

State of Colorado Oil and Gas Conservation Commission

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



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03/11/2021

Report taken by:

CHRIS CANFIELD

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> | 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 #: 15469Initial Form 27 Document #: 402371873

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 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 checked="" 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

Y Multiple Facilities (in accordance with Rule 909.c.)

| | | | |
|--|----------------------------|--|--|
| Facility Type: <u>NONFACILITY</u> | Facility ID: <u>475912</u> | API #: _____ | County Name: <u>WELD</u> |
| Facility Name: <u>Morales Water Well</u> | | Latitude: <u>40.007119</u> | Longitude: <u>-104.798120</u> |
| | | ** correct Lat/Long if needed: Latitude: _____ | Longitude: _____ |
| QtrQtr: <u>NWSE</u> | Sec: <u>32</u> | Twp: <u>1N</u> | Range: <u>66W</u> Meridian: _____ Sensitive Area? <u>Yes</u> |

SITE CONDITIONS

General soil type - USCS Classifications SMMost Sensitive Adjacent Land Use CroplandIs domestic water well within 1/4 mile? YesIs surface water within 1/4 mile? NoIs groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

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) Methane

DESCRIPTION OF IMPACT

| Impacted? | Impacted Media | Extent of Impact | How Determined |
|-----------|----------------|-----------------------|-----------------------|
| Yes | GROUNDWATER | Ongoing investigation | Ongoing investigation |

INITIAL ACTION SUMMARY

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

In response to a landowner request, as well as demonstration of good stewardship and to support landowner concerns in area where PDC operates, PDC retained a third-party environmental consultant, Olsson Associates, to collect a water sample at the Cassia domestic water well (Permit 137465), located in Section 32, Township 1 North, and Range 66 West.

On March 11, 2020, Olsson collected a water sample from the well in accordance with COGCC Baseline Water Quality Sampling Program – Rule 318A.f. The water sample was submitted to Origins Laboratory Inc for analysis of the full COGCC baseline analytical suite.

On March 20, 2020 preliminary analytical results were returned and identify the presence of methane at a concentration of 26 milligrams per liter (mg/l). PDC notified the COGCC of the findings and forwarded the sample for further compositional and isotopic laboratory testing. Results plot on the border between microbial and thermogenic.

On March 24, 2020 the COGCC submitted a request to PDC Energy, Inc. (PDC) and Great Western Operating Company, LLC ("Great Western"), the area operators, to initiate an investigation of the occurrence of dissolved methane in a domestic water well (COGCC Complaint: 200448002; DWR Permit 137465 / Receipt 024601). The well was permitted by MaryAnn Morales and is completed / screened in the Laramie Fox Hills aquifer.

The first request of the March 24, 2020 letter from the COGCC is for area operators to submit engineering data for wells it operates within the study area. PDC operates wells on the Phelps and Eberle pads within the study area. Engineering data for these wells is attached.

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):

Proposed Groundwater Sampling

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

Per approval of COGCC on April 10, 2020 a phased study area water well sampling approach will be implemented. For Phase I, sixteen (16) area water wells completed / screened within the Laramie Fox Hills aquifer are proposed to be sampled. This is the same aquifer the Cassia domestic water well is completed/screened within. Consent request letters to the landowners' have been sent and replies are pending. The water wells are proposed to be sampled in accordance with COGCC Baseline Water Quality Sampling Program – Rule 318A.f. Subsequent sampling phases maybe initiated depending on the results of the prior phase. A listing of the phase I wells is attached.

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

NA / ND

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

Groundwater

Number of groundwater samples collected 1
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 374'
Number of groundwater monitoring wells installed 0
Number of groundwater samples exceeding 910-1 1

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)
-- Highest concentration of Methane (mg/l) 26

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) 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.

Not applicable.

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.

Between July 10 and August 5, 2020, a methane mitigation system was installed at the property associated with the Colorado Division of Water Resources (DWR) Well Permit Number 137465. The system became operational on August 6, 2020.

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
- ☐ _____ Natural Attenuation
- Yes _____ Other _____ Methane mitigation system _____

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.

Water samples are collected from the influent and effluent process streams of the system on a quarterly basis and submitted to Summit Scientific Laboratories for analysis of dissolved gases by EPA Method RSK 175. In addition, the sample collected from the influent process stream will be submitted to Dolan Integration Group (DIG) for hydrocarbon gas composition and stable isotopes analysis.

REMEDATION 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: _____

REMEDATION COMPLETION REPORT

REMEDATION 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.

If remediation activities are conducted the location(s) will be reclaimed in accordance with COGCC 1000 series.

Is the described reclamation complete? No _____

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). 03/11/2020

Date of commencement of Site Investigation. 03/11/2020

Date of completion of Site Investigation. 08/28/2020

REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/10/2020

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

DWR Water Well Permit# 137465 Methane Mitigation System - Quarterly Operations and Monitoring Summary - First Quarter 2021

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: 03/11/2021

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: CHRIS CANFIELD

Date: 03/15/2021

Remediation Project Number: 15469

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

| | |
|-----------|--------------------------------|
| 402625177 | FORM 27-SUPPLEMENTAL-SUBMITTED |
| 402625612 | MONITORING REPORT |
| 402625614 | OTHER |

Total Attach: 3 Files

General Comments

User Group

Comment

Comment Date

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

Total: 0 comment(s)