

# State of Colorado Oil and Gas Conservation Commission

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



Document Number:

403168549

Receive Date:

10/24/2022

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>	<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 #: 22370 Initial Form 27 Document #: 402982089

#### 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

☐ Yes ☐ Multiple Facilities

Facility Type: <u>WELL</u>	Facility ID: _____	API #: <u>123-14193</u>	County Name: <u>WELD</u>
Facility Name: <u>TWO E RANCH 2-11</u>		Latitude: <u>40.245390</u>	Longitude: <u>-104.520890</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>NENW</u>	Sec: <u>11</u>	Twp: <u>3N</u>	Range: <u>64W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>
Facility Type: <u>LOCATION</u>	Facility ID: <u>327122</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>TWO E RANCH-63N64W 11NENW</u>		Latitude: <u>40.245337</u>	Longitude: <u>-104.520812</u>
		** correct Lat/Long if needed: Latitude: <u>40.245571</u>	Longitude: <u>-104.521170</u>
QtrQtr: <u>NENW</u>	Sec: <u>11</u>	Twp: <u>3N</u>	Range: <u>64W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

## **SITE CONDITIONS**

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Ranch land

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? No

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

Tank Battery: Livestock: 0' (within ranch land).

Wellhead (Two E Ranch 2-11): Livestock: 0' (within ranch land).

# 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 Table 5 and Figures 3-5	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Tables 1-4 and Figures 1-5	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 June 24, 2022, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the Two E Ranch 2-11 tank battery and wellhead (Figure 1). Based on initial analytical results, it was determined that a historic release was discovered below the former above ground storage tank (AST). Following the discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. Between June 24 and September 7, 2022, approximately 5,186 cubic yards (CY) of impacted material were removed and transported to the Buffalo Ridge Waste Management Facility for disposal under PDC manifests. Between June 24 and July 12, 2022, three (3) soil samples (AST01, SS01, and SS02) were collected from impacted source material below and adjacent to the AST between approximately 0-6 inches and 10 feet bgs. The samples were submitted for laboratory analysis of the full COGCC Table 915-1 analyte suite. Laboratory analytical results from the source samples indicated COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), acenaphthene, benz(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, pyrene, 1-M, 2-M, and pH.

## 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 August 12 and September 7, 2022, one hundred fourteen (114) soil samples (SS03-SS65, SS68-SS89, SS96-SS124) were collected from the base and sidewalls of the excavation and submitted for analysis for the above mentioned COCs. Additionally, soil samples (SS66, SS67, SS90, SS92) were collected from approximately 2.5 feet bgs and submitted for laboratory analysis of pH, EC, SAR, and boron. Analytical results indicated that organic compounds were in compliance of applicable COGCC Table 915-1 standards from the final excavation extent.

### Proposed Groundwater Sampling

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

On August 16 2022, groundwater was encountered at approximately 22 feet bgs in the excavation. Consequently, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that total xylenes, 1,2,4-TMB, and 1,3,5-TMB were in exceedance of the applicable COGCC Table 915-1 Standards. The groundwater sample location is illustrated on Figures 3-5 and the analytical results are summarized on Table 5 (tank battery).

### 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 decommissioning activities soil samples were collected below the wellhead and wellhead flowline riser and submitted for laboratory analysis of Table 915-1 Organic Compounds in Soil, TPH (C6-C36), and Soil Suitability for Reclamation. Additionally, soil samples were collected at the separator flowline, separator dump-line, and above ground storage tank and submitted for analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). Soil samples were also collected from the the produced water vessel (PWV) base and sidewall which exhibited the highest PID response and were submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH (C6-C36), pH, EC, SAR, and boron.

Nine (9) five-point spoil pile composite samples (SP01-SP09) were collected from the staged excavated soil and analyzed for the above mentioned COCs, pH, EC, SAR, and boron. Analytical results indicated all spoil pile samples were in compliance of the applicable COGCC Table 915-1 standards.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 139

Number of soil samples exceeding 915-1 88

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

Approximate areal extent (square feet) 9343

### NA / ND

-- Highest concentration of TPH (mg/kg) 6890

-- Highest concentration of SAR 3.69

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 21

### Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 22

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 1

-- Highest concentration of Benzene (µg/l) 1.2

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 110

-- Highest concentration of Xylene (µg/l) 2400

NA 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 June 24, 2022, two (2) background soil samples (BKG01) were collected from native material up-gradient of the wellhead at approximately 3 feet and 6 feet bgs and submitted for laboratory analysis of pH. Analytical results indicated that pH was in compliance of the applicable regulatory standards in native soil.

Additionally, between June 27 and August 15, 2022, eight (8) background soil samples (BKG02 & BKG03) were collected from native material up-gradient of the wellhead at approximately 0-6 inches, 1 foot, 2 feet, 2.5 feet, 4 feet, 6 feet, 12 feet, and 17 feet bgs and submitted for laboratory analysis of COGCC Table 915-1 metals and pH. Analytical results indicated pH in exceedance of the applicable regulatory standards in BKG02 @ 1' and BKG02 @ 2'; however, these samples will not be utilized due to being located within the final excavation extent. In addition, arsenic and selenium was observed in exceedance of the applicable regulatory standards in native material.

