

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
401500661

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

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 COGCC 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.

Refer to Rules 340, 905, 906, 907, 908, 909, and 910

OPERATOR INFORMATION

|                                    |                                  |                      |
|------------------------------------|----------------------------------|----------------------|
| Name of Operator: NOBLE ENERGY INC | Operator No: 100322              | <b>Phone Numbers</b> |
| Address: 1001 NOBLE ENERGY WAY     |                                  | Phone: (970) 3045329 |
| City: HOUSTON State: TX Zip: 77070 |                                  | Mobile: ( )          |
| Contact Person: Jacob Evans        | Email: jacob.evans@nblenergy.com |                      |

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**

Remediation Project #: 10185 Initial Form 27 Document #: 401284817

**PURPOSE INFORMATION**

|  |  |
|--|--|
| <input checked="" type="checkbox"/> 901.e. Sensitive Area Determination                            | <input checked="" type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water        |
| <input type="checkbox"/> 909.c.(1), Rule 905: Pit or PW vessel closure                             | <input type="checkbox"/> Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b. |
| <input checked="" type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation                 | <input type="checkbox"/> Rule 909.e.(2)B.: Closure of remediation project                                  |
| <input type="checkbox"/> 909.c.(3), Rule 907.e.: Land treatment of oily waste                      | <input type="checkbox"/> Rule 906.c.: Director request   |
| <input type="checkbox"/> 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure | <input type="checkbox"/> Other _____   |

**SITE INFORMATION**      N Multiple Facilities ( in accordance with Rule 909.c. )

|  |                     |                        |  |
|--|---------------------|------------------------|--|
| Facility Type: SPILL OR RELEASE                | Facility ID: 449192 | API #: _____           | County Name: WELD                          |
| Facility Name: Wardlaw 20-28                   | Latitude: 40.452377 | Longitude: -104.550395 |  |
| ** correct Lat/Long if needed: Latitude: _____ |                     | Longitude: _____       |  |
| QtrQtr: SESE                                   | Sec: 28             | Twp: 6N                | Range: 64W Meridian: 6 Sensitive Area? Yes |

**SITE CONDITIONS**

General soil type - USCS Classifications CL      Most Sensitive Adjacent Land Use Surface Water-Owl Creek

Is domestic water well within 1/4 mile? No      Is surface water within 1/4 mile? Yes

Is groundwater less than 20 feet below ground surface? Yes

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

Owl Creek 6' east

# 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 type="checkbox"/> Produced Water        | <input type="checkbox"/> Workover Fluids             |  |
| <input 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    | 42' X 35'           | Laboratory Analytical Results |
| Yes       | SOILS          | 135' X 51' X 5' bgs | Laboratory Analytical Results |
| Yes       | SURFACE WATER  | 10' X 660'          | Laboratory Analytical Results |

## INITIAL ACTION SUMMARY

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

On Thursday February 9th, 2017, Noble Energy was notified of an unintentional release attributed to the Wardlaw 20-28 flowline. Visual observations confirmed an unintentional release occurred along a section of the flowline. Initial response activities indicated 10 bbls of condensate was released to the ground surface from the flowline. During the unintentional release, condensate flowed over the bank and into Owl Creek, which was partially frozen at the time. Noble immediately deployed absorbent booms and pads, and a hydro-excavator to gather and recover fluid from the adjacent creek. See COGCC Document Number 401208075.

## 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 ):

A total of forty (40) grab soil samples were collected at the Site as part of the site investigation and excavation activities. The soil samples were submitted to a certified laboratory and analyzed for BTEX, Naphthalene, TPH-DRO, and TPH-GRO following EPA Methods 8260c and 8015.

### Proposed Groundwater Sampling

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

One (1) grab groundwater sampled was collected from the base of the excavation and seventeen (17) monitoring wells were installed and sampled. All groundwater samples were analyzed for BTEX using EPA Method 8260c.

### Proposed Surface Water Sampling

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

A total of thirty seven (37) surface water samples were collected from nine (9) locations within Owl Creek to monitor the extent and attenuation of dissolved BTEX impacts within the creek. All samples collected were analyzed for BTEX by a certified laboratory using EPA Method 8260c.

## Additional Investigative Actions

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

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 40  
Number of soil samples exceeding 910-1 7  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 6885

### NA / ND

-- Highest concentration of TPH (mg/kg) 12810  
NA Highest concentration of SAR           
BTEX > 910-1 Yes  
Vertical Extent > 910-1 (in feet) 4

### Groundwater

Number of groundwater samples collected 18  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 4'  
Number of groundwater monitoring wells installed 17  
Number of groundwater samples exceeding 910-1 3

-- Highest concentration of Benzene (µg/l) 434  
-- Highest concentration of Toluene (µg/l) 1560  
-- Highest concentration of Ethylbenzene (µg/l) 138  
-- Highest concentration of Xylene (µg/l) 1530  
NA Highest concentration of Methane (mg/l)         

### Surface Water

37 Number of surface water samples collected  
6 Number of surface water samples exceeding 910-1  
If surface water is impacted, other agency notification may be required.

