

State of Colorado
Oil and Gas Conservation Commission

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Report taken by:
Candice (Nikki) Graber

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 15493 Initial Form 27 Document #: 402390273

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 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: TANK BATTERY | Facility ID: 447565 | API #: | County Name: WELD |
| Facility Name: REYNOLDS 1,2 | Latitude: 40.369633 | Longitude: -104.675364 | |
| | ** correct Lat/Long if needed: Latitude: 40.369622 | Longitude: -104.675409 | |
| QtrQtr: NWSW | Sec: 28 | Twp: 5N | Range: 65W Meridian: 6 Sensitive Area? Yes |

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Ranch

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

FWS Wetlands are located approximately 83 feet west of the location. Occupied buildings are located approximately 416 feet northwest of the location. There are no CPW Sensitive Wildlife Habitats identified within a 1/4-mile radius.

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 checked="" type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input 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 Figure 1 and Table 2. | Implementation of groundwater assessment plan. |
| Yes | SOILS | Refer to Figure 1 and Table 1. | Completion of excavation activities. |

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 April 22, 2020, a historic release was discovered below the former Reynolds 1, 2 tank battery during reclamation activities. Following the discovery, excavation activities were initiated and approximately 1,020 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility and Buffalo Ridge Landfill 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 April 23 and May 1, 2020, 34 soil samples (SS01 - SS34) were collected from the sidewalls and base of the excavation at depths ranging between 1.5 and 3 feet below ground surface (bgs). The 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 EPA Method 8260B, and 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 the soil samples collected from the final excavation extent. The final excavation extent and sample locations are illustrated on Figure 1. Soil analytical results are summarized in Table 1 and 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):

During initial excavation activities, groundwater was encountered at approximately 1.5 feet bgs. Following the completion of source mass removal activities, one groundwater sample (GW01) was collected from the excavation on May 4, 2020, and submitted to Summit for analysis of BTEX by EPA Method 8260. Analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 groundwater standards. The groundwater sample 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):

Eight (8) monitoring wells will be installed via direct-push drilling methods to confirm the absence of dissolved-phase hydrocarbon impacts within and surrounding the former excavation extent. Proposed monitoring well locations are illustrated on Figure 2.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 34
Number of soil samples exceeding 910-1 1
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 10294

NA / ND

-- Highest concentration of TPH (mg/kg) 1510
NA Highest concentration of SAR
BTEX > 910-1 No
Vertical Extent > 910-1 (in feet) 3

Groundwater

Number of groundwater samples collected 1
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 2'
Number of groundwater monitoring wells installed 0
Number of groundwater samples exceeding 910-1 0

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
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) 1020 Volume of liquid waste (barrels) 3210

Is further site investigation required?

Eight (8) monitoring wells will be installed via direct-push drilling methods to confirm the absence of dissolved-phase hydrocarbon impacts within and surrounding the former excavation extent. Proposed monitoring well locations are illustrated on Figure 2.

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 April 22 and May 1, 2020, approximately 1,020 cubic yards of impacted material were removed and transported off site for disposal. As previously described, confirmation soil samples collected from the final excavation extent indicated that unsaturated and saturated hydrocarbon impacted material was 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.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this project between the second quarter 2020 and first quarter 2021.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 1020

_____ Air sparge / Soil vapor extraction

_____ Name of Licensed Disposal Facility or COGCC 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

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.

On May 21, 2020, eight monitoring wells (BH01 - BH08) were installed to confirm the absence of dissolved-phase hydrocarbon impacts. During the first quarter 2021, four consecutive quarters of groundwater concentrations in compliance with COGCC Table 910-1 standards were achieved.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other NFA Request
Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other NFA Request

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 1020

E&P waste (solid) description E&P contaminated soil.

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: North Weld Waste Management Facility and Buffalo Ridge Landfill

Volume of E&P Waste (liquid) in barrels 3210

E&P waste (liquid) description 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? Yes

Do all soils meet Table 910-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? No

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? Yes

Is additional groundwater monitoring to be conducted? No

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 was backfilled and re-graded to match pre-existing conditions. The facility was decommissioned and will be reclaimed in accordance with the COGCC 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 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. 04/22/2020

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/22/2020

Date of commencement of Site Investigation. 04/22/2020

Date of completion of Site Investigation. 05/21/2020

REMEDIAL ACTION DATES

Date of commencement of Remediation. 04/22/2020

Date of completion of Remediation. 02/04/2021

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

During the first quarter 2021, four consecutive quarters of groundwater concentrations in compliance with COGCC Table 910-1 standards were achieved. Consequently, PDC is requesting a No Further Action (NFA) determination for this remediation project.

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

Signed: Karen Olson

Title: Snr. Program Manger

Submit Date: 03/01/2021

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: Candice (Nikki) Graber

Date: 03/04/2021

Remediation Project Number: 15493

COA Type**Description**

| | |
|--|--|
| | <p>Based on the information presented, it appears that no further action is necessary at this time and the COGCC approves the closure request. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards or if groundwater is found to be impacted, then further investigation and/or remediation activities may be required.</p> <p>The surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.</p> |
|--|--|

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**

| | |
|-----------|--------------------------------|
| 402611626 | FORM 27-SUPPLEMENTAL-SUBMITTED |
| 402611636 | ANALYTICAL RESULTS |
| 402611637 | GROUND WATER SAMPLE LOCATION |
| 402611638 | GROUND WATER ELEVATION MAP |

Total Attach: 4 Files

General Comments**User Group****Comment****Comment Date**

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

Total: 0 comment(s)