

State of Colorado  
Energy & Carbon Management Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
Phone: (303) 894-2100 Fax: (303) 894-2109

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403592345

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11/15/2023

Report taken by:

Alexander Ahmadian

## 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 #: 18120 Initial Form 27 Document #: 402688194

## 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: WELL	Facility ID: _____	API #: 123-09749	County Name: WELD
Facility Name: DINNER 2	Latitude: 40.308748	Longitude: -104.747662	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NESW	Sec: 14	Twp: 4N	Range: 66W Meridian: 6 Sensitive Area? Yes

  

Facility Type: LOCATION	Facility ID: 318704	API #: _____	County Name: WELD
Facility Name: DINNER-64N66W 14NESW	Latitude: 40.308575	Longitude: -104.747670	
** correct Lat/Long if needed: Latitude: 40.308318		Longitude: -104.747603	
QtrQtr: NESW	Sec: 14	Twp: 4N	Range: 66W 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**

Tank Battery: Nearest Well: Monitoring - 445 feet NE, Surface Water: Unnamed Irrigation Pond - 20 feet SW, Occupied Building - 1,125 feet W, Livestock - 1,010 feet W, FWS Wetlands - 250 feet SE.

Wellhead: Nearest Well: Monitoring 355 feet NE, Surface Water: 225 SE, Unnamed Holding/Retention Pond, Occupied Buildings: 1,100 feet W, Livestock: 1,035 feet W, FWS Wetlands: Freshwater Emergent Wetland: 465 feet SE

# 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. 403493784	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Document No. 403493784	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 July 7, 2021, historic hydrocarbon impacts were discovered near the production lines during decommissioning activities at the Dinner 2, E Unit 2 Tank Battery. Following the discovery, excavation activities were initiated to delineate and remove remaining hydrocarbon impacted material. During excavation activities, groundwater was encountered at approximately 13 feet below ground surface (bgs). Approximately 569.5 cubic yards of impacted material were removed and transported to the North Weld Landfill for disposal under PDC waste manifests. Petroleum hydrocarbon impacted soils were observed at a depth of 22 feet bgs from the excavation. In order to most efficiently determine the extent of soil impacts, eighteen (18) soil borings were advanced between July 20 and September 8, 2021 as detailed in the previously submitted Supplemental Form 27.

## 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 October 4 and December 14, 2021, twenty-three (23) soil borings (SB19 - SB34, & SB35R) were advanced via hollow-stem drilling methods to approximately 33 feet bgs. Lithologic descriptions and volatile organic compound (VOC) concentrations using a photoionization detector (PID) were recorded for each boring. Soil samples were collected from select depths within the unsaturated and saturated intervals based on the visual observations and VOC concentrations. The samples were submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36), arsenic, and selenium. Partial analytical results and VOC concentrations indicate organic compounds concentrations in exceedance of applicable ECMC Table 915 -1 SSLs have been defined vertically and horizontally.

### Proposed Groundwater Sampling

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

During excavation activities, groundwater was encountered at approximately 13 feet bgs. On July 7, 2021, one groundwater sample (GW01) was collected from the excavation and submitted for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB. Analytical results indicated that select organic compound concentrations were in exceedance of the applicable Table 915-1 groundwater 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 ):

Seven (7) remediation wells were installed on December 20 - 22, 2021, using hollow-stem drilling methodology. The remediation wells were utilized in a pilot test between January 18, and January 22, 2022, to measure the air sparge (AS) and soil vapor extraction (SVE) radius of influence to determine the viability and design of a potential full scale remediation system. The results of the pilot test indicated that the subsurface responded favorably to both AS and SVE remediation techniques.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 169  
Number of soil samples exceeding 915-1 140  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 76000

### NA / ND

-- Highest concentration of TPH (mg/kg) 5310  
-- Highest concentration of SAR 0.749  
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 33

### Groundwater

Number of groundwater samples collected 1  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 13  
Number of groundwater monitoring wells installed 0  
Number of groundwater samples exceeding 915-1 1

-- Highest concentration of Benzene (µg/l) 160  
-- Highest concentration of Toluene (µg/l) 1.7  
-- Highest concentration of Ethylbenzene (µg/l) 310  
-- Highest concentration of Xylene (µg/l) 6500  
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?

Based on the results from the initial drilling investigation conducted on the July 20 and July 21, 2021, the lateral extent of hydrocarbon impacts extend southwest and northwest beyond the lease boundary.

