

State of Colorado  
Energy & Carbon Management Commission

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Document Number:

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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	Phone Numbers
Address: 1099 18TH STREET SUITE 1500		Phone: (303) 860-5800
City: DENVER	State: CO	Zip: 80202
Contact Person: Karen Olson	Email: taspillremediationcontractor@pdce.com	Mobile: ( )

## PROJECT, PURPOSE &amp; SITE INFORMATION

## PROJECT INFORMATION

Remediation Project #: 21647 Initial Form 27 Document #: 402905269

## 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 #: 123-21776	County Name: WELD
Facility Name: ECKHARDT 43-34	Latitude: 40.354020	Longitude: -104.528640	
	** correct Lat/Long if needed: Latitude: 40.354040	Longitude: -104.528645	
QtrQtr: NESE	Sec: 34	Twp: 5N	Range: 6W
Meridian: 6	Sensitive Area? Yes		

## SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Residential / 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? Yes

## Other Potential Receptors within 1/4 mile

Nearest Well: Domestic - 1,320' N; Surface Water: Irrigation Ditch - 575' S; Occupied Building: 655' SE; Livestock: 0' (Within Pasture); FWS Wetlands: 575' S Riverine (R5UBFx).

Flowline conflict - Flowline crosses under irrigation ditch approximately 645' SSE of the wellhead; flowline then runs east towards the tank battery.

## 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 Document No. 403478996	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Document No. 403478996	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.

Between March 11 and 14, 2022, field screening and confirmation soil sampling was conducted in accordance with the ECOM Rule 911 during the decommissioning of the Eckhardt 43-34 wellhead (Figure 1). Based on observed soil staining and olfactory impacts, it was determined that a historic release was discovered adjacent to the former wellhead. Additionally, during the in-situ abandonment of the flowline, soil staining and olfactory impacts were observed, it was determined that a historic release was discovered adjacent to the separator flowline riser. Following the discovery of the releases, mitigation activities were initiated and to date, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. During excavation activities, groundwater was encountered at adjacent to the wellhead at approximately 6.5 feet bgs and approximately 5.5 feet bgs adjacent to the separator flowline riser. Groundwater vacuum recovery was not conducted during excavation activities.

### 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 11, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the wellhead at 6 feet bgs and submitted for laboratory analysis of the full ECOM Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), arsenic and lead, based upon analytical results. Additionally on March 11, 2022, ten (10) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were below the applicable ECOM Table 915-1 standards. One soil sample (SS11) was collected from the sidewall of the final excavation extent at approximately 2.5 feet bgs to evaluate soil suitability for reclamation.

#### Proposed Groundwater Sampling

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

On March 11, 2022, during excavation activities, groundwater was encountered adjacent to the wellhead at approximately 6.5 feet bgs. 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 organic compound concentrations were below the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

On March 14, 2022, during excavation activities, groundwater was encountered adjacent to the separator at approximately 5.5 feet bgs. 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 1,2,4-TMB concentrations were in exceedance of the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

#### 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 ):

On March 14, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the separator flowline riser at 4 feet bgs and submitted for laboratory analysis of the full ECMC Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, pyrene, 1-M and 2-M, based upon analytical results. Additionally on March 14, 2022, seven (7) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were in exceedance of the applicable ECMC Table 915-1 standards in multiple base and sidewall samples. Excavation activities were temporarily discontinued due to the active status of the tank battery.

## SITE INVESTIGATION REPORT

### SAMPLE SUMMARY

#### Soil

Number of soil samples collected 29

Number of soil samples exceeding 915-1 14

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

Approximate areal extent (square feet) 300

#### NA / ND

-- Highest concentration of TPH (mg/kg) 2780

-- Highest concentration of SAR 14.3

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 7

#### Groundwater

Number of groundwater samples collected 2

Was extent of groundwater contaminated delineated? No

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

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 1

ND Highest concentration of Benzene (µg/l)

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 17

-- Highest concentration of Xylene (µg/l) 37

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 March 11, 2022, three (3) background soil samples (BKG01) were collected at approximately 2.5 feet, 4 feet, & 6 feet, bgs from native material adjacent to the wellhead. All background soil samples were submitted for analysis of SAR and ECMC Table 915-1 metals. Analytical results indicated that SAR, arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil adjacent to the wellhead. Additionally, on March 14, 2022, three (3) background soil samples (BKG02) were collected at approximately 4 feet, 6 feet, & 7 feet, bgs from native material adjacent to the separator flowline riser. In addition, on October 10, 2022, five (5) background soil borings (BKG02-BKG06) were advanced in native material adjacent to the final wellhead excavation extent and submitted for laboratory analysis of Table 915-1 metals. Analytical results indicated that arsenic, barium, lead, 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) 18

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

Based on analytical results and per the COA issued in the approved Supplemental Form 27 (Document No. 403221432), on March 29, 2023, nine soil borings (SB01-SB09) were advanced to approximately 7 feet and 10 feet bgs to vertically and horizontally delineate arsenic and lead exceedances recorded during excavation activities. Volatile organic concentrations (VOC) using a photoionization detector (PID) and lithologic descriptions were recorded for each borehole. Forty-two (42) soil samples were collected from the soil borings at depths ranging from 4 feet to 10 feet bgs and were submitted to Summit Scientific Laboratory for analysis of arsenic and lead.

