

# **FREMONT ENVIRONMENTAL INC.**

November 15, 2023

Mr. Daniel Peterson  
Noble Energy Inc.  
2115 117<sup>th</sup> Avenue  
Greeley, CO 80634

Subject:       **Flowline Closure Data Submittal**  
Hansen O 1-23  
API # 05-123-26612  
NESE Sec. 1, T4N, R63W  
Weld County, Colorado  
Fremont Project No. C023-232  
Remediation # 22536

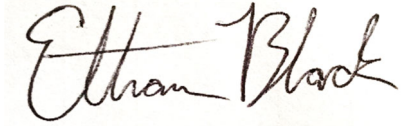
Dear Mr. Peterson:

As you requested, Fremont Environmental Inc. (Fremont) personnel conducted wellhead abandonment activities for the Noble Energy Inc. (Noble) Hansen O 1-23 flowline location. Details of the Hansen O 1-23 flowline abandonment are documented in the attached Closure Report. Organic soil impacts were observed at multiple locations along the flowline. Groundwater was not encountered.

Please contact me at (603) 477-6907 if you require any additional information. Fremont appreciates the opportunity to provide this service.

Sincerely,

**FREMONT ENVIRONMENTAL INC.**



Ethan D. Black, P.G.  
Consultant

Attachments:

Facility Closure Checklist  
Tables  
Figures  
Photos  
Laboratory Report

**1759 REDWING LANE, BROOMFIELD, CO 80020  
(303) 956-8714 (DIRECT)**

# Flowline Closure Checklist

## COGCC Rule 911.a.(4) Environmental Site Closure Assessment Field Form

<i>Additional Attachments:</i>		Tank Battery Closure		Wellhead Closure		Pit Closure		Partially Buried Vault Closure
<i>Site Name &amp; COGCC Facility Number:</i>		<i>Date:</i>						<i>Remediation Project #:</i>
<i>Associated Wells:</i>		<i>Age of Site:</i>						<i>Number of Photos Attached:</i>
<i>Starting point: (GPS coordinates and descriptions)</i>								
<i>End point: (GPS coordinates and descriptions)</i>								
<i>USCS Soil Type:</i>					<i>Estimated Depth to Groundwater:</i>			
<i>Hydrocarbon Impacted Soils / Spills: (Note estimated size and if impact appears to be surficial or extends to an unknown depth)</i>								
<i>Salt Crusted Soils or Impacted Vegetation: (Note estimated size and if impact appears to be surficial or extends to an unknown depth)</i>								
<b>Flowlines</b>								
<i>Flowline type</i>								
<i>Depth</i>								
<i>Age</i>								
<i>Length</i>								
<i>Construction Material</i>								
<i>Were flowlines pulled?</i>								
<i>Visual Integrity of lines</i>								
<i>Visual impacts if trenched</i>								
<i>PID Readings if trenched</i>								
<i>Sample taken? Location/Sample ID#</i>								
<i>Photo Number(s)</i>								
<i>Other observations regarding on location flowlines:</i>								
<b>Summary</b>								
<i>Was impacted soil identified?</i> <div> No Yes - less than 10 cubic yards Yes - more than 10 cubic yards </div>								
<i>Total number of samples field screened:</i>					<i>Total number of samples collected:</i>			
<i>Highest PID Reading:</i>					<i>Total number of samples submitted to lab for analysis:</i>			
<i>If more than 10 cubic yards of impacted soil were observed:</i>								
<i>Vertical extent:</i>					<i>Estimated spill volume:</i>			
<i>Lateral extent:</i>					<i>Volume of soil removed:</i>			
<i>Is additional investigation required?</i>								
<i>Was groundwater encountered during the investigation?</i> <div> No Yes - not impacted or in contact with impacted soils Yes - groundwater impacted and/or in contact with impacted soils </div>								
<i>Measured depth to groundwater:</i>					<i>Was remedial groundwater removal conducted? Yes No</i>			
<i>Date Groundwater was encountered:</i>					<i>Commencement date of removal:</i>			
<i>Sheen on groundwater? Yes No</i>					<i>Volume of groundwater removed prior to sampling:</i>			
<i>Free product observed? Yes No</i>					<i>Volume of groundwater removed post sampling:</i>			
<i>Total number of samples collected:</i>					<i>Total Volume of groundwater removed:</i>			
<i>Total number of samples submitted to lab for analysis:</i>								

TABLE 1  
SUMMARY OF VOLATILE ORGANIC SOIL CHEMISTRY DATA  
NOBLE ENERGY INC.  
HANSEN O 1-23, WELD COUNTY, COLORADO  
FREMONT PROJECT NO. C023-232

Sample ID	Sample Date	Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	1,2,4- Trimethyl- Benzene (mg/kg)	1,3,5- Trimethyl- Benzene (mg/kg)	Naphthalene (mg/kg)	TPH GRO (mg/kg)	TPH DRO (mg/kg)	TPH ORO (mg/kg)
ECMC Table 915-1 Limits (Residential SSL)			1.2	490	5.8	58	30	27	2	500**		
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.0026	0.69	0.78	9.9	0.0081	0.0087	0.0038	500**		
FL01-01@4'	08/22/2023	4	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<b>0.0063</b>	<0.50	<50	<50
FL01-02@4'	08/22/2023	4	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<0.50	<50	<50
FL01-03@4'	08/22/2023	4	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<b>0.012</b>	<0.50	66	<50
FLR01@4'	08/22/2023	4	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<0.50	<50	<50
SEP01-FL@2'	08/22/2023	2	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<0.50	<50	<50

Bold faced values exceed the ECMC Table 915-1 concentrations

Red & blue highlighted 915-1 Limits indicate the referenced soil screening level (SSL)

\* Indicates laboratory minimum detection limit in excess of SSL

\*\* Summation of GRO+DRO+ORO must be less than 500 mg/kg

NA - Not analyzed

TABLE 2  
SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON SOIL CHEMISTRY DATA  
NOBLE ENERGY INC.  
HANSEN O 1-23, WELD COUNTY, COLORADO  
FREMONT PROJECT NO. C023-232

Sample ID	Sample Date	Depth (ft)	Acenaphthene (mg/kg)	Anthracene (mg/kg)	Benzo (a) Anthracene (mg/kg)	Benzo (a) Pyrene (mg/kg)	Benzo (b) Fluoranthene (mg/kg)	Benzo (k) Fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo (a,h) Anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno (1,2,3- cd) Pyrene (mg/kg)	Pyrene (mg/kg)	1-Methyl - Naphthalene (mg/kg)	2-Methyl- Naphthalene (mg/kg)
ECMC Table 915-1 Limits (Residential SSL)			360	1800	1.1	0.11	1.1	11	110	0.11	240	240	1.1	180	18	24
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.55	5.8	0.011	0.24	0.3	2.9	9	0.096	8.9	0.54	0.98	1.3	0.006	0.019
FL01-01@4'	08/22/2023	4	0.016	0.036	<b>0.067</b>	0.034	0.058	0.023	0.0675	0.006	0.153	0.0192	0.029	0.113	<0.00500	<0.00500
FL01-02@4'	08/22/2023	4	<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
FL01-03@4'	08/22/2023	4	0.204	0.410	<b>0.609</b>	<b>0.508</b>	<b>0.715</b>	0.285	0.641	<b>0.105</b>	1.460	0.266	0.341	1.020	<b>0.0243</b>	<b>0.0417</b>
FLR01@4'	08/22/2023	4	<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
SEP01-FL@2'	08/22/2023	2	<0.00500	<0.00500	0.008	<0.00500	0.008	<0.00500	0.00867	<0.00500	0.019	<0.00500	<0.00500	0.015	<0.00500	<0.00500

