 11/21/23 Analyzed: 11/23/23

Acenaphthene	0.0169	0.00500	mg/kg	0.0333	ND	50.6	31-137	9.06	30	
Anthracene	0.0180	0.00500	"	0.0333	ND	54.1	30-120	0.915	30	
Benzo (a) anthracene	0.0191	0.00500	"	0.0333	ND	57.4	30-120	2.94	30	
Benzo (a) pyrene	0.0174	0.00500	"	0.0333	ND	52.2	30-120	0.814	30	
Benzo (b) fluoranthene	0.0175	0.00500	"	0.0333	ND	52.4	30-120	6.05	30	
Benzo (k) fluoranthene	0.0161	0.00500	"	0.0333	ND	48.4	30-120	6.18	30	
Chrysene	0.0176	0.00500	"	0.0333	ND	52.7	30-120	1.04	30	
Dibenz (a,h) anthracene	0.0172	0.00500	"	0.0333	ND	51.7	30-120	6.90	30	
Fluoranthene	0.0193	0.00500	"	0.0333	ND	57.9	30-120	13.9	30	
Fluorene	0.0172	0.00500	"	0.0333	ND	51.7	30-120	1.17	30	
Indeno (1,2,3-cd) pyrene	0.0183	0.00500	"	0.0333	ND	55.0	30-120	11.5	30	
Pyrene	0.0177	0.00500	"	0.0333	ND	53.1	35-142	1.61	30	
1-Methylnaphthalene	0.0187	0.00500	"	0.0333	ND	56.0	15-130	2.39	50	
2-Methylnaphthalene	0.0187	0.00500	"	0.0333	ND	56.1	15-130	0.801	50	
Surrogate: 2-Methylnaphthalene-d10	0.0171		"	0.0333		51.2	40-150			
Surrogate: Fluoranthene-d10	0.0178		"	0.0333		53.5	40-150			

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

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

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

**Batch BGK0871 - EPA 3050B**

**Blank (BGK0871-BLK1)**

Prepared: 11/22/23 Analyzed: 11/23/23

Boron ND 2.00 mg/L

**LCS (BGK0871-BS1)**

Prepared: 11/22/23 Analyzed: 11/23/23

Boron 4.38 2.00 mg/L 5.00 87.7 80-120

**Duplicate (BGK0871-DUP1)**

**Source: 2311422-01**

Prepared: 11/22/23 Analyzed: 11/23/23

Boron 0.165 2.00 mg/L 0.175 5.84 20

**Matrix Spike (BGK0871-MS1)**

**Source: 2311422-01**

Prepared: 11/22/23 Analyzed: 11/23/23

Boron 4.73 2.00 mg/L 5.00 0.175 91.1 75-125

**Matrix Spike Dup (BGK0871-MSD1)**

**Source: 2311422-01**

Prepared: 11/22/23 Analyzed: 11/23/23

Boron 4.35 2.00 mg/L 5.00 0.175 83.5 75-125 8.38 25

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**Total Metals by EPA 6020B - Quality Control**  
**Summit Scientific**

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

**Batch BGK0937 - EPA 3050B**

**Blank (BGK0937-BLK1)**

Prepared: 11/27/23 Analyzed: 11/28/23

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 (BGK0937-BS1)**

Prepared: 11/27/23 Analyzed: 11/28/23

Arsenic	42.1	0.200	mg/kg wet	40.0		105	80-120			
Barium	42.9	0.400	"	40.0		107	80-120			
Cadmium	2.20	0.200	"	2.00		110	80-120			
Copper	41.7	0.400	"	40.0		104	80-120			
Lead	21.8	0.200	"	20.0		109	80-120			
Nickel	41.4	0.400	"	40.0		103	80-120			
Silver	2.15	0.0200	"	2.00		107	80-120			
Zinc	43.4	0.400	"	40.0		109	80-120			
Selenium	4.20	0.260	"	4.00		105	80-120			

