

State of Colorado  
Energy & Carbon Management Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
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Document Number:

403755978

Receive Date:

05/07/2024

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 ECMC 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 #: 22464 Initial Form 27 Document #: 402965674

## 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: LOCATION	Facility ID: 472211	API #: _____	County Name: WELD
Facility Name: Noffsinger 11, 31-33	Latitude: 40.449607	Longitude: -104.556693	
	** correct Lat/Long if needed: Latitude: 40.449596	Longitude: -104.556882	
QtrQtr: NENW	Sec: 33	Twp: 6N	Range: 64W Meridian: 6 Sensitive Area? Yes

## 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? No

Is groundwater less than 20 feet below ground surface? Yes

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

Surface Water: Owl Creek - 1,440' E; Occupied Building: 835' NNE; FWS Wetlands: 1,440' E Riverine (R4SBC).

## 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 1 and Figure 1	Confirmation Groundwater Sampling
Yes	SOILS	Refer to ECMC Doc No. 403101510	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 January 25, 2022, a release was discovered at the separator flowline riser during decommissioning activities and abandonment of the Noffsinger 11-33 wellhead and flowline. Based on the results collected during site investigation and excavation activities, PDC determined that the Noffsinger 11, 31-33 tank battery will be decommissioned and not be rebuilt. Due to the status change, and size of the excavation extent, confirmation soil samples and photos were not collected during the removal of the production equipment. However, all former production equipment was within the excavation extent footprint. During excavation activities, groundwater was encountered in the excavation at approximately 12 feet below ground surface (bgs). To date, a total of 4,182 cubic yards (cy) of impacted material were excavated and transported to the North Weld Waste Management Facility and Buffalo Ridge Landfill for disposal under PDC waste manifests. In addition, groundwater vacuum recovery was conducted concurrent to excavation activities and to date 5,850 barrels (bbls) of groundwater were removed from the excavation and transported to NGL C4 for disposal under PDC waste manifests. On January 24, 2022, one soil sample (SEP01-FL) was collected from the separator flowline riser at approximately 8 feet bgs and was submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). Analytical results indicated that organic compound concentrations exceeded the applicable ECMC Table 915-1 standards. Between January 25 and February 15, 2022, three (3) soil samples (SS01, SS11, & SS19) were collected from impacted source material between approximately 9 feet and 10 feet bgs. The samples were submitted for laboratory analysis of the full ECMC Table 915-1 analyte suite. Analytical results indicated preliminary COCs for the historic release as: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, 1-M, 2-M, pH, arsenic, and barium.

## 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 January 25 and March 7, 2022, twenty-two soil samples (TP02, TP07, TP09-TP12) were collected from test pits (Figure 1) at depths ranging from 6' to 14.5' bgs to delineate the extent of impacts. Soil samples were submitted for laboratory analysis of BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH. In addition, Soil samples (SS02, SS09, SS10) were submitted for additional laboratory analysis of chrysene, fluorene, 1-M and 2-M. Following test-pit advancement activities, excavation extent soil samples (SS17-SS18, SS22-SS24, SS27-SS29, SS32-SS33, SS39-SS40, SS43, SS45-SS49, SS53-SS54, SS57-SS61, SS67-SS68, SS76-SS80) were collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the above mentioned COCs.

### Proposed Groundwater Sampling

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

On January 25, 2022, 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 compounds were in exceedance of the applicable ECMC 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 ):

Following a COA issued on Initial Form 27 document #402965674 and subsequent communication with the ECMC, soil samples (SS12-SS16 & SS20-SS21, SS25-SS26, SS30-SS31, SS34-SS38, SS41-SS42, SS44, SS50-SS52, SS55-SS56, SS62-SS66, SS69-SS75, & SS81-SS83) were submitted for laboratory analysis of the full ECMC Table 915-1 analytical suite. Soil samples (SS84-SS87) were collected from the excavation sidewalls at 2.5 feet bgs and submitted for laboratory analysis of pH, EC, SAR, and boron. Final analytical results indicate that organic compound concentrations were below the applicable ECMC Table 915-1 Protection of Groundwater SSLs in soil samples from the final excavation extent.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 104

Number of soil samples exceeding 915-1 34

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

Approximate areal extent (square feet) 16720

### NA / ND

-- Highest concentration of TPH (mg/kg) 390

-- Highest concentration of SAR 2.87

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 14

### Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 12

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 1

-- Highest concentration of Benzene (µg/l) 1700

-- Highest concentration of Toluene (µg/l) 44

-- Highest concentration of Ethylbenzene (µg/l) 2.6

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

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?

