

# 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:

402880597

Receive Date:

12/01/2021

Report taken by:

RICK ALLISON

## 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 #: 19634 Initial Form 27 Document #: 402756652

#### 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>123-14039</u>	County Name: <u>WELD</u>
Facility Name: <u>VONFELDT 13-12</u>		Latitude: <u>40.495307</u>	Longitude: <u>-104.618470</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>SWSW</u>	Sec: <u>12</u>	Twp: <u>6N</u>	Range: <u>65W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>
Facility Type: <u>LOCATION</u>	Facility ID: <u>327034</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>VONFELDT-66N65W 12SWSW</u>		Latitude: <u>40.495244</u>	Longitude: <u>-104.618768</u>
		** correct Lat/Long if needed: Latitude: <u>40.495086</u>	Longitude: <u>-104.618131</u>
QtrQtr: <u>SWSW</u>	Sec: <u>12</u>	Twp: <u>6N</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 Agriculture

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**

Tank Battery: Nearest Well: Domestic - 1,565 feet NW, Surface Water: Unnamed Freshwater Pond - 45 feet SW / Willow Creek #2 - 54 feet SE, Occupied Buildings: 161 feet SSW / 707 feet SW, Livestock: 854 feet SW, FWS Wetlands: Freshwater Pond (PUBFx) - 45 feet SW / Riverine (R4SBCx) - 54 feet SE

Wellhead: Nearest Well: Domestic - 1,430 feet NW, Surface Water: Unnamed Freshwater Pond - 92 feet S, Occupied Buildings: 162 feet SSW / 706 feet SW, Livestock: 808 feet SW, FWS Wetlands: Freshwater Pond (PUBFx) - 92 feet SW

Flowline conflict possible as both wellhead and flowline are located <100 feet from surface water and FWS wetlands

Flowline conflict possible as tank battery is located <100 feet from surface water and FWS wetlands

## **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
No	GROUNDWATER	Refer to Table 5, Figures 1 & 2	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Tables 1-4, Figures 1 & 2	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 September 2, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the former Von Feldt 13-12 wellhead, associated flowline, and tank battery. During decommissioning activities, historic hydrocarbon impacts were discovered at the wellhead. Following this discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. During excavation activities, groundwater was encountered in the excavation at approximately 6 feet below ground surface (bgs). Approximately 8 cubic yards (cy) of impacted material were excavated and transported to the North Weld Waste Management Facility 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 ):

On September 2, 2021, two soil samples (WH01 & WH01-N) were collected from the impacted source material at approximately 6 feet and 5 feet bgs, respectively, and were submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicated that contaminants of concern (COC) include: benzene, toluene, ethylbenzene, xylene(s) (BTEX), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, naphthalene (N), total petroleum hydrocarbons (TPH), arsenic, barium, lead, and selenium. Additionally on September 2, 2021, three (3) soil samples (WH01-[direction]) were collected from the remaining three sidewalls of the excavation at approximately 5 feet bgs and were submitted for laboratory analysis of BTEX, 1,2,4-TMB, 1,3,5-TMB, N, and TPH. In addition, one soil sample (FLR01) was collected at approximately 2.5' bgs adjacent to the flowline riser and submitted for laboratory analysis of Table 915-1 organic constituents, ph, EC, SAR, and boron.

### Proposed Groundwater Sampling

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

On September 2, 2021, one groundwater sample (GW01) was collected from the wellhead excavation and submitted for laboratory analysis of BTEX, N, 1,2,4-TMB and 1,2,5-TMB. Analytical results indicated that all analyzed constituents were below the applicable COGCC Table 195-1 Standards. The groundwater sample location is illustrated on Figure 2 and the analytical results are summarized on Wellhead Table 5.

During tank battery decommission activities, groundwater was encountered below the separator and produced water vessel at approx. 3 ft. to 4 ft bgs. Consequently, groundwater samples (GW01 - GW03) were collected below the separator flowline, separator dump line, and produced water vessel, respectively. All three samples were submitted for laboratory analysis of BTEX, N, 1,2,4-TMB and 1,2,5-TMB. Analytical results indicated that all analyzed constituents were below the applicable COGCC Table 195-1 Standards. The groundwater sample location is illustrated on tank battery Figure 1.