**Duplicate (BGK0937-DUP1)**

Source: 2311302-01

Prepared: 11/27/23 Analyzed: 11/28/23

Arsenic	0.711	0.200	mg/kg dry	0.725		2.03	20			
Barium	58.8	0.400	"	55.4		5.93	20			
Cadmium	0.0908	0.200	"	0.0904		0.473	20			
Copper	1.97	0.400	"	1.87		4.93	20			
Lead	4.35	0.200	"	3.83		12.8	20			
Nickel	1.69	0.400	"	1.63		3.43	20			
Silver	0.0253	0.0200	"	0.0210		18.5	20			
Zinc	7.05	0.400	"	6.89		2.39	20			
Selenium	ND	0.260	"	ND			20			

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0937 - EPA 3050B**

**Matrix Spike (BGK0937-MS1)**

Source: 2311302-01

Prepared: 11/27/23 Analyzed: 11/28/23

Arsenic	16.9	0.200	mg/kg dry	42.8	0.725	37.7	75-125				QM-07
Barium	115	0.400	"	42.8	55.4	139	75-125				QM-07
Cadmium	2.50	0.200	"	2.14	0.0904	112	75-125				
Copper	17.9	0.400	"	42.8	1.87	37.4	75-125				QM-07
Lead	25.3	0.200	"	21.4	3.83	100	75-125				
Nickel	17.1	0.400	"	42.8	1.63	36.1	75-125				QM-07
Silver	2.24	0.0200	"	2.14	0.0210	104	75-125				
Zinc	28.6	0.400	"	42.8	6.89	50.8	75-125				QM-07
Selenium	4.66	0.260	"	4.28	ND	109	75-125				

**Matrix Spike Dup (BGK0937-MSD1)**

Source: 2311302-01

Prepared: 11/27/23 Analyzed: 11/28/23

Arsenic	16.7	0.200	mg/kg dry	42.8	0.725	37.3	75-125	0.992	25		QM-07
Barium	107	0.400	"	42.8	55.4	121	75-125	6.58	25		
Cadmium	2.28	0.200	"	2.14	0.0904	102	75-125	9.19	25		
Copper	17.9	0.400	"	42.8	1.87	37.4	75-125	0.0503	25		QM-07
Lead	23.7	0.200	"	21.4	3.83	92.8	75-125	6.47	25		
Nickel	17.2	0.400	"	42.8	1.63	36.3	75-125	0.380	25		QM-07
Silver	2.09	0.0200	"	2.14	0.0210	96.5	75-125	7.05	25		
Zinc	28.9	0.400	"	42.8	6.89	51.5	75-125	0.956	25		QM-07
Selenium	3.75	0.260	"	4.28	ND	87.5	75-125	21.6	25		

**Batch BGL0587 - EPA 3050B**

**Blank (BGL0587-BLK1)**

Prepared: 12/15/23 Analyzed: 12/27/23

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	"								

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGL0587 - EPA 3050B**

**LCS (BGL0587-BS1)**

Prepared: 12/15/23 Analyzed: 12/27/23

Arsenic	33.9	0.200	mg/kg wet	40.0		84.7	80-120			
Barium	32.8	0.400	"	40.0		82.0	80-120			
Cadmium	1.67	0.200	"	2.00		83.7	80-120			
Copper	34.7	0.400	"	40.0		86.6	80-120			
Lead	16.5	0.200	"	20.0		82.5	80-120			
Nickel	34.0	0.400	"	40.0		85.0	80-120			
Silver	1.71	0.0200	"	2.00		85.3	80-120			
Zinc	34.3	0.400	"	40.0		85.7	80-120			
Selenium	3.56	0.260	"	4.00		89.0	80-120			

**Duplicate (BGL0587-DUP1)**

Source: 2311392-02

Prepared: 12/15/23 Analyzed: 12/27/23

Arsenic	0.602	0.200	mg/kg dry		0.618			2.68	20	
Barium	56.8	0.400	"		59.0			3.75	20	
Cadmium	0.0865	0.200	"		0.0764			12.5	20	
Copper	1.72	0.400	"		1.71			0.437	20	
Lead	7.43	0.200	"		5.37			32.2	20	QR-04
Nickel	1.43	0.400	"		1.55			7.94	20	
Silver	0.0331	0.0200	"		0.0318			4.08	20	
Zinc	5.88	0.400	"		6.00			2.05	20	
Selenium	ND	0.260	"		ND				20	