Bold faced values exceed the ECMC Table 915-1 concentrations

Red & blue highlighted 915-1 Limits indicate the referenced soil screening level (SSL)

\* Indicates laboratory minimum detection limit in excess of SSL

NA - Not analyzed

TABLE 3  
SUMMARY OF SOIL SUITABILITY FOR RECLAMATION  
NOBLE ENERGY INC.  
HANSEN O 1-23, WELD COUNTY, COLORADO  
FREMONT PROJECT NO. C023-232

Sample ID	Sample Date	Depth (ft)	pH	EC (mmhos/cm)	SAR	Boron (mg/L)
COGCC Table 915-1 Soil Suitability Limits			6 - 8.3	<4	<6	2
FL01-01@4'	08/22/2023	4	<b>8.51</b>	0.424	0.888	0.049
FL01-02@4'	08/22/2023	4	7.94	2.77	2.46	0.0634
FL01-03@4'	08/22/2023	4	7.88	3.6	2.8	0.846
FLR01@4'	08/22/2023	4	7.61	1.06	0.356	<0.0100
SEP01-FL@2'	08/22/2023	2	<b>8.32</b>	0.158	0.0295	<0.0100

Bold faced values exceed the ECMC Table 915-1 concentrations

Yellow highlighted 915-1 Limits indicate the referenced soil screening level (SSL)

NA - Not analyzed

TABLE 4  
SUMMARY OF METALS IN SOIL CHEMISTRY DATA  
NOBLE ENERGY INC.  
HANSEN O 1-23, WELD COUNTY, COLORADO  
FREMONT PROJECT NO. C023-232

Sample ID	Sample Date	Depth (ft)	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)
ECMC Table 915-1 Limits (Residential SSL)			0.68	15000	71	0.3	3100	400	1500	390	390	23000
ECMC Table 915-1 Limits (Protection of Groundwater SSL)			0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
FL01-01@4'	08/22/2023	4'	<b>6.7</b>	36.5	<0.200	<0.30	3.53	7.12	4.64	<0.260	0.0349	22.4
FL01-02@4'	08/22/2023	4'	<b>7.17</b>	64.4	<0.200	<0.30	5.33	8.04	6.05	<b>0.358</b>	0.0458	26.9
FL01-03@4'	08/22/2023	4'	<b>3.81</b>	<b>143</b>	<0.200	<0.30	8.22	7.18	6.82	<b>0.777</b>	0.0393	31.2
FLR01@4'	08/22/2023	4'	<b>4.14</b>	<b>137</b>	0.30	<0.30	9.35	<b>19.2</b>	9.22	<b>0.39</b>	0.0518	36.6
SEP01-FL@2'	08/22/2023	2'	<b>5.51</b>	72.9	<b>0.48</b>	<0.30	5.79	7.62	5.42	<0.260	0.0249	23.7

Bold faced values exceed the ECMC Table 915-1 concentrations

Red & blue highlighted 915-1 Limits indicate the referenced soil screening level (SSL)

\* Indicates laboratory minimum detection limit in excess of SSL

NA - Not analyzed

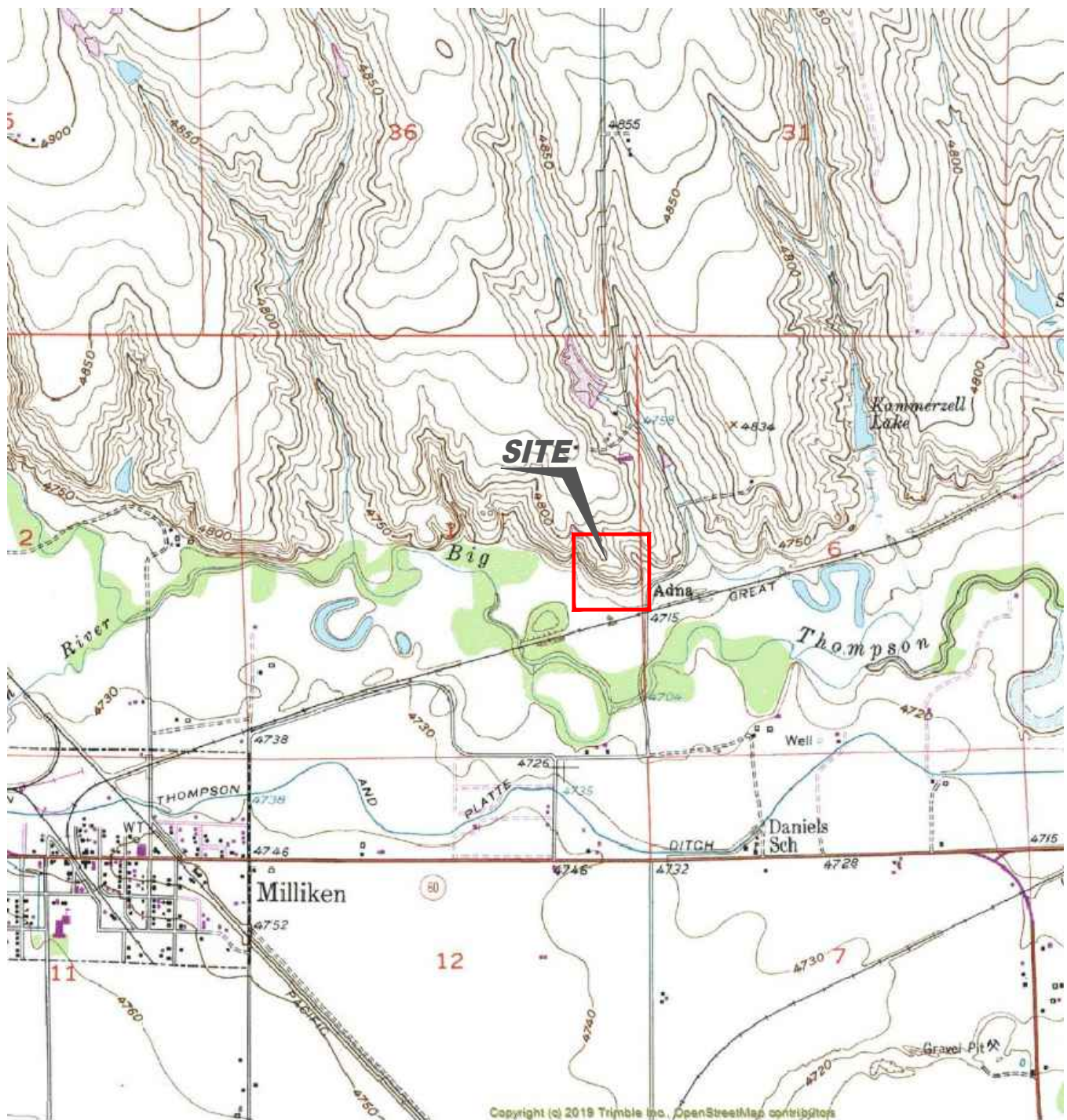
**TABLE 4**  
**SUMMARY OF FIELD OBSERVATIONS**  
**NOBLE ENERGY INC.**  
**HANSEN O 1-23, WELD COUNTY, COLORADO**  
**FREMONT PROJECT C023-232**

