



Facility Closure Investigation and Environmental Summary

Barton C 15-29 Wellhead

ECMC Remediation Project #32014

Weld County, Colorado

Attachments:

Figure 1 – General Location Map

Figure 2 – Wellhead Soil Sample and Field Screening Locations

Table 1 – Soil Sample and Field Screening Location Information

Table 2 – Soil Analytical Results Summary Table – Volatile Organics

Table 3 – Soil Analytical Results Summary Table – PAHs

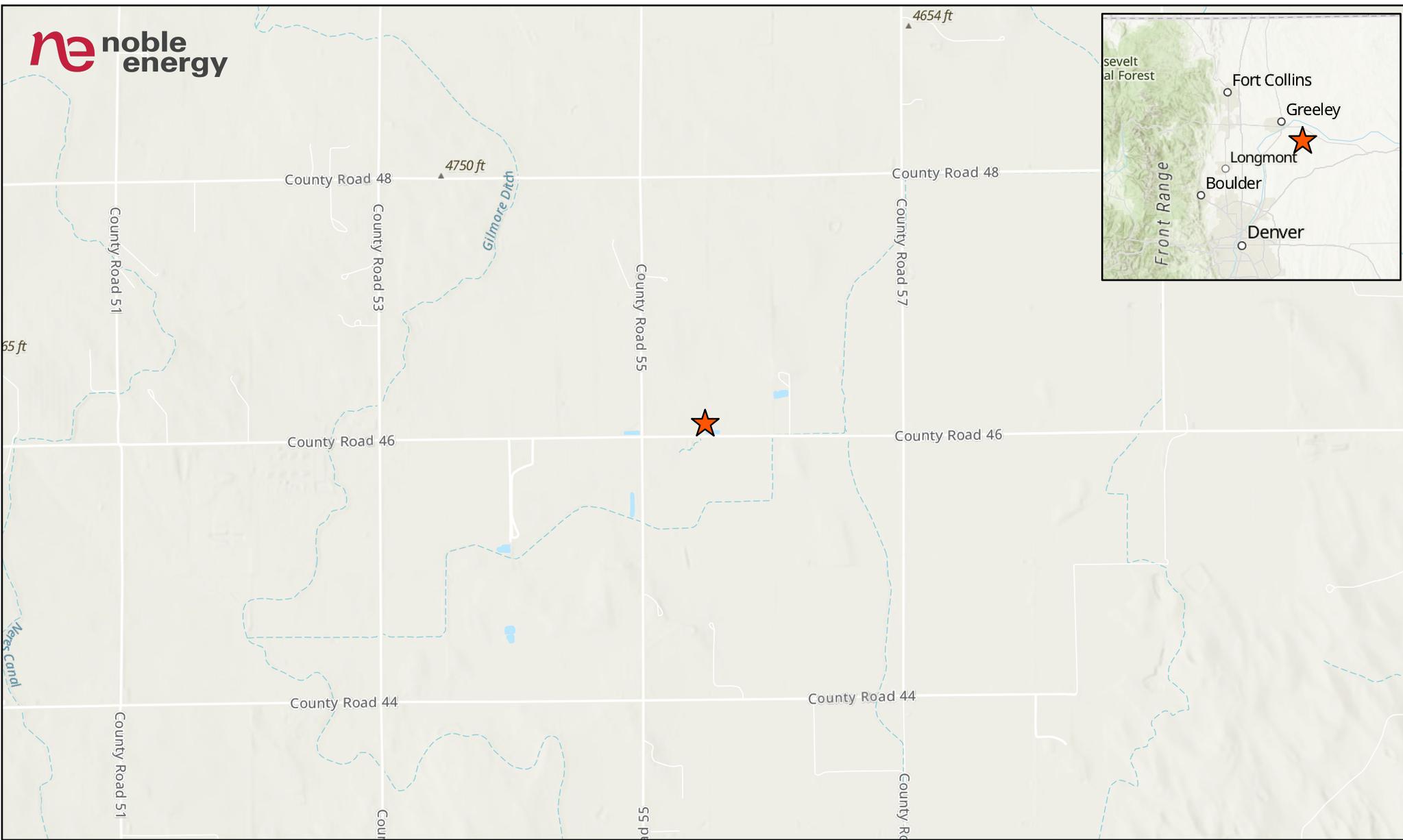
Table 4 – Soil Analytical Results Summary Table – Soil Suitability

