

State of Colorado
Oil and Gas Conservation Commission

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Document Number:

402644637

Receive Date:

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

Report taken by:

OPERATOR INFORMATION

| | | |
|--|--|------------------------------|
| Name of Operator: <u>PDC ENERGY INC</u> | Operator No: <u>69175</u> | Phone Numbers |
| 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> | | Mobile: <u>()</u> |
| Contact Person: <u>Karen Olson</u> | Email: <u>COGCCSpillRemediation@pdce.com</u> | |

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 16260 Initial Form 27 Document #: 402574838

PURPOSE INFORMATION

| | |
|--|--|
| <input 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 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>333319</u> | API #: _____ | County Name: <u>WELD</u> |
| Facility Name: <u>LATHAM RESERVOIR-64N65W 2SESW</u> | Latitude: <u>40.335536</u> | Longitude: <u>-104.632817</u> | |
| | ** correct Lat/Long if needed: Latitude: <u>40.335695</u> | Longitude: <u>-104.632785</u> | |
| QtrQtr: <u>SESW</u> | Sec: <u>2</u> | Twp: <u>4N</u> | Range: <u>65W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u> |

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use FWS Wetlands
 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? Yes

Other Potential Receptors within 1/4 mile

Location is within FWS Wetland habitat classified as freshwater emergent wetlands. Location is within a CPW Sensitive Wildlife Habitat buffer of an active bald eagle roost and nest. An irrigation well is located approximately 1,308 feet east of the location. Occupied buildings are located approximately 1,001 feet east of the location. Lower Latham Reservoir is located approximately 991 feet northeast of the location.

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 Table 2 and Figure 2. | Implementation of Initial Groundwater Assessment. |
| No | SOILS | Refer to Table 1 and Figure 1. | Implementation of Site Investigation Plan. |

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 September 23, 2020, a historic release was discovered while performing a pre-reclamation sub-surface survey. Groundwater was encountered at approximately 5 feet below ground surface. PDC and two other area operators utilized this this location for oil & gas activities. PDC plugged and abandoned all wells and the associated production facility in 2014 and performed partial reclamation of the area where the tank battery and one well was located. Oxy had midstream gas gathering unit that collected gas from PDC and offsite Noble wells. Oxy and Noble ceased operations on this location in 2019.

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):

On September 2 and October 14, 2020, nine boreholes (BH01 - BH09) were advanced using direct-push drilling methods to approximately 10 feet below ground surface (bgs). Lithologic conditions and volatile organic compound (VOC) concentrations using a photoionization detector (PID) were recorded for each borehole. Soil samples were collected from intervals which exhibited elevated field-measured VOC concentrations or within the capillary fringe zone. Eleven soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by EPA Method 8260B, TPH– diesel range organics (DRO) by EPA Method 8015. Analytical results indicated that organic compound concentrations were below the applicable COGCC Table 910-1 standards in all borehole locations. Borehole locations are illustrated on Figure 1 and soil analytical results are summarized in Table 1.

Proposed Groundwater Sampling

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

Between September 14 and October 22, 2020, initial groundwater assessment activities were conducted to assess and confirm dissolved-phase hydrocarbon impacts. Groundwater samples were collected from nine monitoring wells (BH01 - BH09) and submitted to Summit Scientific Laboratories for analysis of BTEX by EPA Method 8260B. Analytical results indicated that the benzene concentration was in exceedance of the applicable COGCC Table 910-1 groundwater standard in monitoring well BH04. The remaining wells exhibited BTEX concentrations below regulatory standards. Monitoring well locations and groundwater analytical results are illustrated on Figure 2 and groundwater elevations are illustrated on Figure 3. Groundwater laboratory results are summarized in Table 2.

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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 11
Number of soil samples exceeding 910-1 0
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 13071

NA / ND

-- Highest concentration of TPH (mg/kg) 5.7
NA Highest concentration of SAR
BTEX > 910-1 No
Vertical Extent > 910-1 (in feet) 10

Groundwater

Number of groundwater samples collected 10
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 5'
Number of groundwater monitoring wells installed 9
Number of groundwater samples exceeding 910-1 2

-- Highest concentration of Benzene (µg/l) 990
ND Highest concentration of Toluene (µg/l)
-- Highest concentration of Ethylbenzene (µg/l) 110
-- Highest concentration of Xylene (µg/l) 630
NA Highest concentration of Methane (mg/l)

Surface Water

0 Number of surface water samples collected
0 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) 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.

Following the pre-reclamation sub-survey conducted in September 2020, dissolved-phase impacts were discovered south of the former PDC tank battery location. Based on the results from a desktop review, the location of dissolved-phase impacts are in proximity of the historic tank battery location originally located on the southern half of the lease area, which was maintained by former operators.

REMEDICATION 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.

Based on the analytical results collected during the initial groundwater assessment, monitored natural attenuation (MNA) was selected as the remediation strategy for the first quarter 2021 and will continue as the selected remediation strategy through the second quarter 2021.

Soil Remediation Summary

In Situ

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

Ex Situ

- _____ Excavate and offsite disposal
- _____ If Yes: Estimated Volume (Cubic Yards) _____
- _____ 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
- Yes _____ 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.

Groundwater monitoring will continue on a quarterly basis at the nine site monitoring wells (BH01-BH09). Groundwater samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B in accordance with Table 915-1. In addition, site-specific inorganic parameters, including total dissolved solids (TDS), chloride, and sulfate, will be evaluated at the source, up-and down-gradient monitoring wells during the second quarter 2021. Contingent on analytical results, inorganic parameter analysis will be discontinued after one sampling event.

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? 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 _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

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

E&P waste (liquid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC 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.

Reclamation will be conducted in accordance with COGCC 1004 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 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. 09/23/2020

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 09/02/2020

Date of commencement of Site Investigation. 09/02/2020

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 09/02/2020

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

Refer to the updated groundwater monitoring plan, in accordance with Table 915-1.

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: 16260

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

| | |
|-----------|-------------------|
| 402644641 | 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)