Between January 17 & 18, 2024, thirteen (13) soil borings (SB10-SB22) were advanced within and adjacent to the wellhead final excavation extent to define the vertical and horizontal extent of arsenic and lead concentrations. In addition, one background soil boring (BKG07) was advanced in native material adjacent to the tank battery location to assess arsenic and lead concentrations. The soil boring locations are illustrated on Figure 1. Receipt and evaluation of laboratory analytical results are pending and will be provided in a forthcoming Supplemental Form 27.

## 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 11 and 14, 2022, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. No groundwater was recovered during 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.

Based on analytical results received from the initial groundwater assessment, monitored natural attenuation was selected as the remediation strategy for this location between the fourth quarter 2022 and the third quarter 2023. During the third quarter 2023, four consecutive quarters of organic compound concentrations in accordance with the applicable ECMC Table 915-1 regulatory standards were achieved. Consequently, PDC was granted the request to discontinue groundwater monitoring at this remediation project per ECMC document no. 403478996.

Between January 17 & 18, 2024, thirteen (13) soil borings (SB10-SB22) were advanced within and adjacent to the wellhead final excavation extent to define the vertical and horizontal extent of arsenic and lead concentrations. In addition, one background soil boring (BKG07) was advanced in native material adjacent to the tank battery location to assess arsenic and lead concentrations. The soil boring locations are illustrated on Figure 1. Analytical results are pending and will be provided in a forthcoming Supplemental Form 27.

A remediation strategy will be selected following the evaluation of soil analytical results for samples collected during the above mentioned supplemental site investigation activities.

Supporting documentation was included on the previously submitted Supplemental Form 27 Document No. 403596552 & 403498946.

### Soil Remediation Summary

☐ In Situ

☒ Ex Situ

Bioremediation ( or enhanced bioremediation )

Yes Excavate and offsite disposal

Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) 18

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 October 21, 2022, groundwater monitoring was initiated at the five site monitoring wells (BH01 - BH05) at the former Eckhardt 43-34 wellhead location. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B in accordance with Table 915-1. Per the approved Supplemental Form 27 (Document No. 403221432), chloride and sulfate anions and TDS were removed from the quarterly sampling and analysis plan following the fourth quarter 2022.

During the third quarter 2023, four consecutive quarters of organic compound concentrations in accordance with the applicable ECMC Table 915-1 regulatory standards were achieved. Consequently, PDC was granted the request to discontinue groundwater monitoring at this remediation project per ECMC document no. 403478996.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

#### Approved Reporting Schedule:

☒ Quarterly ☐ Semi-Annually ☐ Annually ☐ Other First Quarter 2024 - Timeline Update

#### ☐ 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 First Quarter 2024 - Timeline Update

### 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 and delineation has been completed for organics in soil. Metals delineation is ongoing.
- Source mass removal has been completed.
- Groundwater closure criteria was achieved during the third quarter 2023 and the request to discontinue was subsequently approved.
- 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: \$ 10000

### 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 18

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 source mass removal activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the ECMC 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. 01/10/2022

Proposed date of completion of Reclamation. 05/30/2027

### 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. 11/18/2021

Actual Spill or Release date, or date of discovery. 03/11/2022

#### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/10/2022

Proposed site investigation commencement. 01/17/2024

Proposed completion of site investigation. 01/18/2024

#### REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/11/2022

Proposed date of completion of Remediation. 05/30/2027

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:

Due to pending analytical results for the soil samples collected during the supplemental site investigation conducted between January 17 & 18, 2024, the proposed date of site investigation completion has been adjusted to span January 17 & 18, 2024, to reflect the commencement and completion dates of the supplemental site investigation. A subsequent Supplemental Form 27 will be submitted within 90 days of the completion of the supplemental site investigation.

## OPERATOR COMMENT

This form is being submitted as a first quarter 2024 timeline update and update for the supplemental site investigation activities conducted between January 17 & 18, 2024, at the Eckhardt 43-34 wellhead. Soil boring locations are illustrated on Figure 1. Per ECMC request, tables and figures previously submitted have not been included with this form submittal. Please refer to ECMC document no.403478996 for previously submitted tables and figures.

During the third quarter 2023, four consecutive quarters of organic compound concentrations in accordance with the applicable ECMC Table 915-1 regulatory standards were achieved. Consequently, PDC was granted the request to discontinue groundwater monitoring at this remediation project per ECMC document no. 403478996.

Due to the pending analytical results and subsequent evaluation, a forthcoming Supplemental Form 27 will be submitted within 90 days of completing the supplemental site investigation.

A COA was issued on the previously approved Supplemental Form 27 Document no. 403478996 stating: "COGCC approves Operator proposal to discontinue groundwater monitoring. However, additional groundwater monitoring for metals may be required dependent on the additional site investigation results." Following the receipt and evaluation of the January 17 & 18, 2024 site investigation data, this COA will be addressed on a forthcoming supplemental form 27.

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: 21647

## 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

403696770	SOIL SAMPLE LOCATION MAP
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Total Attach: 1 Files

## General Comments

### User Group

### Comment

### Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)