Location	Latitude	Longitude	PID Reading	Field Observations
SEP01-FL	40.3397138	-104.8305755	0.0	No impacts observed
FL01-01	40.3397555	-104.830873	0.0	No impacts observed
FL01-02	40.3399211	-104.8323456	0.0	No impacts observed
FL01-03	40.3397361	-104.8324032	0.0	No impacts observed
FLR01	40.3393333	-104.8325722	0.0	No impacts observed

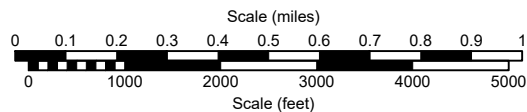
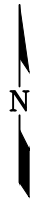
**TABLE 5**  
**SUMMARY OF FLOW LINE CONDITION**  
**NOBLE ENERGY INC.**  
**HANSEN O 1-23, WELD COUNTY, COLORADO**  
**FREMONT PROJECT C023-232**

START	STOP	FOOTAGE	PIPE TYPE AND CONDITION
SEP01-FL	FL01-01	88	2" sch. 80 carbon steel, non-ACM TGF, good condition
FL01-01	FL01-02	417	2" sch. 80 carbon steel, Fusion Bonded Epoxy (FBE) - Green, good condition, abandoned in place
FL01-02	FL01-03	70	2" sch. 80 carbon steel, Fusion Bonded Epoxy (FBE) - Green, good condition
FL01-03	FLR01	150	2" sch. 80 carbon steel, Fusion Bonded Epoxy (FBE) - Green, good condition
		725	<b>Total linear feet of flowline</b>





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USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1  
SITE LOCATION MAP

**Noble Energy, Inc. ~ Hansen O 1-23**  
NESE Section 1, T4N, R67W, 6th PM  
Weld County, Colorado  
40.3397555°, -104.830873°

Project No. <b>C023-232</b>	API # <b>05-123-26612</b>	Facility #
Date <b>9/7/2023</b>	Remediation # <b>22536</b>	Filename <b>23232T</b>








#### LEGEND

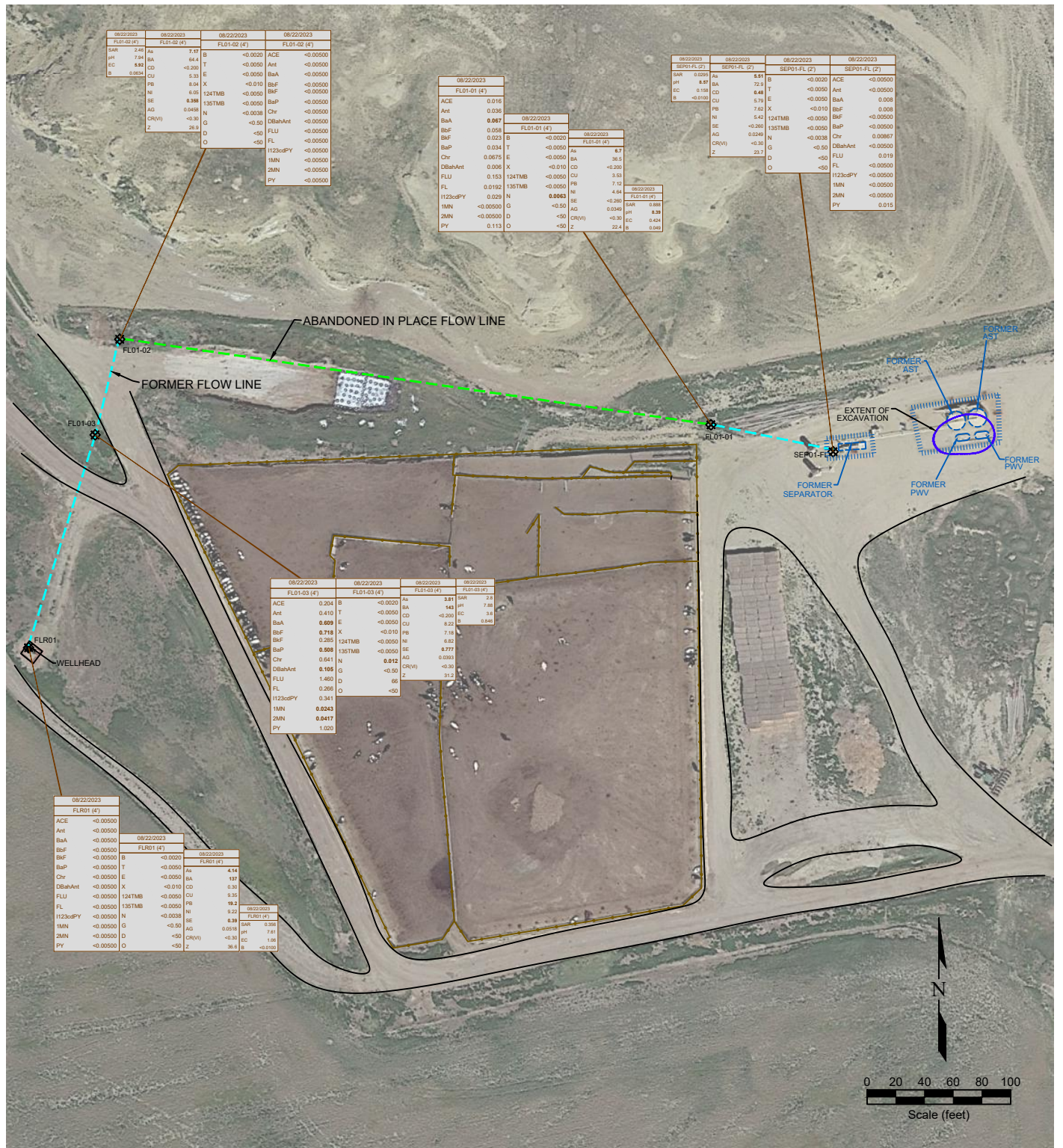
● WELLHEAD LOCATION	○ ABOVE GROUND STORAGE TANK	FORMER FACILITY	CONTAINMENT BERM
▲ PID READING LOCATION		BUILDING	CONTAINMENT WALL
FL01-01 (4') PID 0.0			EXTENT OF EXCAVATION
			FORMER FLOW LINE
			ABANDONED IN PLACE FLOW LINE
			FENCE LINE

Figure 2  
SITE MAP

**Noble Energy, Inc. ~ Hansen O 1-23**  
NESE Section 1, T4N, R67W, 6th PM  
Weld County, Colorado  
40.3397555°, -104.830873°

Project No. <b>C023-232</b>	API # <b>05-123-26612</b>	Facility #	
Date <b>11/15/23</b>	Remediation # <b>22536</b>	Filename <b>23232Q</b>	





