

State of Colorado  
Energy & Carbon Management Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
Phone: (303) 894-2100 Fax: (303) 894-2109



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Report taken by:

Site Investigation and Remediation Workplan (Supplemental Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by ECMC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27.

This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: NOBLE ENERGY INC	Operator No: 100322	<b>Phone Numbers</b>
Address: 1099 18TH STREET SUITE 1500		Phone: (715) 562-0251
City: DENVER State: CO Zip: 80202		Mobile: ( )
Contact Person: Dan Peterson	Email: rbueuf27@chevron.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 24052 Initial Form 27 Document #: 403104005

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: \_\_\_\_\_

SITE INFORMATION

Yes Multiple Facilities

Facility Type: LOCATION	Facility ID: 332337	API #: _____	County Name: WELD
Facility Name: HIGHLAND-64N64W 20NWSW	Latitude: 40.295853	Longitude: -104.582261	
** correct Lat/Long if needed: Latitude: 40.296514		Longitude: -104.577168	
QtrQtr: NWSW	Sec: 20	Twp: 4N	Range: 64W Meridian: 6 Sensitive Area? Yes
Facility Type: SPILL OR RELEASE	Facility ID: 483859	API #: _____	County Name: WELD
Facility Name: Highland 12-20 Tank Battery	Latitude: 40.296323	Longitude: -104.577165	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NWSW	Sec: 20	Twp: 4N	Range: 64W Meridian: 6 Sensitive Area? Yes

## **SITE CONDITIONS**

General soil type - USCS Classifications SW \_\_\_\_\_

Most Sensitive Adjacent Land Use Crop Land \_\_\_\_\_

Is domestic water well within 1/4 mile? Yes \_\_\_\_\_

Is surface water within 1/4 mile? Yes \_\_\_\_\_

Is groundwater less than 20 feet below ground surface? No \_\_\_\_\_

### **Other Potential Receptors within 1/4 mile**

Riverine 0.02mi S, 0.11/0.19mi W, 0.02mi E, 0.08mi NE  
Freshwater Pond 0.03mi E  
Structures 0.18/0.2mi NE

# SITE INVESTIGATION PLAN

## **TYPE OF WASTE:**

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste      | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             | _____                                  |
| <input checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" type="checkbox"/> Condensate     | <input type="checkbox"/> Pigging Waste               |  |
| <input type="checkbox"/> Drilling Fluids           | <input type="checkbox"/> Rig Wash                    |  |
| <input type="checkbox"/> Drill Cuttings            | <input type="checkbox"/> Spent Filters               |  |
|  | <input type="checkbox"/> Pit Bottoms                 |  |
|  | <input type="checkbox"/> Other (as described by EPA) | _____                                  |

## **DESCRIPTION OF IMPACT**

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	Refer to Tables and Figures	Laboratory Analysis
Yes	SOILS	Refer to Tables and Figures	Laboratory Analysis and Field Screening

## **INITIAL ACTION SUMMARY**

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

A site investigation was conducted pursuant to ECMC Rule 911 at the HIGHLAND T4N-R64W-S20 L01 Tank Battery location.

## **PROPOSED SAMPLING PLAN**

### **Proposed Soil Sampling**

Will soil samples be collected as part of this investigation? ( Number, type (grab/composite), analyses, and locations of samples ):

Eight grab confirmation soil samples were collected from the produced water vessel excavation, beneath the above-ground oil tank, and at the separator. Soil samples were analyzed by a certified laboratory for TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons), organic compounds in soil per ECMC Table 915-1, and EC, SAR, pH, and boron. Additionally, one soil sample was analyzed for ECMC Table 915-1 metals. All samples collected were analyzed by a certified laboratory using approved ECMC laboratory analysis methods.

### **Proposed Groundwater Sampling**

Will groundwater samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

Groundwater samples were collected as part of the site investigation and analyzed for organic and inorganic compounds in groundwater per ECMC Table 915-1. Groundwater monitoring will be continued on a quarterly basis. Point of compliance has been achieved at the location.

### **Proposed Surface Water Sampling**

Will surface water samples be collected as part of this investigation? ( Number, analyses, and locations of samples ):

## **Additional Investigative Actions**

Additional alternative investigative actions described in attached Site Investigation Plan ( summary ):

Visual inspection at the tank battery area occurred during abandonment activities. Field personnel field screened all disturbed areas using visual and olfactory senses to determine if laboratory confirmation sampling was required. A detailed summary of decommissioning activities, including field notes, site photos, figures, and laboratory analytical results was submitted on the Subsequent Form 27.

