

# State of Colorado Oil and Gas Conservation Commission

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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: <u>PDC ENERGY INC</u>        | Operator No: <u>69175</u>                    | <b>Phone Numbers</b>         |
| Address: <u>1775 SHERMAN STREET - STE 3000</u> |  | Phone: <u>(303) 860-5800</u> |
| City: <u>DENVER</u>                            | State: <u>CO</u>                             | Zip: <u>80203</u>            |
| Contact Person: <u>Karen Olson</u>             | Email: <u>COGCCSpillRemediation@pdce.com</u> | Mobile: <u>( )</u>           |

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 13570 Initial Form 27 Document #: 402040721

#### PURPOSE INFORMATION

- |  |  |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination                                       | <input type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water                   |
| <input checked="" 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: <u>LOCATION</u>           | Facility ID: <u>323174</u> | API #: _____  | County Name: <u>WELD</u>      |
| Facility Name: <u>BAUER-65N64W 4NWNW</u> |                            | Latitude: <u>40.433535</u>                                | Longitude: <u>-104.562405</u> |
|  |                            | ** correct Lat/Long if needed: Latitude: <u>40.433697</u> | Longitude: <u>-104.564496</u> |
| QtrQtr: <u>NWNW</u>                      | Sec: <u>4</u>              | Twp: <u>5N</u>  | Range: <u>64W</u>             |
|  |                            | Meridian: <u>6</u>  | Sensitive Area? <u>Yes</u>    |

#### SITE CONDITIONS

General soil type - USCS Classifications SC Most Sensitive Adjacent Land Use Agriculture

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

Occupied housing is located approximately 296 feet south of location. An irrigation canal is located approximately 696 feet south of location. The following additional receptors were evaluated and determined to be outside of the 1/4-mile radius of the site: CPW Sensitive Wildlife Habitat (SWH) and FWS wetlands.

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- ☒ E&P Waste      ☐ Other E&P Waste      ☐ Non-E&P Waste
- ☒ Produced Water      ☐ Workover Fluids
- ☐ Oil      ☐ Tank Bottoms
- ☐ Condensate      ☐ Pigging Waste
- ☐ Drilling Fluids      ☐ Rig Wash
- ☐ Drill Cuttings      ☐ Spent Filters
- ☐ Pit Bottoms
- ☐ Other (as described by EPA)

## DESCRIPTION OF IMPACT

| Impacted? | Impacted Media | Extent of Impact               | How Determined                                |
|-----------|----------------|--------------------------------|---|
| Yes       | GROUNDWATER    | Refer to Figure 1 and Table 2. | Confirmation excavation groundwater sampling. |
| Yes       | SOILS          | Refer to Figure 1 and Table 1. | Confirmation Soil Sampling.                   |

## INITIAL ACTION SUMMARY

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

Historic hydrocarbon impacts were discovered during the removal of the produced water vessel at the Bauer 5, 12, 21-5 tank battery. Following the discovery, site investigation and excavation activities were initiated to delineate and remove petroleum hydrocarbon impacts. Approximately 1,330 cubic yards of impacted material were removed from the excavation and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests.

## 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 ):

Between June 20 and July 1, 2019, 15 soil samples (SS01 – SS15) were collected between 15 and 18 feet below ground surface (bgs) to confirm that remaining hydrocarbon impacts within the unsaturated and saturated intervals were successfully removed. Soil samples were submitted to Summit Scientific Laboratories (Summit) for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by USEPA Method 8260B, and TPH – diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that organic compound concentrations were below COGCC Table 910-1 standards in the samples collected from the final excavation extent. The final excavation extent and soil sample locations are illustrated on Figure 1 and soil analytical results are summarized in Table 1. The laboratory reports are included in Attachment A.

### Proposed Groundwater Sampling

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

Groundwater was encountered in the excavation at approximately 16 feet bgs. On July 3, 2019, one groundwater sample (GW01) was collected from the excavation and submitted to Summit for laboratory analysis of BTEX by USEPA Method 8260B. Analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 groundwater standards. The groundwater sample location is illustrated on Figure 1 and groundwater analytical results are summarized in Table 2. The laboratory report is included in Attachment A.