Eleven (11) background soil samples (BKG02 & BKG03) were collected upgradient of the excavation between 2.5' and 14' bgs and submitted for laboratory analysis of Table 915-1 metals. Soil samples collected from BKG03 were submitted for additional analysis of pH. Analytical results indicate arsenic and barium are in exceedance of the Protection of Groundwater SSLs in native soil adjacent to the excavation. Additionally, barium was in exceedance of the Protection of Groundwater SSLs in background soil samples BKG02 @ 8', BKG02 @ 14', BKG03 @ 2.5', and BKG03 @ 8'. pH was observed in exceedance of the Soil Suitability for Reclamation Standard in background soil sample BKG03 @ 14' bgs.

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

Volume of solid waste (cubic yards) 4182

Volume of liquid waste (barrels) 5850

☒ Is further site investigation required?

Between December 15, and December 20, 2022, 20 monitoring wells (BH01-BH20) were installed at the Noffsinger 11, 31-33 tank battery location to delineate dissolved-phase hydrocarbon impacts within and adjacent to the former excavation extent. Lithologic descriptions and VOC concentrations measured using a PID were recorded for each monitoring well. Due to elevated PID readings recorded during installation activities, a soil sample was collected from monitoring well BH18 from the interval exhibiting the highest VOC concentrations as well as, from the terminus of the soil boring. Two soil samples were submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH(C6-C36), chrysene, fluorene, 1-M, 2-M, pH, arsenic, barium, cadmium, and lead.

Soil analytical results indicated that organic compound concentrations, pH, and cadmium were in compliance with the applicable ECOM Table 915-1 regulatory standards in monitoring well BH18. Arsenic, barium, and lead concentrations were in exceedance of the applicable regulatory standards in monitoring well BH18.

Background analytical results indicated that pH was in exceedance of the applicable regulatory standard in all five background soil boring locations. Additionally, 2 out of 3 waste characterization samples (SS11 and SS19) are below the background pH levels recorded in 7 background soil sample locations. The remaining 4 confirmation soil samples in exceedance of background pH levels are within 0.1 of background soil sample BKG07@9'. Based on this data, the pH levels recorded in confirmation samples collected from the final excavation extent are not a result of oil and gas operations and indicative of native soil conditions.

On February 19, 2024, one monitoring well (BH14R) was installed adjacent to monitoring well BH14 which was destroyed during agricultural operations. Lithologic descriptions and VOC concentrations measured using a PID were recorded for the monitoring well.

## 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 January 25 and March 7, 2022, a total of 4,182 cubic yards (CY) of impacted material were excavated and transported to the North Weld Waste Management Facility and Buffalo Ridge Landfill for disposal under PDC waste manifests. In addition, groundwater vacuum recovery was conducted concurrent to the excavation activities and to date 5,850 barrels (bbls) of groundwater were removed from the excavation and transported to NGL C4 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.

Per the condition of approval (COA) issued by the ECMC in the approved Supplemental Form 27 (Document No. 403101510), samples were collected from each monitoring well during installation activities at approximately 2.5 feet bgs. Twenty soil samples were submitted to Summit for analysis of pH, EC, SAR, and boron. Soil analytical results indicated that inorganic concentrations were in compliance with the applicable regulatory standards or below background concentrations in all 20 monitoring well locations.

Per the approved Supplemental Form 27 (Document No. 403384437), Mann-Whitney-Wilcoxon rank-sum test results indicated that arsenic, cadmium, lead, and selenium concentrations were not significantly higher than background concentrations and consequently, representative of background conditions.

Additionally, in accordance to the COAs issued by the ECMC in the approved second quarter 2023 Supplemental Form 27 (Document No. 403313706), dissolved barium was added to the list of constituents to be monitored in groundwater.

Based on the four consecutive quarters of dissolved barium concentrations in compliance with the applicable regulatory standard, PDC is requesting to compare soil barium concentrations to ECMC Residential Soil Screening Levels (RSSLs). When compared to RSSLs, all barium concentrations on site are in compliance with regulatory standards and PDC is requesting to remove barium as a contaminate of concern for this remediation project. Soil analytical results are included as Attachment D.