☐ Were background samples collected as part of this site investigation?

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

Volume of solid waste (cubic yards) 570 Volume of liquid waste (barrels) 345

☒ Is further site investigation required?

Based on the analytical results collected during the preliminary drilling investigation conducted from July 20 through December 14, 2021, petroleum hydrocarbon impacted soils have been defined vertically and horizontally. Further site investigation activities are required to assess arsenic and selenium concentrations in native soil on-site. Additional site investigation activities and groundwater monitoring plan will be determined following land-access approval.

## 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.

Following the discovery, approximately 569.5 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. During excavation activities, groundwater was encountered within the excavation at approximately 13 feet bgs. Groundwater vacuum recovery activities were conducted concurrent with excavation activities and approximately 345 barrels of groundwater were removed and transported to the NGL C6 Energy facility for disposal.

## REMEDICATION 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.

An AS/SVE pilot test was conducted between January 18, and January 22, 2022 at the 7 remediation wells to assess the efficacy of this remedial approach to address residual petroleum hydrocarbon impacts within the unsaturated and saturated intervals, as well as to acquire design parameters for full-scale implementation. Results of the pilot test indicated that the subsurface responded favorably to AS and SVE. Due to land-access impediments, further remediation implementation will commence at a later date.

Supporting documentation was included in previously submitted Supplemental Form 27 Document No. 403493784

## Soil Remediation Summary

☐ In Situ

☒ Ex Situ

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

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

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

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 570

\_\_\_\_\_ 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

\_\_\_\_\_ 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 until closure criteria are met. Following land-access agreements and prior to installation, a proposed monitoring well location map will be submitted for ECMC approval.

## 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.

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.

- Facility and infrastructure were decommissioned, and the location will be reclaimed in accordance with the ECMC 1000 Series.
- Additional site investigation and confirmation sampling will be conducted to evaluate ECMC Table 915-1 Metals in native soil.
- Investigation and delineation activities of organics in soils have been completed; petroleum hydrocarbon impacted soils remain in place.
- A full-scale SVE/AS remediation system is proposed for this location and planned pending landowner negotiations and completion of the current CDOT road construction on location.

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: \$

### 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

E&P waste (solid) description

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility:

Volume of E&P Waste (liquid) in barrels

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 tank battery, 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 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. 07/01/2021

Proposed date of completion of Reclamation. 12/17/2031

## 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. 11/10/2020

Actual Spill or Release date, or date of discovery. 07/07/2021

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/03/2021

Proposed site investigation commencement. 12/01/2023

Proposed completion of site investigation. 03/31/2024

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 07/01/2021

Proposed date of completion of Remediation. 12/17/2031

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:

Following the completion of the CDOT construction, a site access evaluation will be conducted to determine future site assessment, monitoring, and remediation capabilities, as these will be directly affected by the new surficial and subsurface transportation infrastructure. As such, the proposed date of site investigation commencement and the proposed date of the completion of site investigation was adjusted to span through the first quarter of 2024.

## OPERATOR COMMENT

This form is being submitted as a fourth quarter 2023 timeline update for the former Dinner 2, E Unit 2 location.

Supplemental Form 27s will be prepared and submitted on a quarterly schedule to provide updates and progress of the remediation until closure criteria has been achieved. Following the completion of the CDOT construction, a site access evaluation will be conducted to determine future site assessment, monitoring, and remediation capabilities, as these will be directly affected by the new surficial and subsurface transportation infrastructure. The AS/SVE pilot test indicated that the subsurface responded favorably to this remediation strategy, however, due to land-access impediments, selection, feasibility, and implementation of further remediation will be conducted following the completion of the CDOT construction. Following the implementation of a remediation strategy, remediation data will be provided on a quarterly basis per the COA issued by the ECMC in the approved Supplemental Form 27 (Document No. 403316517).

Supplemental site investigation activities will be conducted following land-access negotiations. A proposed soil boring location map will be submitted to the ECMC following completion of the current road construction by CDOT on location.

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: 11/15/2023

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: Alexander Ahmadian

Date: 01/04/2024

Remediation Project Number: 18120

### 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

403592345	INVESTIGATION/REMEDIATION WORKPLAN (SUPPLEMENTAL)
403644537	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 2 Files

## General Comments

### User Group

### Comment

### Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)