**Matrix Spike (BGL0587-MS1)**

Source: 2311392-02

Prepared: 12/15/23 Analyzed: 12/27/23

Arsenic	12.0	0.200	mg/kg dry	44.2	0.618	25.7	75-125			QM-07
Barium	96.5	0.400	"	44.2	59.0	84.8	75-125			
Cadmium	1.84	0.200	"	2.21	0.0764	79.8	75-125			
Copper	13.4	0.400	"	44.2	1.71	26.4	75-125			QM-07
Lead	22.2	0.200	"	22.1	5.37	76.3	75-125			
Nickel	13.1	0.400	"	44.2	1.55	26.1	75-125			QM-07
Silver	1.82	0.0200	"	2.21	0.0318	81.2	75-125			
Zinc	18.0	0.400	"	44.2	6.00	27.2	75-125			QM-07
Selenium	3.61	0.260	"	4.42	ND	81.8	75-125			

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

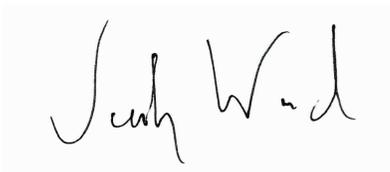
**Total Metals by EPA 6020B - Quality Control**  
**Summit Scientific**

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

**Batch BGL0587 - EPA 3050B**

<b>Matrix Spike Dup (BGL0587-MSD1)</b>	<b>Source: 2311392-02</b>			Prepared: 12/15/23		Analyzed: 12/27/23					
Arsenic	12.1	0.200	mg/kg dry	44.2	0.618	26.0	75-125	0.793	25		QM-07
Barium	95.2	0.400	"	44.2	59.0	81.9	75-125	1.35	25		
Cadmium	1.81	0.200	"	2.21	0.0764	78.7	75-125	1.31	25		
Copper	13.5	0.400	"	44.2	1.71	26.7	75-125	0.743	25		QM-07
Lead	22.1	0.200	"	22.1	5.37	75.8	75-125	0.552	25		
Nickel	13.1	0.400	"	44.2	1.55	26.3	75-125	0.549	25		QM-07
Silver	1.80	0.0200	"	2.21	0.0318	80.3	75-125	1.05	25		
Zinc	18.2	0.400	"	44.2	6.00	27.6	75-125	0.834	25		QM-07
Selenium	3.51	0.260	"	4.42	ND	79.5	75-125	2.85	25		

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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**Hexavalent Chromium by EPA Method 7196 - Quality Control**  
**Summit Scientific**

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

**Batch BGK0885 - 3060A Mod**

<b>Blank (BGK0885-BLK1)</b>											
											Prepared: 11/22/23 Analyzed: 11/27/23
Chromium, Hexavalent	ND	0.30	mg/kg wet								
<b>LCS (BGK0885-BS1)</b>											
											Prepared: 11/22/23 Analyzed: 11/27/23
Chromium, Hexavalent	25.0	0.30	mg/kg wet	25.0		100	80-120				
<b>Duplicate (BGK0885-DUP1)</b>											
											Source: 2311312-01 Prepared: 11/22/23 Analyzed: 11/27/23
Chromium, Hexavalent	ND	0.30	mg/kg dry		ND					20	
<b>Matrix Spike (BGK0885-MS1)</b>											
											Source: 2311312-01 Prepared: 11/22/23 Analyzed: 11/27/23
Chromium, Hexavalent	26.5	0.30	mg/kg dry	28.6	ND	92.6	75-125				
<b>Matrix Spike Dup (BGK0885-MSD1)</b>											
											Source: 2311312-01 Prepared: 11/22/23 Analyzed: 11/27/23
Chromium, Hexavalent	26.6	0.30	mg/kg dry	28.6	ND	93.0	75-125	0.431		20	