Based on analytical results received from the initial groundwater monitoring assessment, monitored natural attenuation was the selected remediation strategy during the fourth quarter 2022 and will remain the selected remediation strategy through the second quarter 2024.

## Soil Remediation Summary

☐ In Situ

☒ Ex Situ

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

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

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

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) 4182

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

\_\_\_\_\_ Name of Licensed Disposal Facility or ECMC 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.

PDC will conduct quarterly groundwater monitoring at the 20 site monitoring wells (BH01 - BH13, BH14R, and BH15 - BH20) until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of chloride and sulfate anions by EPA Method 300.0 and total dissolved solids (TDS) by Method SM 2540C in accordance with Table 915-1. Per the approved Supplemental Form 27 (Document No. 403574379), benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB were removed from the quarterly sampling and analysis plan following the third quarter 2023.

During the first quarter 2024, four consecutive quarters of dissolved barium concentrations in compliance with the applicable CDPHE regulatory standard were achieved. Consequently, PDC is requesting to remove dissolved barium from the quarterly sampling and analysis plan.

Inorganic parameter concentration trends were examined over time and compared to historic background data and groundwater flow direction. Based on the data, inorganic analytical results indicated that TDS, chloride, and sulfate concentrations were in compliance of the applicable ECMC Table 915-1 regulatory standards and less than 1.25x the historic maximum background concentrations recorded in the up- and cross-gradient monitoring wells (BH01 – BH05 & BH11) in all sampled monitoring wells aside from BH20.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

#### Approved Reporting Schedule:

☒ Quarterly ☐ Semi-Annually ☐ Annually ☒ Other Analyte Reduction Request

#### ☐ 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 Analyte Reduction Request

### 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 2023 Supplemental Form 27 (Document No. 403461939). This section and estimate will be updated on an annual basis until closure criteria are achieved.

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 4182

E&P waste (solid) description Hydrocarbon impacted soils

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: North Weld Waste Management Facility & Buffalo Ridge Landfill

Volume of E&P Waste (liquid) in barrels 5850

E&P waste (liquid) description Groundwater

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: NGL C4

## 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 ECMC 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 tank battery 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 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. 01/24/2022

Proposed date of completion of Reclamation. 07/12/2027

## 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. 01/25/2022

Actual Spill or Release date, or date of discovery. 01/25/2022

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/24/2022

Proposed site investigation commencement. 12/15/2022

Proposed completion of site investigation. 12/20/2022

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 01/24/2022

Proposed date of completion of Remediation. 07/12/2027

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

This Supplemental Form 27 was submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the first quarter 2024 at the former Noffsinger 11, 31-33 tank battery location.

On February 19, 2024, one monitoring well (BH14R) was installed adjacent to monitoring well BH14 which was destroyed during agricultural operations.

During the first quarter 2024, four consecutive quarters of dissolved barium concentrations in compliance with the applicable CDPHE regulatory standard were achieved. Consequently, PDC is requesting to remove dissolved barium from the quarterly sampling and analysis plan.

Inorganic parameter concentration trends were examined over time and compared to historic background data and groundwater flow direction. Based on the data, inorganic analytical results indicated that TDS, chloride, and sulfate concentrations were in compliance of the applicable ECMC Table 915-1 regulatory standards and within 1.25x the historic maximum background concentrations in all sampled monitoring wells with the exception of BH20.

Based on the four consecutive quarters of dissolved barium concentrations in compliance with the applicable regulatory standard, PDC is requesting to compare soil barium concentrations to ECMC Residential Soil Screening Levels (RSSLs). When compared to RSSLs, all barium concentrations on site are in compliance with regulatory standards and PDC is requesting to remove barium as a contaminate of concern for this remediation project. Soil analytical results are included as Attachment D.

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: 05/07/2024

Email: [taspillremediationcontractor@pdce.com](mailto:taspillremediationcontractor@pdce.com)

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: RICK ALLISON

Date: 05/16/2024

Remediation Project Number: 22464

## COA Type

## Description

0 COA	

## ATTACHMENT 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

403755978	FORM 27-SUPPLEMENTAL-SUBMITTED
403782818	MONITORING REPORT

Total Attach: 2 Files

## General Comments

### User Group

### Comment

### Comment Date

Engineering Tech	ECMC agrees to remove dissolved barium from quarterly groundwater monitoring.	05/16/2024
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Total: 1 comment(s)