Site Assessment activities have been conducted to delineate impacted media at the facility, as described herein. Seven soil borings (BH01 - BH07) have been advanced in the area of impacts. Soil borings BH01 - BH07 were converted to temporary groundwater monitoring wells, and groundwater samples were collected. Groundwater monitoring at the 7 temporary monitoring wells will be continued on a quarterly basis.

# SITE INVESTIGATION REPORT

## **SAMPLE SUMMARY**

**Soil**

Number of soil samples collected 46  
Number of soil samples exceeding 915-1 36  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 600

**NA / ND**

-- Highest concentration of TPH (mg/kg) 35  
-- Highest concentration of SAR 7.48  
BTEX > 915-1 No  
Vertical Extent > 915-1 (in feet) 9

**Groundwater**

Number of groundwater samples collected 30  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 7  
Number of groundwater monitoring wells installed 7  
Number of groundwater samples exceeding 915-1 3

ND Highest concentration of Benzene (µg/l) \_\_\_\_\_  
ND Highest concentration of Toluene (µg/l) \_\_\_\_\_  
ND Highest concentration of Ethylbenzene (µg/l) \_\_\_\_\_  
ND Highest concentration of Xylene (µg/l) \_\_\_\_\_  
NA Highest concentration of Methane (mg/l) \_\_\_\_\_

**Surface Water**

0 Number of surface water samples collected  
         Number of surface water samples exceeding 915-1  
If surface water is impacted, other agency notification may be required.

**OTHER INVESTIGATION INFORMATION**

Were impacts to adjacent property or offsite impacts identified?

Empty text box for response to adjacent property impacts.

Were background samples collected as part of this site investigation?

A total of two background samples were collected on 2/2/2023 from one discrete location and analyzed for pH, SAR, EC, and Boron. A total of ten background samples were collected on 5/1/2023 from five discrete locations and analyzed for arsenic, barium, pH, and SAR. A detailed discussion of background sampling results is provided in the Operator Comments section.

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) \_\_\_\_\_ Volume of liquid waste (barrels) \_\_\_\_\_

Is further site investigation required?

A supplemental site investigation (SSI) will be completed to vertically and horizontally delineate the elevated pH results observed at sample locations SEP01-FL@3.5' and SEP01-DL@3.5' during facility decommissioning, and at sample locations BH02@8-9', BH02@17-18', and BH03@8-9' during the 5/1/2023 site assessment activities. A proposed SSI map is attached to this Form 27. Based on the pH exceedances identified during previous site assessment activities, Noble proposes to limit future SSI soil sampling to pH only. Concurrently with the SSI, additional background soil samples will be collected to determine if elevated pH results are attributed to native soil conditions at the site. The SSI will be completed in accordance with the proposed implementation schedule, and the results of the SSI will be submitted on a subsequent Form 27.

**REMEDIAL ACTION PLAN**

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? No

**SOURCE REMOVAL SUMMARY**

Describe how source is to be removed.

A Site Assessment was conducted on 5/1/2023 and 11/13/2023 to delineate impacted media. Seven soil borings were advanced in the area of impacts. BH01 was advanced between waste characterization samples AST01@0.5' and FS01@5.5' to vertically delineate impacts at those locations. BH02 - BH07 were advanced surrounding BH01 to vertically and laterally delineate impacts identified at AST01@0.5' and FS01@5.5'. Soil samples were collected and analyzed for TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons), organic compounds in soil, arsenic, barium, EC, SAR, pH, and boron. Each of the seven soil borings were converted to temporary groundwater monitoring wells. Seven groundwater samples were collected and analyzed for BTEX, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benz(a)anthracene, 1-methylnaphthalene, 2-methylnaphthalene and inorganic parameters in groundwater per Table 915-1. The results of the 5/1/2023 and 11/13/2023 site assessment are attached to this Form 27, and discussed in the Operator Comments section.

**REMEDIATION SUMMARY**

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

Groundwater was not encountered during decommissioning activities. Groundwater was encountered during subsequent site assessment soil boring activities, and temporary monitoring wells were installed for quarterly groundwater monitoring, as described herein. Quarterly groundwater monitoring will be continued until four consecutive quarters of compliant groundwater results have been achieved.

