

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
403099614  
Receive Date:  
08/09/2022  
Report taken by:  
Jason Kosola

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.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers Phone: <u>(303) 860-5800</u> Mobile: <u>( )</u>
Address: <u>1775 SHERMAN STREET - STE 3000</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>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 21296 Initial Form 27 Document #: 402888756

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: \_\_\_\_\_

SITE INFORMATION

No Multiple Facilities

Facility Type: <u>LOCATION</u>	Facility ID: <u>467698</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>NYC N-65N67W 24SESE</u>	Latitude: <u>40.378098</u>	Longitude: <u>-104.839404</u>	
** correct Lat/Long if needed: Latitude: <u>40.378011</u>		Longitude: <u>-104.838922</u>	
QtrQtr: <u>SWSE</u>	Sec: <u>24</u>	Twp: <u>5N</u>	Range: <u>67W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Agricultural  
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? No

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

Surface Water: Possible Surface Draw - 1,040' SW; FWS Wetlands: 1,040' WNW Riverine (R4SBC).

# 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	SOILS	Refer to Tables 1-5 & Figures 1-3	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.

On March 7, 2022, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the Booth 25-32 Tank Battery (Figure 1). Based on initial results, it was determined that a historic release was discovered below the former produced water vessel (PWV). Following the discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. Approximately 179 cubic yards (CY) of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC 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 ):

On March 7, 2022, one (1) soil sample (PWV01-NW-B) was collected from impacted source material adjacent to and below the PWV at approximately 9 feet bgs. The sample was submitted for laboratory analysis of the full COGCC Table 915-1 analyte suite. Laboratory analytical results from the PWV source area indicated COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, pyrene, 1-M, and 2-M. On April 18, 2022, one (1) soil sample (SS01) was collected from the base of the excavation at a depths of approximately 22 feet bgs and submitted for laboratory analysis of the above referenced COC's. Final analytical results for the soil sample collected from the base of the excavation indicate that organic concentrations are in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater SSLs in SS01.

### Proposed Groundwater Sampling

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

### 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 ):

During initial site investigative activities, deep soil impacts in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater Soil Screening Levels (SSLs) were discovered below 22 feet bgs. Due to the depth of the remaining impacts, source mass removal activities were discontinued. Consequently, on May 3, 2022, four (4) soil borings were advanced to direct push probe refusal in order to delineate the vertical and horizontal extent of the remaining hydrocarbon impacts. Seven (7) soil samples were collected from soil borings (SB01-SB04) from the depth exhibiting the highest observed VOC concentration and/or the terminus of each boring and were submitted for the above referenced COCs. Analytical results indicate that organic compound concentrations in exceedance of COGCC Table 915-1 Protection of Groundwater SSLs remain beneath, north, and south of the former PWV. The horizontal and vertical extent of hydrocarbon impacts have not been delineated.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

**Soil**

Number of soil samples collected 16  
Number of soil samples exceeding 915-1 7  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 365

**NA / ND**

-- Highest concentration of TPH (mg/kg) 4190  
-- Highest concentration of SAR 0.461  
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 22

**Groundwater**

Number of groundwater samples collected 0  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) \_\_\_\_\_  
Number of groundwater monitoring wells installed \_\_\_\_\_  
Number of groundwater samples exceeding 915-1 \_\_\_\_\_

Highest concentration of Benzene (µg/l) \_\_\_\_\_  
Highest concentration of Toluene (µg/l) \_\_\_\_\_  
Highest concentration of Ethylbenzene (µg/l) \_\_\_\_\_  
Highest concentration of Xylene (µg/l) \_\_\_\_\_  
Highest concentration of Methane (mg/l) \_\_\_\_\_

**Surface Water**

0 Number of surface water samples collected  
\_\_\_\_\_ Number of surface water samples exceeding 915-1  
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?

On March 7, 2022, three (3) background soil samples (BKG01) were collected at approximately 1 foot, 2.5 feet, and 4 feet bgs from native material topographically up-gradient of the tank battery. All background soil samples were submitted for analysis of COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil. Based on these results, arsenic and selenium exceedances observed in soil sample PWV01-NW-B are within 1.25x the background concentrations and indicative of native soil conditions, as referenced in footnote 11 of the Table 915-1.

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) 179 Volume of liquid waste (barrels) 0

Is further site investigation required?

Four (4) soil borings will be advanced via to approximately 22 feet bgs to define the horizontal extent of Table 915-1 exceedances observed to date. Volatile organic compound (VOC) concentrations using a photoionization detector (PID) and lithologic descriptions will be recorded for each borehole. Soil samples will be collected from each soil boring at the highest observed VOC concentration, and at the terminus of each borehole and submitted for laboratory analysis of the COGCC approved COCs. Should groundwater be encountered during the advancement of the soil borings, groundwater samples will be collected and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB and 1,3,5-TMB by EPA method 8260B in accordance with the Table 915-1. Should elevated field screened VOC concentrations be observed during the advancement of the 4 proposed soil boring locations, up to four (4) additional soils borings may be advanced. Proposed soil boring locations are illustrated on Figure 4.