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

Volume of solid waste (cubic yards) 5186

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

Twelve (12) groundwater monitoring wells will be installed to delineate dissolved-phase hydrocarbon impacts within and surrounding the former tank battery excavation extent. Volatile organic compound (VOC) concentrations using a photoionization detector (PID) and lithologic descriptions will be recorded for each borehole. If elevated VOC concentrations are encountered during the investigation, a soil sample will be collected from the interval exhibiting the highest VOC concentration from the borehole and submitted for laboratory analysis of the COGCC approved COCs. Proposed monitoring well locations are illustrated on Figure 6.

In addition, up to five (5) additional background soil borings will be advanced to approximately 22 feet bgs with samples being collected at 0-6 inches, 2 feet, 3 feet, 6 feet, 8 feet, 15 feet, 21 feet and 22 feet bgs. The background soil borings will be advanced adjacent to the former tank battery excavation extent and wellhead to evaluate pH in native material. The proposed background soil boring locations are illustrated on Figure 7.

## 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 February 14 and June 30, 2022, approximately 5,186 cubic yards of impacted material were removed from the tank battery excavation and transported to the Buffalo Ridge Waste Management Facility in Keenesburg, CO for disposal under PDC waste manifests.

## 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.

A remediation strategy will be selected following the evaluation of soil and groundwater analytical results.

Wellhead and flowline analytical results are summarized in Tables 1-3. Wellhead and flowline GPS coordinates and PID readings are summarized in Table 4. Tank battery analytical results are summarized in Tables 1-5. Tank battery GPS coordinates and PID readings for the soil samples are summarized in Table 6. Initial decommissioning soil sample locations are illustrated on Figures 1 & 2. The tank battery excavation extent and soil sample locations are illustrated on Figures 3-5. Proposed monitoring well locations are illustrated on Figure 6. Proposed background soil boring locations are illustrated on Figure 7. Laboratory analytical results are included as Attachment A. Field notes & photo log are included as Attachment B.

## 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) \_\_\_\_\_ 5186  
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.

Based on the analytical data collected during tank battery source mass removal activities, PDC will conduct quarterly groundwater monitoring at the twelve proposed monitoring wells until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5 -TMB by EPA Method 8260B, as well as total dissolved solids (TDS), chlorides, and sulfates in accordance with Table 915-1.

## REMEDATION PROGRESS UPDATE

### PERIODIC REPORTING

#### Approved Reporting Schedule:

☒ Quarterly☐ Semi-Annually☐ Annually☒ Other

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

#### ☐ 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.

#### Wellhead:

- Investigation has been completed for organics in soil.
- Assessment of soil suitability for reclamation conditions in native material is ongoing.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.

#### Tank Battery:

- Source mass removal has been completed.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.
- Investigation and delineation has been completed for organics in soil.
- Assessment of soil suitability for reclamation conditions in native material is ongoing.
- Monitoring wells will be installed, and groundwater will be monitored.

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: \$ 40000

### 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 5186

E&P waste (solid) description Hydrocarbon impacted soils

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: Buffalo Ridge Waste Management

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

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 \_\_\_\_\_

☐ 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 wellhead and flowline abandonment activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 series.

Following supplemental source mass removal activities at the former tank battery location, the 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. 06/24/2022

Proposed date of completion of Reclamation. 09/16/2027

## 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. 12/03/2021

Actual Spill or Release date, or date of discovery. 06/24/2022

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/01/2022

Proposed site investigation commencement. 01/01/2023

Proposed completion of site investigation. 03/31/2023

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 06/24/2022

Proposed date of completion of Remediation. 09/16/2027

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 samples AST01, SS01, & SS02 collected from the Two E Ranch 2-11 tank battery source area, PDC is requesting that the COCs for the historic release discovered at the Two E Ranch 2-11 tank battery be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), acenaphthene, benz(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, fluorene, pyrene, 1-M, 2-M, and pH.

In addition, analytical results indicated that constituent concentrations in all samples from the Two E Ranch 2-11 wellhead were in compliance with COGCC Table 915-1 standards, with exception to pH in WH01 @ 6' & FLR01 @ 3'.

Following the approval of this form and landowner approval, PDC will install and conduct quarterly groundwater monitoring at the twelve proposed monitoring wells within and surrounding the Two E Ranch 2-11 tank battery excavation until closure criteria are met. Additionally, PDC will conduct a supplemental site investigation to evaluate pH in native material adjacent to the former excavation extent and wellhead. Proposed monitoring well installation and soil boring advancement will be completed by the end of the first quarter 2023.

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: 10/24/2022

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: BOB CHESSON

Date: 11/08/2022

Remediation Project Number: 22370

## COA Type

## Description

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

403168549	FORM 27-SUPPLEMENTAL-SUBMITTED
403169034	SOIL SAMPLE LOCATION MAP
403196965	SOIL SAMPLE LOCATION MAP
403196966	SOIL SAMPLE LOCATION MAP
403196969	SITE INVESTIGATION PLAN
403196972	SITE INVESTIGATION PLAN
403198987	ANALYTICAL RESULTS
403198988	PHOTO DOCUMENTATION
403198991	PHOTO DOCUMENTATION
403205976	SOIL SAMPLE LOCATION MAP
403205979	SOIL SAMPLE LOCATION MAP
403205982	ANALYTICAL RESULTS

Total Attach: 12 Files

## General Comments



<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)