Table 5 – Soil Analytical Results Summary Table – Metals

Attachment A: Photographic Log

Attachment B: Facility Closure Checklists

FIGURES



LEGEND

★ Site Location

0 0.5 1 Miles

1 inch = 0.5 Mile

Project No:	024-049
Map By:	JW
Date:	06/04/2024

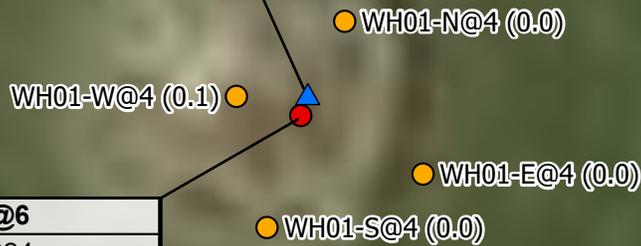
**BARTON C15-29 WELLHEAD
GENERAL LOCATION MAP**
NOBLE ENERGY
SW 1/4 SW 1/4 SECTION 10
T4N R64W, 6TH PM
WELD COUNTY, COLORADO

1843 Sunlight Dr.
Longmont, CO 80504
303.378.4036

Figure
1

GW01	
3/19/2024	
TDS (mg/L):	2,890
Chloride (mg/L):	516
Sulfate (mg/L):	1,100

WH01@6	
3/19/2024	
Arsenic (mg/kg):	3.35
Barium (mg/kg):	125
Selenium (mg/kg):	0.435

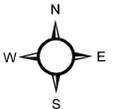
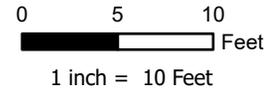


LABEL LEGEND	
XXXX@X: SAMPLE NAME @ DEPTH IN FEET	
WH: WELLHEAD SAMPLE	
TDS: TOTAL DISSOLVED SOLIDS	
RED : ABOVE ECMC TABLE 915-1 GWSSL	

Legend

- Soil Sample
- ▲ Groundwater Sample
- Screening Location

NOTES:
 - Sample Label (PID Result in ppm)
 - ppm = parts per million
 - PID = photoionization detector



Project No: 024-049
Map By: JW
Date: 06/18/2024

**BARTON C15-29 WELLHEAD
 SOIL SAMPLE AND FIELD SCREENING LOCATIONS**
 NOBLE ENERGY
 SW 1/4 SW 1/4 SECTION 10
 T4N R64W, 6TH PM
 WELD COUNTY, COLORADO



1843 Sunlight Drive
 Longmont, CO 80504
 303.378.4036

Figure
 2

TABLES

TABLE 1
FIELD DATA SUMMARY TABLE
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	GPS Data Latitude/Longitude		VOC Concentration (ppm)
WH01@6	3/19/2024	6	40.320467	-104.541506	0.0
WH01-N@4	3/19/2024	4	40.320480	-104.541497	0.0
WH01-S@4	3/19/2024	4	40.320451	-104.541512	0.0
WH01-E@4	3/19/2024	4	40.320458	-104.541483	0.0
WH01-W@4	3/19/2024	4	40.320470	-104.541518	0.1
GW01	3/19/2024	~5	40.320470	-104.541504	NM

1. Global Positioning System (GPS) data is provided in decimal degrees using North American Datum (NAD) 83 UTMZone 13 North.

2. Volatile organic compound (VOC) concentrations are measured in the field using a photoionization detector (PID).

ppm - Parts per million

ft-bgs - feet below ground surface

NM - Not measured

TABLE 2
SUMMARY OF VOLATILE ORGANIC SOIL CHEMISTRY DATA
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	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 (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	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	500**		
WH01@6	3/19/2024	6	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.002	<125.200	<0.200	<25.0	<100

1. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit

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

ft-bgs - feet below ground surface

mg/kg - milligrams per kilogram

TABLE 3
SUMMARY OF POLYCYCLIC AROMATIC HYDROCARBON SOIL CHEMISTRY DATA
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	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
WH01@6	3/19/2024	6	<0.020	<0.020	<0.005	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.002	<0.002

1. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit

ft-bgs - feet below ground surface

mg/kg - milligrams per kilogram

TABLE 4
SUMMARY OF SOIL SUITABILITY FOR RECLAMATION
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	pH (Standard Units)	EC (mmhos/cm)	SAR (Standard Units)	Boron (mg/L)
ECMC Table 915-1 Soil Suitability Limits			6 - 8.3	<4	<6	2
WH01@6	3/19/2024	6	8.16	1.01	2.99	1.14

ft-bgs - feet below ground surface

EC - Electrical Conductivity

SAR - Sodium adsorption ratio

mmhos/cm - millimhos per centimeter

mg/L - milligrams per liter

TABLE 5
SUMMARY OF METALS IN SOIL CHEMISTRY DATA
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	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
WH01@6	3/19/2024	6	3.35	125	0.247	<0.118*	<9.53	10.9	7.64	0.435	<0.0953	42.4