A supplemental site investigation (SSI) will be completed to vertically and horizontally delineate the elevated pH results observed at sample locations SEP01-FL@3.5' and SEP01-DL@3.5' during facility decommissioning, and at sample locations BH02@8-9', BH02@17-18', and BH03@8-9' during the 5/1/2023 site assessment activities, in accordance with the attached proposed site investigation map, and proposed sampling plan outlined in the Site Investigation Report.

Following the additional SSI soil sampling activities outlined in the Site Investigation Report section, the generation of a detailed reclamation plan, and the completion of quarterly groundwater monitoring, Noble will request a No Further Action (NFA) designation for the site.

### **Soil Remediation Summary**

**In Situ**

**Ex Situ**

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Excavate and offsite disposal

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Name of Licensed Disposal Facility or ECMC Facility ID # \_\_\_\_\_

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Excavate and onsite remediation

\_\_\_\_\_ Other \_\_\_\_\_

\_\_\_\_\_ Land Treatment

\_\_\_\_\_ Bioremediation (or enhanced bioremediation)

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Other \_\_\_\_\_

### **Groundwater Remediation Summary**

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Other \_\_\_\_\_

### **GROUNDWATER MONITORING**

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

A total of eight (8) temporary groundwater monitoring wells (BH01 - BH07, BH02R) were installed to delineate dissolved phase impacts. The existing wells will continue to be sampled on a quarterly basis and analyzed for BTEX, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzo(a)anthracene, 1-methylnaphthalene, 2-methylnaphthalene, inorganic parameters per ECMC Table 915-1, until four consecutive quarters of compliant groundwater results have been achieved. In addition, dissolved barium (Ba) was added to the quarterly groundwater sampling plan beginning in the first quarter 2024, in order to demonstrate that the elevated barium concentrations above the ECMC Table 915-1 Protection of Groundwater Soil Screening Levels (GSSL) are not affecting the barium concentrations in groundwater at the site, and to therefore use the ECMC Table 915-1 Residential Soil Screening Levels (RSSLs) when evaluating barium concentrations in soil, which would eliminate barium as a contaminant of concern.

Groundwater analytical results from the second quarter 2024 monitoring event indicated that constituent concentrations in all 7 site monitoring wells were in compliance with the applicable regulatory standards (or within 1.25x site-specific background concentrations for BH05 and BH07). Quarterly groundwater monitoring will be continued until four consecutive quarters of compliant results have been achieved.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

### Approved Reporting Schedule:

Quarterly    Semi-Annually    Annually    Other

### Request Alternative Reporting Schedule:

Semi-Annually    Annually    Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

Report Type:    Groundwater Monitoring    Land Treatment Progress Report    O&M Report  
 Other Site Investigation Sample Summary & Proposed SSI

## Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).  
If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Noble intends to directly address the costs of remediation at the locations as part of our asset retirement obligation process and operations. Noble has general liability insurance (policy MWZZ 316714) and financial assurance in compliance with ECMC rules. Records are available on the ECMC's website. The cost for remediation is an estimate only, costs may change upwards or downward based on site-specific information. Noble makes no representation or guarantees as to the accuracy of the estimate.

Operator anticipates the remaining cost for this project to be: \$ 50000

## WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? No

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_

E&P waste (solid) description \_\_\_\_\_

ECMC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-ECMC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_

E&P waste (liquid) description \_\_\_\_\_

ECMC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-ECMC Disposal Facility: \_\_\_\_\_

# REMEDIATION COMPLETION REPORT

## REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No

If YES:

- Compliant with Rule 913.h.(1).
- Compliant with Rule 913.h.(2).
- Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? \_\_\_\_\_

Does Groundwater meet Table 915-1 standards? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

Operator shall comply with the ECMC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

## RECLAMATION PLAN

### RECLAMATION PLANNING

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeded program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

Reclamation will be in accordance with ECMC 1000 Series Rules.

Is the described reclamation complete? Yes \_\_\_\_\_

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim  Final

Did the Surface Owner provide the seed mix? \_\_\_\_\_

If YES, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

Did the local soil conservation district provide the seed mix? \_\_\_\_\_

### SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 02/02/2023

Proposed date of completion of Reclamation. 07/11/2025

## IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

### PRIOR DATES

Date of Surface Owner notification/consultation, if required. 06/16/2022

Actual Spill or Release date, or date of discovery. 02/10/2023

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 02/02/2023

Proposed site investigation commencement. 05/01/2023

Proposed completion of site investigation. 12/31/2024

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 12/05/2023

Proposed date of completion of Remediation. 06/30/2025

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

The implementation schedule has been changed due to the necessity for additional supplemental site investigation activities to delineate pH. The proposed site investigation will be completed following the approval of this form, landowner negotiations, and crew availability. Based on the need for four consecutive quarters of compliant groundwater sampling, the date of proposed completion remediation has been updated to the end of the second quarter 2025.