DATE SAMPLED	SAMPLE ID & DEPTH (ft)	DATE SAMPLED	SAMPLE ID & DEPTH (ft)	DATE SAMPLED	SAMPLE ID & DEPTH (ft)
08/22/2023	FL01-02 (4')	08/22/2023	FL01-03 (4')	08/22/2023	FL01-01 (4')
ACE	<0.00500	ACE	0.204	ACE	0.016
Ant	<0.00500	Ant	0.410	Ant	0.039
BaA	<0.00500	BaA	0.609	BaA	0.087
BbF	<0.00500	BbF	0.716	BbF	0.058
BkF	<0.00500	BkF	0.285	BkF	0.023
BaP	<0.00500	BaP	0.285	BaP	0.034
Chr	<0.00500	Chr	0.661	Chr	0.0675
DBaAnt	<0.00500	DBaAnt	0.105	DBaAnt	0.006
FLU	<0.00500	FLU	1.460	FLU	0.153
FL	<0.00500	FL	0.266	FL	0.0192
I123cdPY	<0.00500	I123cdPY	0.341	I123cdPY	0.029
1MN	<0.00500	1MN	0.0243	1MN	<0.00500
2MN	<0.00500	2MN	0.0417	2MN	<0.00500
PY	<0.00500	PY	1.020	PY	0.113

Project No. <b>C023-232</b>	API # <b>05-123-26612</b>	Facility #	
Date <b>11/15/23</b>	Remediation # <b>22536</b>	Filename <b>23232Q</b>	

# Photo Log



***Description:***

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# Photo Log



***Description:***

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# Photo Log



***Description:***

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# Photo Log



***Description:***

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# Photo Log



***Description:***

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# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

September 20, 2023

Paul Henchan

Fremont Environmental

PO Box 1289

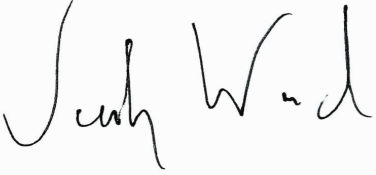
Wellington, CO 80549

RE: Noble - Hansen O 1-23 Flowline

Work Order #2308546

Enclosed are the results of analyses for samples received by Summit Scientific on 08/23/23 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 "Jacob Wood". The signature is written in a cursive, flowing style.

Jacob Wood For Paul Shrewsbury

President



Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SEP01-FL@2'	2308546-01	Soil	08/22/23 11:20	08/23/23 16:30
FL01-01@4'	2308546-02	Soil	08/22/23 10:30	08/23/23 16:30
FL01-02@4'	2308546-03	Soil	08/22/23 10:45	08/23/23 16:30
FL01-03@4'	2308546-04	Soil	08/22/23 11:00	08/23/23 16:30
FLR01@4'	2308546-05	Soil	08/22/23 11:15	08/23/23 16:30

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.*

# SUMMIT SCIENTIFIC

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

Lab ID	Page 1 of 1
2308546	

<b>Send Data To:</b>		<b>Send Invoice To:</b>
Client: Fremont Environmental	Project Manager: Paul Henehan	Company: Noble/Chevron
Address: 8305 6th Street	E-Mail: Fremont Distribution List	Project Name/Location:
City/State/Zip: Wellington, CO, 80549		AFE#: UWRWE - A2137 - ABN
Phone: 603-477-6907	Project Name: Hansen O 1-23 Flowline	PO/Billing Codes:
Sampler Name: Aaron Otilar	Project Number: C023-232	Contact: 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 _____	BTEXN - 915	TPH (C6-C36)	PAH	SAR, EC, pH, Boron	TDS, Cl, SO4	Metals (915-1)				
1	SEPOL-FL02'	8/22/23	1120	2			2			X			X	X	X	X		X				
2	FL01-0104'	8/23/23	1030	2			1			1			1	1	1	1		1				
3	FL01-0204'	1	1045	1			1			1			1	1	1	1		1				
4	FL01-0304'	1	1100	1			1			1			1	1	1	1		1				
5	FL0104'	1	1115	1			1			1			1	1	1	1		1				
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Relinquished by:	Date/Time:	Received by:	Date/Time:	TAT Business Days	Field DO	Notes:
<i>Aaron Otilar</i>	8/23/23 1400	Summit North	8/23/23 1400	Same Day	Field EC	
Relinquished by:	Date/Time:	Received by:	Date/Time:	1 Day	Field ORP	
S2	8/23/23 1030	<i>[Signature]</i>	8/23/23 1030	2 Days	Field pH	
Relinquished by:	Date/Time:	Received by:	Date/Time:	3 Days	Field Temp.	
				Standard	X Field Turb.	
Temperature Upon Receipt: 11.1		Corrected Temperature <i>0</i>		IR gun #:	1	HNO3 lot #:

S<sub>2</sub>

## Sample Receipt Checklist

S2 Work Order# 2308546Client: FremontClient Project ID: Hansen 0 1-23 FlowlineShipped Via: H.D./P.U./FedEx/UPS/USPS/Other

Airbill #: \_\_\_\_\_

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	-------------------------------------	--------------------------	--------------------------	--------------------------

Matrix (Check all that apply)

Air

☐

Soil/Solid

☐

Water

☐

Other

☐

Temp (°C)

Thermometer #

	Yes	No	N/A	Comments (if any)
If samples require cooling, is the temperature < 6°C? <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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	incomplete sample name on jars
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.

Custodian Printed Name

Date/Time

8/23/23



Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**SEP01-FL@2'**  
**2308546-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BGH1064	08/25/23	08/26/23	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: **08/22/23 11:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4	0.0288	72.0 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0402	100 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0378	94.6 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BGH1067	08/25/23	08/26/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl	12.7	101 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
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**SEP01-FL@2'**  
**2308546-01 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BGH1040	08/25/23	08/25/23	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
<b>Benzo (a) anthracene</b>	<b>0.00804</b>	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
<b>Benzo (b) fluoranthene</b>	<b>0.00821</b>	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
<b>Chrysene</b>	<b>0.00867</b>	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
<b>Fluoranthene</b>	<b>0.0185</b>	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
<b>Pyrene</b>	<b>0.0154</b>	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0247	74.1 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0176	52.7 %	40-150		"	"	"	"	

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

Date Sampled: **08/22/23 11:20**


Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	0.0100	mg/L	1	BGH0971	08/24/23	08/25/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**SEP01-FL@2'**  
**2308546-01 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Arsenic	5.51	0.200	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B
Barium	72.9	0.400	"	"	"	"	"	"
Cadmium	0.480	0.200	"	"	"	"	"	"
Copper	5.79	0.400	"	"	"	"	"	"
Lead	7.62	0.200	"	"	"	"	"	"
Nickel	5.42	0.400	"	"	"	"	"	"
Silver	0.0249	0.0200	"	"	"	"	"	"
Zinc	23.7	0.400	"	"	"	"	"	"
Selenium	ND	0.260	"	"	"	"	"	"

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGH1102	08/28/23	08/28/23	EPA 7196A	

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

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	128	0.0556	mg/L dry	1	BGH1166	08/29/23	08/30/23	EPA 6020B	
Magnesium	14.4	0.0556	"	"	"	"	"	"	
Sodium	1.32	0.0556	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.0295	0.00100	units	1	BGH1268	08/31/23	08/31/23	Calculation	

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

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**SEP01-FL@2'**  
**2308546-01 (Soil)**

**Summit Scientific**

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

% Solids	89.9	%	1	BGH1058	08/25/23	08/25/23	Calculation
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**Specific Conductance by EPA Method 120.1, Saturated Paste Extraction**

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.158	0.0100	mmhos/cm	1	BGH1188	08/29/23	08/30/23	EPA 120.1	

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Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**SEP01-FL@2'**  
**2308546-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 11:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>pH</b>	<b>8.32</b>			pH Units	1	BGI0309	08/29/23	09/12/23	EPA 9045D	

