

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:

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: PDC ENERGY INC	Operator No: 69175	<b>Phone Numbers</b>
Address: 1099 18TH STREET SUITE 1500		Phone: (303) 860-5800
City: DENVER State: CO Zip: 80202		Mobile: ( )
Contact Person: Karen Olson	Email: taspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 18936 Initial Form 27 Document #: 402719490

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: WELL	Facility ID: _____	API #: 123-12813	County Name: WELD
Facility Name: WILLMAN 42-16	Latitude: 40.314433	Longitude: -104.660546	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SENE	Sec: 16	Twp: 4N	Range: 65W Meridian: 6 Sensitive Area? Yes

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**

Nearest Well: Domestic/Livestock - 494 feet NE, Surface Water: Unnamed (Livestock) Pond - 575 feet E, Occupied Buildings: 480 feet NE, Livestock: 580 feet SE, FWS Wetlands: Freshwater Emergent Wetland - 1,580 feet SW

Battery/Flowline conflict unlikely, but end of flowline and facility is located ~140 feet from surface water

# 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	GROUNDWATER	Refer to Table 5 and Figure 1 & 3	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Tables 1-4 and 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 September 30, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the former Willman 42-16 Wellhead and associated flowline. 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 35 cubic yards (CY) of impacted material were excavated and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. Additionally, approximately 5 barrels (bbls) of impacted groundwater were removed from the excavation and transported to the NGL C6 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 30, 2021, one soil sample (WH01) was collected adjacent to the cut and capped wellhead from the impacted source material at approximately 6 feet bgs and submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicated contaminants of concern (COC) include BTEX, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, naphthalene, TPH (C6-C36), anthracene, fluorene, 1-Methylnaphthalene (M), and 2-M. Additionally, on October 7, 2021, nine soil samples (SS01-SS09) were collected from the base and sidewalls of the excavation at depths ranging between 4 feet and 8 feet bgs. The samples were submitted for laboratory analysis of the above referenced COCs. Analytical results indicated that organic compound concentrations were below the applicable COGCC Table 915-1 Protection of Groundwater SSLs in all samples collected 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 September 30, 2021, one groundwater sample (GW01) was collected from the wellhead excavation and was submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that all analyzed constituents were below the applicable COGCC Table 915-1 Standards.

### **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 30, 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, one soil sample (FLR01) was collected below the flowline riser at approximately 4 feet bgs and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH (C6-C36), PAHs, pH, EC, SAR, and boron. Analytical results indicated that organic compound concentrations were below the applicable COGCC Table 915-1 Protection of Groundwater SSLs.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 12

Number of soil samples exceeding 915-1 1

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

Approximate areal extent (square feet) 221

### NA / ND

-- Highest concentration of TPH (mg/kg) 3.4

-- Highest concentration of SAR 4.69

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 6

### Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 6

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) \_\_\_\_\_

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 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 30, 2021, two background soil samples (BKG01) were collected at approximately 4 feet and 6 feet bgs, respectively, from native material topographically up-gradient of the wellhead. Due to laboratory hold times constraints, this sample was not analyzed for COGCC Table 915-1 metals. Additionally, on October 7, 2021, one background soil sample (BKG02) was collected from approximately 8 feet bgs from native material topographically up-gradient of the wellhead and was submitted for analysis of COGCC Table 915-1 metals. Analytical results indicated arsenic and selenium were in exceedance of the applicable regulatory standards in native soil.

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

Volume of solid waste (cubic yards) 35

Volume of liquid waste (barrels) 5

Is further site investigation required?

On June 7, 2022, five (5) groundwater monitoring wells (BH01-BH05) were installed via hand auger 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 were recorded for each borehole.

## 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 October 7, 2021, approximately 35 CY of impacted solids were removed from the excavation and transported to North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Additionally, groundwater vacuum recovery was conducted concurrent with excavation activities and approximately 5 barrels of groundwater were removed from the excavation and transported to the NGL C6 facility 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.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this site between the second quarter 2022 and the first quarter 2023.

## Soil Remediation Summary

In Situ

Ex Situ

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

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

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

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 35

\_\_\_\_\_ 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 June 10, 2022, PDC initiated quarterly groundwater monitoring at the five site monitoring wells (BH01-BH05) at the former Willman 42-16 Wellhead location. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDS) by Method SM 2540C in accordance with Table 915-1.

First quarter 2023 groundwater analytical results indicated that organic compound concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in all five monitoring well locations. Chloride and sulfate anion concentrations were in compliance with the applicable regulatory standards and within 1.25x the background concentrations recorded during the first quarter 2023. The TDS concentration in monitoring well BH05 was greater than 1.25x the background concentration recorded during the first quarter 2023.

Inorganic parameter trends were examined over time and compared to historic background data and groundwater flow direction. Based on this data, TDS and sulfate anion concentrations have been within the 125% threshold of the historic maximum background concentration for four consecutive quarters. Based on this data and the absence of organic exceedances in soil and groundwater on site, the inorganic exceedances recorded in monitoring well BH01 during the second quarter 2022 and monitoring well BH05 during the first quarter 2023 are within historic background levels.

# 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 \_\_\_\_\_

## 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.

Financial assurance information was included in the second quarter 2022 Supplemental Form 27 (Document No. 403125784). This project has been completed and no further assistance or remediation is required at this time.

Operator anticipates the remaining cost for this project to be: \$ 1000

## 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:

Volume of E&P Waste (solid) in cubic yards 35

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 5

E&P waste (liquid) description Hydrocarbon impacted groundwater

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

Non-COGCC Disposal Facility: NGL C6

## REMEDIATION COMPLETION REPORT

### REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? Yes

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? Yes

Does the previous reply indicate consideration of background concentrations? Yes

Does Groundwater meet Table 915-1 standards? Yes

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.

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. 10/07/2021

Proposed date of completion of Reclamation. 04/21/2024

## 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. 05/26/2021

Actual Spill or Release date, or date of discovery. 10/04/2021

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/12/2021

Proposed site investigation commencement. 07/12/2021

Proposed completion of site investigation. 06/07/2022

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/07/2021

Proposed date of completion of Remediation. 03/15/2023

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:

Based on first quarter 2023 groundwater analytical results and the results of the inorganic parameter trend assessment, this project has been completed and no further remediation is required at this time.

**OPERATOR COMMENT**

During the first quarter 2023, four consecutive quarters of organic compound concentrations and chloride anion concentrations in compliance with the applicable COGCC Table 915-1 regulatory standards were achieved at the former Willman 42-16 Wellhead location.

Additionally, inorganic parameter trends were examined over time and compared to historic background data and groundwater flow direction. Based on this data, TDS and sulfate anion concentrations have been within the 125% threshold of the historic maximum background concentration for four consecutive quarters. Based on this data and the absence of organic exceedances in soil and groundwater on site, the inorganic exceedances recorded in monitoring well BH01 during the second quarter 2022 and monitoring well BH05 during the first quarter 2023 are within historic background levels and 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: Senior Program Manager

Submit Date: \_\_\_\_\_

Email: taspillremediationcontractor@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: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 18936

**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**

403381111	GROUND WATER ELEVATION MAP
403381112	GROUND WATER SAMPLE LOCATION
403381113	GROUND WATER SAMPLE LOCATION
403406951	ANALYTICAL RESULTS

Total Attach: 4 Files

**General Comments**

**User Group**

**Comment**

**Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)