### 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 closure activities conducted on September 2, 2021, soil encountered on-site and below production equipment was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Per the approved proposed soil sampling plan, samples were collected adjacent to the cut and capped wellhead, between ground surface and 6 inches in the four cardinal directions surrounding the wellhead, below and/or adjacent to the separator flowline and dump line (SEP01-FL, SEP01-DL), the base and sidewalls of the produced water vessel (PWV01-B, PWV01-[direction]), and below the AST (AST01). The samples were submitted for laboratory analysis of BTEX, naphthalene, 1, 2, 4- TMB, 1, 3, 5-TMB, and TPH (C6-C36). In addition, the samples collected adjacent to the produced water vessel were submitted for laboratory analysis of pH, EC, SAR, and boron.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 11

Number of soil samples exceeding 915-1 6

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 280

### NA / ND

ND Highest concentration of TPH (mg/kg)

-- Highest concentration of SAR 0.221

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 6

### Groundwater

Number of groundwater samples collected 4

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 3'

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 0

ND Highest concentration of Benzene (µg/l)

ND Highest concentration of Toluene (µg/l)

ND Highest concentration of Ethylbenzene (µg/l)

-- Highest concentration of Xylene (µg/l) 29

NA Highest concentration of Methane (mg/l)

### Surface Water

0 Number of surface water samples collected

0 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 September 2, 2021, two background soil sample (BKG01) were collected at approximately 5 feet and 6 feet bgs, respectively, and submitted for analysis of pH, EC, SAR and the COGCC Table 915 -1 metals. Analytical results indicate pH, arsenic, and selenium were in exceedance of the applicable regulatory standards.

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

Volume of solid waste (cubic yards) 8

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

Two (2) additional background soil borings will be advanced adjacent to the former wellhead excavation extent to evaluate Table 915 metal concentrations in native material. The proposed background soil boring locations are illustrated on Figure 4.

Five (5) groundwater 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. 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 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 5.

## 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.

On September 2, 2021, approximately 8 CY of impacted material were removed from the excavation and transported to the North Weld Waste Management Facility in Ault, Colorado 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 analytical results.

Soil Remediation Summary

☐ In Situ

☒ Ex Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Other \_\_\_\_\_

Yes \_\_\_\_\_ Excavate and offsite disposal

If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 8

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 source mass removal activities, PDC will conduct quarterly groundwater monitoring at the 5 proposed monitoring wells until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B in accordance with Table 915-1. In addition, site specific inorganic parameters, including total dissolved solids (TDS), chlorides, and sulfates, will be evaluated at at all proposed monitoring well locations during the first quarter 2022.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

#### Approved Reporting Schedule:

☐ Quarterly☐ Semi-Annually☐ Annually☒ Other

Confirmation Sampling 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 Sampling Summary, Analyte Reduction Request, Supplemental Site Investigation Proposal

### 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 8

E&P waste (solid) description Hydrocarbon impacted soils

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

Non-COGCC Disposal Facility: North Weld 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: \_\_\_\_\_

## 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 facility decommissioning and excavation 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.

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. 10/05/2021

Proposed date of completion of Reclamation. 11/30/2026

## 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. 06/25/2021

Actual Spill or Release date, or date of discovery. 09/02/2021

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 08/16/2021

Proposed site investigation commencement. 08/16/2021

Proposed completion of site investigation. 03/31/2022

## REMEDIAL ACTION DATES

Proposed start date of Remediation. 09/02/2021

Proposed date of completion of Remediation. 11/30/2026

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 WH01 and WH01-N, PDC is requesting that the COCs for the historic release discovered at the Von Feldt 13-12 Wellhead be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH, arsenic, barium, lead, and selenium.

Following the approval of this form, PDC will conduct a supplemental site investigation to evaluate Table 915 metal concentrations in native material and install and conduct quarterly groundwater monitoring at the 5 proposed monitoring wells until closure criteria are met.

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: ` 12/01/2021

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: RICK ALLISON

Date: 12/15/2021

Remediation Project Number: 19634

**Condition of Approval****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**

402880597	FORM 27-SUPPLEMENTAL-SUBMITTED
402883630	SOIL SAMPLE LOCATION MAP
402883632	SOIL SAMPLE LOCATION MAP
402883633	SOIL SAMPLE LOCATION MAP
402883634	SITE INVESTIGATION PLAN
402883635	SITE INVESTIGATION PLAN
402883641	ANALYTICAL RESULTS
402883642	ANALYTICAL RESULTS
402883644	PHOTO DOCUMENTATION
402883646	PHOTO DOCUMENTATION

Total Attach: 10 Files

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

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

Total: 0 comment(s)