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-01@4'**  
**2308546-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BGH1064	08/25/23	08/26/23	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	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.0063</b>	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4	0.0306	76.5 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0402	100 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0370	92.6 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BGH1067	08/25/23	08/26/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl	12.5	100 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-01@4'**  
**2308546-02 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	0.0159	0.00500	mg/kg	1	BGH1040	08/25/23	08/25/23	EPA 8270D SIM	
Anthracene	0.0362	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	0.0669	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	0.0343	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	0.0582	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	0.0232	0.00500	"	"	"	"	"	"	
Chrysene	0.0675	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	0.00629	0.00500	"	"	"	"	"	"	
Fluoranthene	0.153	0.00500	"	"	"	"	"	"	
Fluorene	0.0192	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	0.0286	0.00500	"	"	"	"	"	"	
Pyrene	0.113	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0259	77.6 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0191	57.3 %	40-150		"	"	"	"	

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

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	0.0490	0.0100	mg/L	1	BGH0971	08/24/23	08/25/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	6.70	0.200	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B	

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-01@4'**  
**2308546-02 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Barium	36.5	0.400	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B
Cadmium	ND	0.200	"	"	"	"	"	"
Copper	3.53	0.400	"	"	"	"	"	"
Lead	7.12	0.200	"	"	"	"	"	"
Nickel	4.64	0.400	"	"	"	"	"	"
Silver	0.0349	0.0200	"	"	"	"	"	"
Zinc	22.4	0.400	"	"	"	"	"	"
Selenium	ND	0.260	"	"	"	"	"	"

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGH1102	08/28/23	08/28/23	EPA 7196A	

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

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	16.5	0.0538	mg/L dry	1	BGH1166	08/29/23	08/30/23	EPA 6020B	
Magnesium	18.2	0.0538	"	"	"	"	"	"	
Sodium	22.0	0.0538	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.888	0.00100	units	1	BGH1268	08/31/23	08/31/23	Calculation	

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

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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09/20/23 16:43

**FL01-01@4'**  
**2308546-02 (Soil)**

**Summit Scientific**

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

% Solids	92.9	%	1	BGH1058	08/25/23	08/25/23	Calculation
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**Specific Conductance by EPA Method 120.1, Saturated Paste Extraction**

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.424	0.0100	mmhos/cm	1	BGH1188	08/29/23	08/30/23	EPA 120.1	

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**Reported:**  
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**FL01-01@4'**  
**2308546-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 10:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>pH</b>	<b>8.51</b>			pH Units	1	BGI0309	08/29/23	09/12/23	EPA 9045D	

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**Reported:**  
09/20/23 16:43

**FL01-02@4'**  
**2308546-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BGH1064	08/25/23	08/26/23	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: **08/22/23 10:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4	0.0321	80.3 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0403	101 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0389	97.2 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BGH1067	08/25/23	08/26/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl	13.4	107 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-02@4'**  
**2308546-03 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BGH1040	08/25/23	08/25/23	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: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0186	55.7 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0150	44.9 %	40-150		"	"	"	"	

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

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	0.0634	0.0100	mg/L	1	BGH0971	08/24/23	08/26/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-02@4'**  
**2308546-03 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Arsenic	7.17	0.200	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B
Barium	64.4	0.400	"	"	"	"	"	"
Cadmium	ND	0.200	"	"	"	"	"	"
Copper	5.33	0.400	"	"	"	"	"	"
Lead	8.04	0.200	"	"	"	"	"	"
Nickel	6.05	0.400	"	"	"	"	"	"
Silver	0.0458	0.0200	"	"	"	"	"	"
Zinc	26.9	0.400	"	"	"	"	"	"
Selenium	0.358	0.260	"	"	"	"	"	"

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGH1102	08/28/23	08/28/23	EPA 7196A	

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

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	464	0.0578	mg/L dry	1	BGH1166	08/29/23	08/30/23	EPA 6020B	
Magnesium	334	0.0578	"	"	"	"	"	"	
Sodium	284	0.0578	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	2.46	0.00100	units	1	BGH1268	08/31/23	08/31/23	Calculation	

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

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-02@4'**  
**2308546-03 (Soil)**

**Summit Scientific**

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

% Solids	86.5	%	1	BGH1058	08/25/23	08/25/23	Calculation
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**Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction**

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.94		pH Units	1	BGH1189	08/29/23	08/30/23	EPA 9045D	

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-02@4'**  
**2308546-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 10:45**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Specific Conductance (EC)	2.77	0.0100		mmhos/cm	1	BGI0424	09/14/23	09/14/23	EPA 120.1	

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-03@4'**  
**2308546-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BGH1064	08/25/23	08/26/23	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	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.012</b>	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4	0.0281	70.2 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0386	96.4 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0402	100 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
<b>C10-C28 (DRO)</b>	<b>66</b>	50	mg/kg	1	BGH1067	08/25/23	08/26/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl	13.6	109 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-03@4'**  
**2308546-04 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	0.204	0.00500	mg/kg	1	BGH1040	08/25/23	08/25/23	EPA 8270D SIM	E
Anthracene	0.410	0.00500	"	"	"	"	"	"	E
Benzo (a) anthracene	0.609	0.00500	"	"	"	"	"	"	E
Benzo (a) pyrene	0.508	0.00500	"	"	"	"	"	"	E
Benzo (b) fluoranthene	0.715	0.00500	"	"	"	"	"	"	E
Benzo (k) fluoranthene	0.285	0.00500	"	"	"	"	"	"	E
Chrysene	0.641	0.00500	"	"	"	"	"	"	E
Dibenz (a,h) anthracene	0.105	0.00500	"	"	"	"	"	"	E
Fluoranthene	1.46	0.00500	"	"	"	"	"	"	E
Fluorene	0.266	0.00500	"	"	"	"	"	"	E
Indeno (1,2,3-cd) pyrene	0.341	0.00500	"	"	"	"	"	"	E
Pyrene	1.02	0.00500	"	"	"	"	"	"	E
1-Methylnaphthalene	0.0243	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	0.0417	0.00500	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0151	45.2 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0181	54.2 %	40-150		"	"	"	"	

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	0.846	0.0100	mg/L	1	BGH0971	08/24/23	08/26/23	EPA 6020B	

**Total Metals by EPA 6020B**

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.81	0.200	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B	

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-03@4'**  
**2308546-04 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Barium	143	0.400	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B
Cadmium	ND	0.200	"	"	"	"	"	"
Copper	8.22	0.400	"	"	"	"	"	"
Lead	7.18	0.200	"	"	"	"	"	"
Nickel	6.82	0.400	"	"	"	"	"	"
Silver	0.0393	0.0200	"	"	"	"	"	"
Zinc	31.2	0.400	"	"	"	"	"	"
Selenium	0.777	0.260	"	"	"	"	"	"

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGH1102	08/28/23	08/28/23	EPA 7196A	

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	158	0.0565	mg/L dry	1	BGH1166	08/29/23	08/30/23	EPA 6020B	
Magnesium	156	0.0565	"	"	"	"	"	"	
Sodium	207	0.0565	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	2.80	0.00100	units	1	BGH1268	08/31/23	08/31/23	Calculation	

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	88.4		%	1	BGH1058	08/25/23	08/25/23	Calculation	

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Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FL01-03@4'**  
**2308546-04 (Soil)**