## OPERATOR COMMENT

This Form 27 is being re-submitted to include the results of the 5/1/2023 and 11/13/2023 soil boring site investigation data to delineate impacted media at the former HIGHLAND T4N-R64W-S20 L01 Tank Battery location. This Form 27 also includes the results of the quarterly groundwater monitoring activities conducted during the 2Q2023 through 2Q2024.

The purpose of the February 2024 soil boring site assessment activities was to delineate impacted media identified during facility decommissioning activities, and to collect additional background samples for arsenic, barium, pH, and SAR. Ten background soil samples were collected from 5 discrete locations (BG01 - BG05) near the former production facility location at comparable depths and soil composition to the investigation sample locations. The maximum background values of pH, SAR, arsenic, and barium (x1.25 for metals) were compared to the soil boring and decommissioning values of pH, SAR, arsenic, and barium. The maximum background level for pH was 8.39; the maximum background level for SAR was 8.64; the maximum background concentration for arsenic x1.25 was 8.26; the maximum background concentration for barium x1.25 was 166.25. The arsenic and SAR results for all of the investigation soil samples were within the maximum background levels, and are therefore within Table 915-1 standards and indicative of native soil conditions. Based on a comparison to the background results x1.25, the barium concentrations in soil samples BH02@8-9', BH04@0.5', and BH05@8-9' are above ECMC Table 915-1 soil standards. As such, dissolved barium (Ba) was added to the quarterly groundwater sampling plan beginning in the first quarter 2024, in order to demonstrate that the elevated barium concentrations above the ECMC Table 915-1 Protection of Groundwater Soil Screening Levels (GSSL) are not affecting the barium concentrations in groundwater at the site, and to therefore use the ECMC Table 915-1 Residential Soil Screening Levels (RSSLs) when evaluating barium concentrations in soil, which would eliminate barium as a contaminant of concern. Based on a comparison to the background levels, the pH results for soil samples SEP01-FL@3.5', SEP01-DL@3.5', BH02@8-9', BH02@17-18', and BH03@8-9' are above ECMC Table 915-1 soil standards, and additional site investigation soil boring activities will be conducted to vertically and horizontally delineate the the elevated pH results, in accordance with the attached proposed site investigation map. Based on the pH exceedances identified during previous site assessment activities, Noble proposes to limit future SSI soil sampling to pH only. Concurrently with the SSI, additional background soil samples will be collected to determine if elevated pH results are attributed to native soil conditions at the site. Following the delineation of pH, a detailed reclamation plan will be generated.

While one EC exceedance was observed in BH07 at 0.5 ft bgs, this exceedance was observed roughly at the surface, and not immediately adjacent to any oil and gas infrastructure. The closest decommissioning soil sample to BH07@0.5' is AST01@0.5', which did not demonstrate an EC exceedance and is also located down gradient from BH07. Since BH07 is upgradient from any former oil and gas infrastructure at the location, and since EC is only elevated in one soil sample collected at the site (BH07@0.5'), this EC exceedance is attributed to background conditions and is not related to the former production facility operations. As such, EC should not be considered a contaminant of concern.

Groundwater analytical results from the second quarter 2024 monitoring event indicated that constituent concentrations in all 7 site monitoring wells were in compliance with the applicable regulatory standards (or within 1.25x site-specific background concentrations for BH05 and BH07). Quarterly groundwater monitoring will be continued until four consecutive quarters of compliant results have been achieved.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Allan Engelhardt

Title: Environmental Consultant

Submit Date: 02/09/2024

Email: chevroneform@tasman-geo.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 24052

### COA Type

### Description

COA Type	Description
0 COA	

### ATTACHMENT LIST

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

#### Att Doc Num

#### Name

403851843	MONITORING REPORT
403851847	MONITORING REPORT
403851879	MONITORING REPORT
403852094	SITE INVESTIGATION REPORT
403855876	MONITORING REPORT

Total Attach: 5 Files

### General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)