**Batch BGL0498 - 3060A Mod**

<b>Blank (BGL0498-BLK1)</b>											
											Prepared & Analyzed: 12/13/23
Chromium, Hexavalent	ND	0.30	mg/kg wet								
<b>LCS (BGL0498-BS1)</b>											
											Prepared & Analyzed: 12/13/23
Chromium, Hexavalent	26.1	0.30	mg/kg wet	25.0		104	80-120				
<b>Duplicate (BGL0498-DUP1)</b>											
											Source: 2311392-02 Prepared & Analyzed: 12/13/23
Chromium, Hexavalent	ND	0.30	mg/kg dry		ND					20	
<b>Matrix Spike (BGL0498-MS1)</b>											
											Source: 2311392-02 Prepared & Analyzed: 12/13/23
Chromium, Hexavalent	27.9	0.30	mg/kg dry	27.6	ND	101	75-125				

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**Hexavalent Chromium by EPA Method 7196 - Quality Control**

**Summit Scientific**

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

**Batch BGL0498 - 3060A Mod**

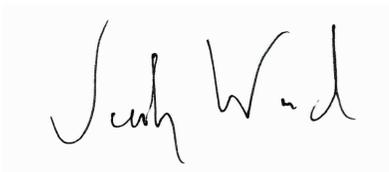
**Matrix Spike Dup (BGL0498-MSD1)**

Source: 2311392-02

Prepared & Analyzed: 12/13/23

Chromium, Hexavalent	27.5	0.30	mg/kg dry	27.6	ND	99.6	75-125	1.40	20	
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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

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

**Summit Scientific**

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

**Batch BGK0898 - General Preparation**

**Blank (BGK0898-BLK1)**

Prepared: 11/22/23 Analyzed: 11/27/23

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

**LCS (BGK0898-BS1)**

Prepared: 11/22/23 Analyzed: 11/27/23

Calcium	5.71	0.0500	mg/L wet	5.00	114	70-130				
Magnesium	5.28	0.0500	"	5.00	106	70-130				
Sodium	5.32	0.0500	"	5.00	106	70-130				

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 - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

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

**Summit Scientific**

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

**Batch BGK0875 - General Preparation**

<b>Duplicate (BGK0875-DUP1)</b>		<b>Source: 2311422-01</b>			<b>Prepared &amp; Analyzed: 11/22/23</b>			
% Solids	83.8		%		86.6		3.38	20

**Batch BGL0639 - General Preparation**

<b>Duplicate (BGL0639-DUP1)</b>		<b>Source: 2311392-02</b>			<b>Prepared &amp; Analyzed: 12/18/23</b>			
% Solids	90.6		%		90.6		0.0518	20

Summit Scientific



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Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

**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 BGK0970 - General Preparation**

**Blank (BGK0970-BLK1)**

Prepared & Analyzed: 11/27/23

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (BGK0970-BS1)**

Prepared & Analyzed: 11/27/23

Specific Conductance (EC) 0.152 0.0100 mmhos/cm 0.150 101 95-105

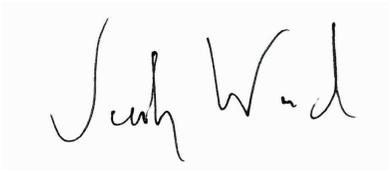
**Duplicate (BGK0970-DUP1)**

Source: 2311320-01

Prepared & Analyzed: 11/27/23

Specific Conductance (EC) 0.106 0.0100 mmhos/cm 0.106 0.00 20

Summit Scientific



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6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

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

**Summit Scientific**

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

**Batch BGK0971 - General Preparation**

**LCS (BGK0971-BS1)**

Prepared & Analyzed: 11/27/23

pH	9.09		pH Units	9.18		99.0	95-105		
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**Duplicate (BGK0971-DUP1)**

Source: 2311320-01

Prepared & Analyzed: 11/27/23

pH	8.07		pH Units			8.07		0.00	20
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**Batch BGL0387 - General Preparation**

**LCS (BGL0387-BS1)**

Prepared & Analyzed: 12/11/23

pH	9.18		pH Units	9.18		100	95-105		
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**Duplicate (BGL0387-DUP1)**

Source: 2311368-03

Prepared & Analyzed: 12/11/23

pH	8.25		pH Units			8.22		0.364	20
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Summit Scientific

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

Project: Noble - Castor Federal LD13-78HN

Project Number: [none]  
Project Manager: Jacob Whritenour

**Reported:**  
12/28/23 15:29

### 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.
- 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.
- 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