**Summit Scientific**

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

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Specific Conductance (EC)	3.60	0.0100		mmhos/cm	1	BGH1188	08/29/23	08/30/23	EPA 120.1	

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

Date Sampled: **08/22/23 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
pH	7.88			pH Units	1	BGH1189	08/29/23	08/30/23	EPA 9045D	

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Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FLR01@4'**  
**2308546-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BGH1064	08/25/23	08/26/23	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: **08/22/23 11:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4	0.0303	75.8 %	50-150		"	"	"	"	
Surrogate: Toluene-d8	0.0401	100 %	50-150		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	0.0371	92.7 %	50-150		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BGH1067	08/25/23	08/26/23	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl	12.5	99.7 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project Number: CO23-232  
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**Reported:**  
09/20/23 16:43

**FLR01@4'**  
**2308546-05 (Soil)**

### Summit Scientific

#### PAH by EPA Method 8270D SIM

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BGH1040	08/25/23	08/25/23	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: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10	0.0302	90.5 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10	0.0217	65.0 %	40-150		"	"	"	"	

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

Date Sampled: **08/22/23 11:15**


Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	ND	0.0100	mg/L	1	BGH0971	08/24/23	08/26/23	EPA 6020B	

#### Total Metals by EPA 6020B

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Project: Noble - Hansen O 1-23 Flowline

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Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**FLR01@4'**  
**2308546-05 (Soil)**

**Summit Scientific**

**Total Metals by EPA 6020B**

Arsenic	4.14	0.200	mg/kg dry	1	BGH0987	08/24/23	08/28/23	EPA 6020B
Barium	137	0.400	"	"	"	"	"	"
Cadmium	0.297	0.200	"	"	"	"	"	"
Copper	9.35	0.400	"	"	"	"	"	"
Lead	19.2	0.200	"	"	"	"	"	"
Nickel	9.22	0.400	"	"	"	"	"	"
Silver	0.0518	0.0200	"	"	"	"	"	"
Zinc	36.6	0.400	"	"	"	"	"	"
Selenium	0.390	0.260	"	"	"	"	"	"

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BGH1102	08/28/23	08/28/23	EPA 7196A	

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

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	102	0.0600	mg/L dry	1	BGH1166	08/29/23	08/30/23	EPA 6020B	
Magnesium	49.1	0.0600	"	"	"	"	"	"	
Sodium	17.5	0.0600	"	"	"	"	"	"	

**Calculated Analysis**

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.356	0.00100	units	1	BGH1268	08/31/23	08/31/23	Calculation	

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

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**Reported:**  
09/20/23 16:43

**FLR01@4'**  
**2308546-05 (Soil)**

**Summit Scientific**

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

% Solids	83.4	%	1	BGH1058	08/25/23	08/25/23	Calculation
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**Specific Conductance by EPA Method 120.1, Saturated Paste Extraction**

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	1.06	0.0100	mmhos/cm	1	BGH1188	08/29/23	08/30/23	EPA 120.1	

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

Date Sampled: **08/22/23 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.61		pH Units	1	BGH1189	08/29/23	08/30/23	EPA 9045D	

Summit Scientific

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Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

## 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 BGH1064 - EPA 5030 Soil MS

##### Blank (BGH1064-BLK1)

Prepared: 08/25/23 Analyzed: 08/26/23

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	"							
Surrogate: 1,2-Dichloroethane-d4	0.0307		"	0.0400		76.7	50-150			
Surrogate: Toluene-d8	0.0398		"	0.0400		99.6	50-150			
Surrogate: 4-Bromofluorobenzene	0.0364		"	0.0400		90.9	50-150			

##### LCS (BGH1064-BS1)

Prepared: 08/25/23 Analyzed: 08/26/23

Benzene	0.106	0.0020	mg/kg	0.100		106	70-130			
Toluene	0.105	0.0050	"	0.100		105	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	0.108	0.0050	"	0.100		108	70-130			
1,2,4-Trimethylbenzene	0.114	0.0050	"	0.100		114	70-130			
1,3,5-Trimethylbenzene	0.114	0.0050	"	0.100		114	70-130			
Naphthalene	0.0999	0.0038	"	0.100		99.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0230		"	0.0400		57.6	50-150			
Surrogate: Toluene-d8	0.0388		"	0.0400		96.9	50-150			
Surrogate: 4-Bromofluorobenzene	0.0371		"	0.0400		92.8	50-150			

##### Matrix Spike (BGH1064-MS1)

Source: 2308363-02

Prepared: 08/25/23 Analyzed: 08/26/23

Benzene	0.0854	0.0020	mg/kg	0.100	ND	85.4	70-130			
Toluene	0.0826	0.0050	"	0.100	ND	82.6	70-130			
Ethylbenzene	0.0867	0.0050	"	0.100	ND	86.7	70-130			
m,p-Xylene	0.165	0.010	"	0.200	ND	82.5	70-130			
o-Xylene	0.0796	0.0050	"	0.100	ND	79.6	70-130			
1,2,4-Trimethylbenzene	0.0830	0.0050	"	0.100	ND	83.0	70-130			
1,3,5-Trimethylbenzene	0.0823	0.0050	"	0.100	ND	82.3	70-130			
Naphthalene	0.0544	0.0038	"	0.100	ND	54.4	70-130			QM-07
Surrogate: 1,2-Dichloroethane-d4	0.0343		"	0.0400		85.7	50-150			
Surrogate: Toluene-d8	0.0403		"	0.0400		101	50-150			
Surrogate: 4-Bromofluorobenzene	0.0371		"	0.0400		92.8	50-150			

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1064 - EPA 5030 Soil MS**

Matrix Spike Dup (BGH1064-MSD1)		Source: 2308363-02			Prepared: 08/25/23 Analyzed: 08/26/23					
Benzene	0.0838	0.0020	mg/kg	0.100	ND	83.8	70-130	1.88	30	
Toluene	0.0845	0.0050	"	0.100	ND	84.5	70-130	2.23	30	
Ethylbenzene	0.0927	0.0050	"	0.100	ND	92.7	70-130	6.69	30	
m,p-Xylene	0.180	0.010	"	0.200	ND	90.2	70-130	8.93	30	
o-Xylene	0.0838	0.0050	"	0.100	ND	83.8	70-130	5.11	30	
1,2,4-Trimethylbenzene	0.0885	0.0050	"	0.100	ND	88.5	70-130	6.47	30	
1,3,5-Trimethylbenzene	0.0881	0.0050	"	0.100	ND	88.1	70-130	6.83	30	
Naphthalene	0.0555	0.0038	"	0.100	ND	55.5	70-130	1.97	30	QM-07
Surrogate: 1,2-Dichloroethane-d4		0.0303	"	0.0400		75.8	50-150			
Surrogate: Toluene-d8		0.0385	"	0.0400		96.2	50-150			
Surrogate: 4-Bromofluorobenzene		0.0384	"	0.0400		95.9	50-150			

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Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1067 - EPA 3550A**

**Blank (BGH1067-BLK1)**

Prepared & Analyzed: 08/25/23

C10-C28 (DRO)	ND	50	mg/kg							
C28-C36 (ORO)	ND	50	"							
Surrogate: o-Terphenyl	12.0		"	12.5		96.0	30-150			

**LCS (BGH1067-BS1)**

Prepared: 08/25/23 Analyzed: 08/26/23

C10-C28 (DRO)	512	50	mg/kg	500		102	70-130			
Surrogate: o-Terphenyl	11.9		"	12.5		95.2	30-150			