## OTHER INVESTIGATION INFORMATION

Were impacts to adjacent property or offsite impacts identified?

Impacts were identified within Owl Creek and in the agricultural land where the flowline release occurred.

Were background samples collected as part of this site investigation?

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?

# 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.

The source area was removed via excavation activities from February 10, 2017 through February 13, 2017. Hydrophobic booms were deployed along Owl Creek and impacted surface water was recovered via hydro-vacuum activities.

## 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.

Residual absorbed phase impacts are being remediated by passive solar vapor extraction (SVE). Two (2) passive 2 inch SVE wells were installed on March 28, 2017 with a 4-inch passive ventilation, wind turbine. The wind turbine will passively and continuously remove residual absorbed petroleum impacts in the surrounding area. Confirmation soil samples will be collected adjacent to residual absorbed petroleum impacts associated with the site. Dissolved petroleum hydrocarbon impacts will be monitored for natural attenuation. MW01-MW17 will be sampled on a quarterly basis for BTEX. Quarterly surface water samples will be collected to monitor dissolved BTEX levels in Owl Creek.

## Soil Remediation Summary

In Situ

No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
No \_\_\_\_\_ Chemical oxidation  
Yes \_\_\_\_\_ Air sparge / Soil vapor extraction  
Yes \_\_\_\_\_ Natural Attenuation  
No \_\_\_\_\_ Other \_\_\_\_\_

Ex Situ

Yes \_\_\_\_\_ Excavate and offsite disposal  
If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 1004  
Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_  
No \_\_\_\_\_ Excavate and onsite remediation  
\_\_\_\_\_ Land Treatment  
\_\_\_\_\_ Bioremediation (or enhanced bioremediation)  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Other \_\_\_\_\_

## Groundwater Remediation Summary

No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
No \_\_\_\_\_ Chemical oxidation  
No \_\_\_\_\_ Air sparge / Soil vapor extraction  
Yes \_\_\_\_\_ Natural Attenuation  
No \_\_\_\_\_ 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.

Seventeen (17) monitoring wells have been installed at the Site and will be monitored for natural attenuation on a quarterly basis. Groundwater samples will be submitted to a certified laboratory and analyzed for BTEX by EPA Method 8260c.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other \_\_\_\_\_

Report Type:  Groundwater Monitoring  Land Treatment Progress Report  O&M Report

Other \_\_\_\_\_

## WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? Yes

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

No beneficial reuse

Volume of E&P Waste (solid) in cubic yards 1004

E&P waste (solid) description Impacted soil above COGCC Table 910-1 standards

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

Non-COGCC Disposal Facility: North Weld Landfill-Ault

Volume of E&P Waste (liquid) in barrels 112

E&P waste (liquid) description Impacted surface and groundwater above COGCC Table 910-1 standards

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

Non-COGCC Disposal Facility: Republic

## REMEDIATION COMPLETION REPORT

### REMEDIATION COMPLETION SUMMARY

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

Do all soils meet Table 910-1 standards? No

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

Are the only residual soil impacts pH, SAR, or EC at depths greater than 3 feet below ground surface? No

Does Groundwater meet Table 910-1 standards? No

Is additional groundwater monitoring to be conducted? Yes

## RECLAMATION PLAN

### RECLAMATION PLANNING

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

The location has been contoured and graded to match surrounding conditions.

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 approve the seed mix? \_\_\_\_\_

If NO, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

# IMPLEMENTATION SCHEDULE

## PRIOR DATES

Date of Surface Owner notification/consultation, if required. \_\_\_\_\_

Actual Spill or Release date, if known. 02/09/2017

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 02/09/2017

Date of commencement of Site Investigation. 02/09/2017

Date of completion of Site Investigation. 03/28/2017

## REMEDIAL ACTION DATES

Date of commencement of Remediation. 02/09/2017

Date of completion of Remediation. \_\_\_\_\_

## SITE RECLAMATION DATES

Date of commencement of Reclamation. 02/13/2017

Date of completion of Reclamation. 02/13/2017

## OPERATOR COMMENT

Wardlaw 20-28

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

Signed: ` Jacob Evans \_\_\_\_\_

Title: Environmental Coordinator

Submit Date: ` \_\_\_\_\_

Email: jacob.evans@nblenergy.com

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

COGCC Approved: \_\_\_\_\_

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

Remediation Project Number: 10185

## COA Type

## Description

| <u>COA Type</u> | <u>Description</u> |
|-----------------|--------------------|
|                 |                    |

## Attachment Check 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

| <u>Att Doc Num</u> | <u>Name</u>       |
|--------------------|-------------------|
| 401500665          | MONITORING REPORT |

Total Attach: 1 Files

## General Comments

### User Group

### Comment

### Comment Date

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

Total: 0 comment(s)