1. **RED** - Above ECMC Table 915-1 Standards
 2. Red & blue highlighted soil analytical values indicate an exceedance of the referenced soil screening level (SSL)
 3. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit
- * Indicates laboratory minimum detection limit in excess of SSL
- ft-bgs - feet below ground surface
mg/kg - milligrams per kilogram

TABLE 6
SUMMARY OF ORGANIC GROUNDWATER CHEMISTRY DATA
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Xylenes (µg/L)	Naphthalene (µg/L)	1,2,4-Trimethyl-Benzene (µg/L)	1,3,5-Trimethyl-Benzene (µg/L)
ECMC Table 915-1 Limits			5.0	560	700	1400	140	67	67
GW01	3/19/2024	~5	<1.00	<1.00	1.06	<1.00	<2.00	2.61	<2.00

1. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit
 ft-bgs - feet below ground surface
 µg/L - micrograms per liter

TABLE 7
SUMMARY OF INORGANIC GROUNDWATER CHEMISTRY DATA
NOBLE 100322
BARTON C15-29 WELLHEAD, WELD COUNTY, COLORADO
REM # 32014

Sample ID	Sample Date	Depth (ft-bgs)	Total Dissolved Solids (mg/L)	Chloride Ion (mg/L)	Sulfate Ion (mg/L)	Alkalinity, Total (mg/L)	Bicarbonate Alkalinity (mg/L)	Carbonate Alkalinity (mg/L)	Potassium (mg/L)	Sodium (mg/L)
ECMC Table 915-1 Limits			<1.25 x local background	250 or <1.25 x local background	250 or <1.25 x local background					
GW01	3/19/2024	~5	2890	516	1100	736	736	<0.725	91.4	553

1. **RED** - Above ECMC Table 915-1 Standards
 2. Blue highlighted soil analytical values indicate an exceedance of the referenced soil screening level (SSL)
 3. Grey highlighted soil analytical values indicate result is less than laboratory reporting limit
- ft-bgs - feet below ground surface
mg/L - milligrams per liter

**ATTACHMENT A
PHOTOGRAPHIC LOG**

Barton C15-29 Wellhead Photographic Log



Barton C15-29 Wellhead Photographic Log



Barton C15-29 Wellhead Photographic Log



**ATTACHMENT B
FACILITY CLOSURE CHECKLISTS**

Wellhead Closure Checklist

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

Additional attachments (optional):		Pit Closure		Tank Battery Closure		Flowline Closure		Partially Buried Vault Closure	
Site Name & COGCC Facility Number: Barton C15-29, 413228		Date: 03/19/2024				Remediation Project #: 32014			
Associated Wells: NA		Age of Site: 01/20/2010 - Spud Date				Number of Photos Attached: 3			
Location: (GPS coordinates of wellhead or southeastern most wellhead for multiple) 40.320466 / -104.541502						Estimated Facility Size (acres): ~0.02			
General Condition of Site: (General observations regarding housekeeping, corrosion, waste management, etc.) Overall good									
USCS Soil Type: Clayey Sand (SC)				Estimated Depth to Groundwater: ~5 ft below ground surface					
Hydrocarbon Impacted Soils / Spills: (Note estimated size and if impact appears to be surficial or extends to an unknown depth) None observed or encountered									
Salt Crusted Soils or Impacted Vegetation: (Note estimated size and if impact appears to be surficial or extends to an unknown depth) None observed or encountered									
Wellhead(s)									
Well API	05-123-30614								
Age	01/20/2010 - Spud Date								
Condition of surface around wellhead	Good								
PID Readings	0.1 ppm								
Condition of subsurface (staining present)	Good								
PID Readings	0.1 ppm								
Sample taken? Location/Sample ID#	WH01@6, GW01								
Photo Number(s)	1-3								
Other observations regarding wellheads:									
Summary									
Was impacted soil identified? <input checked="" type="checkbox"/> No 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: 0.1 ppm				Total number of samples submitted to lab for analysis: 1					
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? No <input checked="" type="checkbox"/> Yes - not impacted or in contact with impacted soils Yes - groundwater impacted and/or in contact with impacted soils									
Measured depth to groundwater: ~5 ft below ground surface				Was remedial groundwater removal conducted? Yes <input checked="" type="checkbox"/> No					
Date Groundwater was encountered: 03/19/2024				Commencement date of removal:					
Sheen on groundwater? Yes <input checked="" type="checkbox"/> No				Volume of groundwater removed prior to sampling:					
Free product observed? Yes <input checked="" type="checkbox"/> No				Volume of groundwater removed post sampling:					
Total number of samples collected: 1				Total Volume of groundwater removed:					
Total number of samples submitted to lab for analysis: 1									