**Matrix Spike (BGH1067-MS1)**

Source: 2308363-02

Prepared: 08/25/23 Analyzed: 08/26/23

C10-C28 (DRO)	488	50	mg/kg	500	12.2	95.3	70-130			
Surrogate: o-Terphenyl	12.3		"	12.5		98.6	30-150			

**Matrix Spike Dup (BGH1067-MSD1)**

Source: 2308363-02

Prepared: 08/25/23 Analyzed: 08/26/23

C10-C28 (DRO)	527	50	mg/kg	500	12.2	103	70-130	7.53	20	
Surrogate: o-Terphenyl	13.0		"	12.5		104	30-150			

Summit Scientific

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

## 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 BGH1040 - EPA 5030 Soil MS

##### Blank (BGH1040-BLK1)

Prepared & Analyzed: 08/25/23

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	"							
Surrogate: 2-Methylnaphthalene-d10	0.0415		"	0.0333		125	40-150			
Surrogate: Fluoranthene-d10	0.0313		"	0.0333		93.9	40-150			

##### LCS (BGH1040-BS1)

Prepared & Analyzed: 08/25/23

Acenaphthene	0.0358	0.00500	mg/kg	0.0333		107	31-137			
Anthracene	0.0346	0.00500	"	0.0333		104	30-120			
Benzo (a) anthracene	0.0272	0.00500	"	0.0333		81.6	30-120			
Benzo (a) pyrene	0.0354	0.00500	"	0.0333		106	30-120			
Benzo (b) fluoranthene	0.0367	0.00500	"	0.0333		110	30-120			
Benzo (k) fluoranthene	0.0355	0.00500	"	0.0333		107	30-120			
Chrysene	0.0356	0.00500	"	0.0333		107	30-120			
Dibenz (a,h) anthracene	0.0325	0.00500	"	0.0333		97.6	30-120			
Fluoranthene	0.0333	0.00500	"	0.0333		99.9	30-120			
Fluorene	0.0363	0.00500	"	0.0333		109	30-120			
Indeno (1,2,3-cd) pyrene	0.0237	0.00500	"	0.0333		71.2	30-120			
Pyrene	0.0392	0.00500	"	0.0333		117	35-142			
1-Methylnaphthalene	0.0250	0.00500	"	0.0333		75.1	35-142			
2-Methylnaphthalene	0.0406	0.00500	"	0.0333		122	35-142			
Surrogate: 2-Methylnaphthalene-d10	0.0408		"	0.0333		123	40-150			
Surrogate: Fluoranthene-d10	0.0303		"	0.0333		90.8	40-150			

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

## 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 BGH1040 - EPA 5030 Soil MS

Matrix Spike (BGH1040-MS1)			Source: 2308521-01		Prepared & Analyzed: 08/25/23					
Acenaphthene	0.0153	0.00500	mg/kg	0.0333	ND	45.9	31-137			
Anthracene	0.0146	0.00500	"	0.0333	ND	43.7	30-120			
Benzo (a) anthracene	0.0163	0.00500	"	0.0333	ND	48.8	30-120			
Benzo (a) pyrene	0.0141	0.00500	"	0.0333	ND	42.2	30-120			
Benzo (b) fluoranthene	0.0153	0.00500	"	0.0333	ND	46.0	30-120			
Benzo (k) fluoranthene	0.0154	0.00500	"	0.0333	ND	46.1	30-120			
Chrysene	0.0163	0.00500	"	0.0333	ND	48.8	30-120			
Dibenz (a,h) anthracene	0.0136	0.00500	"	0.0333	ND	40.7	30-120			
Fluoranthene	0.0157	0.00500	"	0.0333	ND	47.1	30-120			
Fluorene	0.0159	0.00500	"	0.0333	0.0903	NR	30-120			QM-01
Indeno (1,2,3-cd) pyrene	0.0141	0.00500	"	0.0333	ND	42.2	30-120			
Pyrene	0.0167	0.00500	"	0.0333	0.00603	31.9	35-142			QM-01
1-Methylnaphthalene	0.0146	0.00500	"	0.0333	0.482	NR	15-130			QM-01
2-Methylnaphthalene	0.0171	0.00500	"	0.0333	0.772	NR	15-130			QM-01
Surrogate: 2-Methylnaphthalene-d10	0.0157		"	0.0333		47.1	40-150			
Surrogate: Fluoranthene-d10	0.0136		"	0.0333		40.7	40-150			

Matrix Spike Dup (BGH1040-MSD1)			Source: 2308521-01		Prepared & Analyzed: 08/25/23					
Acenaphthene	0.0139	0.00500	mg/kg	0.0333	ND	41.6	31-137	9.81	30	
Anthracene	0.0148	0.00500	"	0.0333	ND	44.3	30-120	1.20	30	
Benzo (a) anthracene	0.0149	0.00500	"	0.0333	ND	44.8	30-120	8.55	30	
Benzo (a) pyrene	0.0158	0.00500	"	0.0333	ND	47.5	30-120	11.9	30	
Benzo (b) fluoranthene	0.0155	0.00500	"	0.0333	ND	46.4	30-120	0.745	30	
Benzo (k) fluoranthene	0.0146	0.00500	"	0.0333	ND	43.9	30-120	4.86	30	
Chrysene	0.0155	0.00500	"	0.0333	ND	46.6	30-120	4.76	30	
Dibenz (a,h) anthracene	0.0138	0.00500	"	0.0333	ND	41.4	30-120	1.78	30	
Fluoranthene	0.0134	0.00500	"	0.0333	ND	40.3	30-120	15.5	30	
Fluorene	0.0148	0.00500	"	0.0333	0.0903	NR	30-120	7.00	30	QM-01
Indeno (1,2,3-cd) pyrene	0.0147	0.00500	"	0.0333	ND	44.1	30-120	4.50	30	
Pyrene	0.0146	0.00500	"	0.0333	0.00603	25.8	35-142	13.0	30	QM-01
1-Methylnaphthalene	0.0160	0.00500	"	0.0333	0.482	NR	15-130	9.29	50	QM-01
2-Methylnaphthalene	0.0158	0.00500	"	0.0333	0.772	NR	15-130	7.41	50	QM-01
Surrogate: 2-Methylnaphthalene-d10	0.0156		"	0.0333		46.8	40-150			
Surrogate: Fluoranthene-d10	0.0148		"	0.0333		44.5	40-150			

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH0971 - EPA 3050B**

**Blank (BGH0971-BLK1)**

Prepared: 08/24/23 Analyzed: 08/25/23

Boron ND 0.0100 mg/L

**LCS (BGH0971-BS1)**

Prepared: 08/24/23 Analyzed: 08/25/23

Boron 4.48 0.0100 mg/L 5.00 89.5 80-120

**Duplicate (BGH0971-DUP1)**

**Source: 2308537-01**

Prepared: 08/24/23 Analyzed: 08/25/23

Boron ND 0.0100 mg/L ND 20

**Matrix Spike (BGH0971-MS1)**

**Source: 2308537-01**

Prepared: 08/24/23 Analyzed: 08/25/23

Boron 4.40 0.0100 mg/L 5.00 ND 87.9 75-125

**Matrix Spike Dup (BGH0971-MSD1)**

**Source: 2308537-01**

Prepared: 08/24/23 Analyzed: 08/25/23

Boron 4.62 0.0100 mg/L 5.00 ND 92.3 75-125 4.92 25

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

### 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 BGH0987 - EPA 3050B

##### Blank (BGH0987-BLK1)

Prepared: 08/24/23 Analyzed: 08/28/23

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 (BGH0987-BS1)