### 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 ):

Five (5) monitoring wells will be installed within and surrounding the former excavation area to confirm dissolved-phase hydrocarbon concentrations are below regulatory standards. Lithologic descriptions and field-measured volatile organic compound (VOC) concentrations will be recorded at each borehole/monitoring well. Following installation, wells will be surveyed to calculate groundwater elevation and flow direction. Proposed monitoring well locations are illustrated on Figure 2.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 15

Number of soil samples exceeding 910-1 0

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 2940

### NA / ND

-- Highest concentration of TPH (mg/kg) 1.2

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 18

### Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 16

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 910-1 0

-- Highest concentration of Benzene (µg/l) 3.5

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 1.6

-- Highest concentration of Xylene (µg/l) 16

NA Highest concentration of Methane (mg/l)

### Surface Water

0 Number of surface water samples collected

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?

☐ 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) 1330

Volume of liquid waste (barrels) 265

☒ Is further site investigation required?

Five (5) monitoring wells will be installed to confirm dissolved-phase BTEX concentrations are below regulatory standards.

# 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.

Between June 4 and June 5, 2019, 30 cubic yards of material were removed during the removal of the produced water vessel and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. Between June 6 and July 1, 2019, an additional 1,300 cubic yards of hydrocarbon impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. Waste manifests are provided in Attachment B. As previously described, confirmation soil samples collected from the final excavation extent indicated that unsaturated and saturated hydrocarbon impacted material were successfully removed by excavation 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.

Five (5) monitoring wells will be installed on September 25, 2019, within and surrounding the former excavation area to confirm dissolved-phase hydrocarbon concentrations are below regulatory standards. A remediation strategy may be selected upon the evaluation of groundwater analytical data.

## Soil Remediation Summary

☐ In Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Air sparge / Soil vapor extraction  
\_\_\_\_\_ Natural Attenuation  
\_\_\_\_\_ Other \_\_\_\_\_

☒ Ex Situ

Yes \_\_\_\_\_ Excavate and offsite disposal  
If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 1330  
Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_  
\_\_\_\_\_ Excavate and onsite remediation  
\_\_\_\_\_ 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.

PDC will conduct quarterly groundwater monitoring at the five (5) proposed monitoring wells until closure criteria are achieved.

## 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 use.

Volume of E&P Waste (solid) in cubic yards 1330

E&P waste (solid) description Petroleum hydrocarbon impacted soil.

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

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 265

E&P waste (liquid) description Petroleum hydrocarbon impacted groundwater.

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

Non-COGCC Disposal Facility: NGL Energy Disposal Facility

## 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? \_\_\_\_\_

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? \_\_\_\_\_

Does Groundwater meet Table 910-1 standards? \_\_\_\_\_

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

## 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 excavation area was backfilled, compacted, and re-graded to match pre-existing conditions. The production facility and associated infrastructure will be reconstructed. The production facility will remain operational.

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. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/04/2019

Date of commencement of Site Investigation. 06/04/2019

Date of completion of Site Investigation. \_\_\_\_\_

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 06/04/2019

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

### SITE RECLAMATION DATES

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

### OPERATOR COMMENT

Per the Condition of Approval (COA) issued on July 10, 2019, proposed site investigation and well installation activities are scheduled for September 25, 2019. Activities could not be completed prior to this COA date due to landowner negotiations. Following the completion of the scope of work, a summary of site investigation activities, including boring logs and well construction details, will be submitted in a Supplemental Form 27 report within 45 days of completion.

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

Signed: Karen Olson

Title: Senior Program Manager

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

Email: COGCCSpillRemediation@pdce.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: 13570

### COA Type

### Description

|  |  |
|--|--|
|  |  |
|--|--|

### 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

|           |                         |
|-----------|-------------------------|
| 402156666 | SITE INVESTIGATION PLAN |
|-----------|-------------------------|

Total Attach: 1 Files

### General Comments

### User Group

### Comment

### Comment Date

|  |  |                     |
|--|--|---------------------|
|  |  | Stamp Upon Approval |
|--|--|---------------------|

Total: 0 comment(s)