**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 March 7 and April 18, 2022, approximately 179 cubic yards of impacted material were excavated below and adjacent to the former PWV and transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests.

**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.

During initial decommissioning activities conducted on March 7, 2022, soil encountered on-site and below production equipment was visually inspected and field screened for VOC concentrations using a PID. Per the approved proposed soil sampling plan, samples were collected below and/or adjacent to the produced water vessel (PWV01-B and PWV01-E), one soil sample (SEP01-DL) was collected adjacent to the separator dumpline risers, one sample (SEP01-FL) was collected beneath the flowline riser at the separator, and one sample (AST01) was collected adjacent to the above ground storage tank. Additionally, two grab soil samples (ECD01 @ 0-6" and MH01 @ 0-6") were collected adjacent to the ECD and meterhouse and field screened for VOCs using a PID. Soil samples PWV01-B, PWV01-E, SEP01-DL, SEP01-FL, and AST01 were submitted for analysis of BTEX, N, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). In addition, the samples collected below and adjacent to the PWV were submitted for laboratory analysis of pH, EC, SAR, and boron. Analytical results indicated that organic compounds were in compliance with the applicable COGCC Table 915-1 Protection of Groundwater SSLs in all five soil samples collected.

A remediation strategy will be determined following the receipt of soil analytical results.

Analytical results are summarized in Tables 1-4. GPS coordinates and field screened VOC concentrations are summarized in Table 5. Field screening and laboratory sample locations are illustrated on Figures 1 through 3. The laboratory reports are included as Attachment A, the tank battery decommissioning field notes and photo logs are included in Attachment B, and the soil boring logs are included in Attachment C.

### Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
_____ Bioremediation ( or enhanced bioremediation )	Yes _____ Excavate and offsite disposal
_____ Chemical oxidation	_____ If Yes: Estimated Volume (Cubic Yards) _____ 179
_____ 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

\_\_\_\_\_ 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 was not encountered during initial decommissioning, confirmation sampling activities, or supplemental site investigation activities.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

### Approved Reporting Schedule:

Quarterly     Semi-Annually     Annually     Other

### Request Alternative Reporting Schedule:

Semi-Annually     Annually     Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

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

Other Confirmation Sample Summary, Analyte Reduction Request, Supplemental Site Investigation Proposal

## Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Operator does not have site-specific financial assurance for this project; however, Operator has inactive well, blanket, and surface bonding including Surety IDs 106077122, 106473808, and 106473820, as well as commercial general liability and/or umbrella/excess insurance meeting the requirements of Rule 705.b. operator does not anticipate making an insurance claim for this project.

- Investigation and delineation activities are ongoing in soils.
- Partial source mass removal activities have been conducted.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.

Costs included herein are estimates only and may change over time based on numerous factors. Accordingly, Operator makes no guarantees as to the accuracy of such cost estimates, thus providing an estimate for the next year below.

Operator anticipates the remaining cost for this project to be: \$ 15000

## 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 179

E&P waste (solid) description Hydrocarbon impacted soils

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

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 0

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

If YES:

Compliant with Rule 913.h.(1).

Compliant with Rule 913.h.(2).

Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? \_\_\_\_\_

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

Does Groundwater meet Table 915-1 standards? \_\_\_\_\_

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

Operator shall comply with the COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

## 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.

Following supplemental source mass removal activities adjacent to the produced water vessel location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 series.

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 provide the seed mix? \_\_\_\_\_

If YES, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

Did the local soil conservation district provide the seed mix? \_\_\_\_\_

### SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 03/07/2022

Proposed date of completion of Reclamation. 08/09/2027

## IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

### PRIOR DATES

Date of Surface Owner notification/consultation, if required. 03/02/2021

Actual Spill or Release date, or date of discovery. 03/07/2022

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 12/27/2021

Proposed site investigation commencement. 01/01/2023

Proposed completion of site investigation. 03/31/2023

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/07/2022

Proposed date of completion of Remediation. 08/09/2027

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

## OPERATOR COMMENT

Based on analytical results for the waste characterization sample (PWV01-NW-B) collected from the produced water vessel source area at the Booth 25-32 tank battery location, PDC is requesting that the COCs for the historic release discovered at the Booth 25-32 Tank battery be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, pyrene, 1-M, and 2-M.

Following the approval of this form and landowner approval, PDC will conduct a supplemental site investigation to define the vertical and horizontal extents of the remaining hydrocarbon impacts discovered during the March 2022 decommissioning and subsequent May 2022 soil boring advancement activities.

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: 08/09/2022

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: Jason Kosola

Date: 10/31/2022

Remediation Project Number: 21296

### COA Type

### Description

<u>COA Type</u>	<u>Description</u>
0 COA	

## 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

403099614	FORM 27-SUPPLEMENTAL-SUBMITTED
403099751	PHOTO DOCUMENTATION
403099752	LOGS
403129996	ANALYTICAL RESULTS
403129997	SOIL SAMPLE LOCATION MAP

Total Attach: 5 Files

## General Comments

### User Group

### Comment

### Comment Date

Environmental	COGCC approves reduced analyte request.	10/31/2022
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Total: 1 comment(s)