Prepared: 08/24/23 Analyzed: 08/28/23

Arsenic	40.6	0.200	mg/kg wet	40.0	102	80-120
Barium	46.7	0.400	"	40.0	117	80-120
Cadmium	2.28	0.200	"	2.00	114	80-120
Copper	46.8	0.400	"	40.0	117	80-120
Lead	23.0	0.200	"	20.0	115	80-120
Nickel	44.7	0.400	"	40.0	112	80-120
Silver	2.25	0.0200	"	2.00	112	80-120
Zinc	45.2	0.400	"	40.0	113	80-120

##### Duplicate (BGH0987-DUP1)

Source: 2308501-01

Prepared: 08/24/23 Analyzed: 08/28/23

Arsenic	4.83	0.200	mg/kg dry	5.20	7.25	20
Barium	62.1	0.400	"	62.2	0.275	20
Cadmium	0.159	0.200	"	0.171	7.49	20
Copper	4.06	0.400	"	4.04	0.349	20
Lead	6.17	0.200	"	6.26	1.45	20
Nickel	4.78	0.400	"	4.92	2.82	20
Silver	0.0190	0.0200	"	0.0194	2.30	20
Zinc	22.4	0.400	"	22.7	1.61	20
Selenium	ND	0.260	"	ND		200

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

### 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 BGH0987 - EPA 3050B

##### Matrix Spike (BGH0987-MS1)

Source: 2308501-01

Prepared: 08/24/23 Analyzed: 08/28/23

Arsenic	59.1	0.200	mg/kg dry	44.1	5.20	122	75-125			
Barium	119	0.400	"	44.1	62.2	129	75-125			QM-07
Cadmium	2.78	0.200	"	2.21	0.171	118	75-125			
Copper	39.2	0.400	"	44.1	4.04	79.7	75-125			
Lead	32.1	0.200	"	22.1	6.26	117	75-125			
Nickel	39.7	0.400	"	44.1	4.92	78.8	75-125			
Silver	2.52	0.0200	"	2.21	0.0194	113	75-125			
Zinc	57.5	0.400	"	44.1	22.7	78.7	75-125			

##### Matrix Spike Dup (BGH0987-MSD1)

Source: 2308501-01

Prepared: 08/24/23 Analyzed: 08/28/23

Arsenic	58.9	0.200	mg/kg dry	44.1	5.20	122	75-125	0.382	25	
Barium	119	0.400	"	44.1	62.2	130	75-125	0.285	25	QM-07
Cadmium	2.76	0.200	"	2.21	0.171	117	75-125	0.653	25	
Copper	39.3	0.400	"	44.1	4.04	80.0	75-125	0.360	25	
Lead	32.5	0.200	"	22.1	6.26	119	75-125	1.17	25	
Nickel	39.8	0.400	"	44.1	4.92	79.1	75-125	0.334	25	
Silver	2.56	0.0200	"	2.21	0.0194	115	75-125	1.44	25	
Zinc	58.0	0.400	"	44.1	22.7	79.8	75-125	0.866	25	

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1102 - 3060A Mod**

**Blank (BGH1102-BLK1)**

Prepared & Analyzed: 08/28/23

Chromium, Hexavalent ND 0.30 mg/kg wet

**LCS (BGH1102-BS1)**

Prepared & Analyzed: 08/28/23

Chromium, Hexavalent 26.0 0.30 mg/kg wet 25.0 104 80-120

**Duplicate (BGH1102-DUP1)**

**Source: 2308546-01**

Prepared & Analyzed: 08/28/23

Chromium, Hexavalent ND 0.30 mg/kg dry ND 20

**Matrix Spike (BGH1102-MS1)**

**Source: 2308546-01**

Prepared & Analyzed: 08/28/23

Chromium, Hexavalent 27.9 0.30 mg/kg dry 27.8 ND 100 75-125

**Matrix Spike Dup (BGH1102-MSD1)**

**Source: 2308546-01**

Prepared & Analyzed: 08/28/23

Chromium, Hexavalent 27.8 0.30 mg/kg dry 27.8 ND 99.8 75-125 0.599 20

Summit Scientific

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1166 - General Preparation**

**Blank (BGH1166-BLK1)**

Prepared: 08/29/23 Analyzed: 08/30/23

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

**LCS (BGH1166-BS1)**

Prepared: 08/29/23 Analyzed: 08/30/23

Calcium	5.19	0.0500	mg/L wet	5.00	104	70-130
Magnesium	5.36	0.0500	"	5.00	107	70-130
Sodium	5.50	0.0500	"	5.00	110	70-130

Summit Scientific

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1058 - General Preparation**

**Duplicate (BGH1058-DUP1)**

**Source: 2308541-01**

**Prepared & Analyzed: 08/25/23**

% Solids	84.9	%	84.7	0.252	20
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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline  
Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

**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 BGH1188 - General Preparation**

**Blank (BGH1188-BLK1)**

Prepared: 08/29/23 Analyzed: 08/30/23

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (BGH1188-BS1)**

Prepared: 08/29/23 Analyzed: 08/30/23

Specific Conductance (EC) 0.155 0.0100 mmhos/cm 0.150 104 95-105

**Duplicate (BGH1188-DUP1)**

**Source: 2308546-01**

Prepared: 08/29/23 Analyzed: 08/30/23

Specific Conductance (EC) 0.158 0.0100 mmhos/cm 0.158 0.00 20

**Batch BGI0424 - General Preparation**

**Blank (BGI0424-BLK1)**

Prepared & Analyzed: 09/14/23

Specific Conductance (EC) ND 0.0100 mmhos/cm

**LCS (BGI0424-BS1)**

Prepared & Analyzed: 09/14/23

Specific Conductance (EC) 0.149 0.0100 mmhos/cm 0.150 99.6 95-105

**Duplicate (BGI0424-DUP1)**

**Source: 2308546-03**

Prepared & Analyzed: 09/14/23

Specific Conductance (EC) 2.80 0.0100 mmhos/cm 2.77 0.898 20

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.*



Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

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

**Summit Scientific**

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

**Batch BGH1189 - General Preparation**

**LCS (BGH1189-BS1)**

Prepared: 08/29/23 Analyzed: 08/30/23

pH	9.08		pH Units	9.18		98.9	95-105		
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**Duplicate (BGH1189-DUP1)**

**Source: 2308546-01**

Prepared: 08/29/23 Analyzed: 08/30/23

pH	8.57		pH Units	8.57				0.00	20
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**Batch BGI0309 - General Preparation**

**LCS (BGI0309-BS1)**

Prepared & Analyzed: 09/12/23

pH	9.25		pH Units	9.18		101	95-105		
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**Duplicate (BGI0309-DUP1)**

**Source: 2308174-05**

Prepared & Analyzed: 09/12/23

pH	8.84		pH Units	8.84				0.00	20
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Summit Scientific

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: Noble - Hansen O 1-23 Flowline

Project Number: CO23-232  
Project Manager: Paul Henchan

**Reported:**  
09/20/23 16:43

### Notes and Definitions

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.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.
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