

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

403826338

Receive Date:

07/07/2024

Report taken by:

RICK ALLISON

## Site Investigation and Remediation Workplan (Initial 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 ECOM 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 Phone: (970) 313-5582 Mobile: ( )
Address: 1099 18TH STREET SUITE 1500		
City: DENVER	State: CO Zip: 80202	
Contact Person: Jason Davidson	Email: FRspillremediationcontractor@pdce.com	

## PROJECT, PURPOSE &amp; SITE INFORMATION

## PROJECT INFORMATION

Remediation Project #: 36122 Initial Form 27 Document #: 403826338

## 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: SPILL OR RELEASE	Facility ID: 486346	API #: _____	County Name: WELD
Facility Name: Raindance FD Off-Site #20-202HNX		Latitude: 40.455451	Longitude: -104.927633
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: SESE	Sec: 30	Twp: 6N	Range: 67W Meridian: 6 Sensitive Area? Yes

## SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Golf Course, Hoedown Hill Ski Area

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

Occupied Buildings within 1/4 mile- 865' SE, 1,160' SE, 1,180' SE, 1,300' E  
High Priority Habitats within 1/4 mile - Edge of a Bald Eagle Active Nest Site Half Mile Buffer in place 1,290' NW  
Oil and Gas Production Operations- 1,079' NE, 1,300' S

No other potential receptors are located within 1/4 mile of the Site.  
Above distances are approximations.

## SITE INVESTIGATION PLAN

### TYPE OF WASTE:

☒ E&P Waste ☐ Other E&P Waste ☐ Non-E&P Waste

☒ Produced Water ☐ Workover Fluids

☒ Oil ☐ Tank Bottoms

☒ Condensate ☐ Pigging Waste

☐ Drilling Fluids ☐ Rig Wash

☐ Drill Cuttings ☐ Spent Filters

☐ Pit Bottoms

☐ Other (as described by EPA)

### DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
No	GROUNDWATER	Not impacted	Not encountered
Yes	SOILS	7,000' sq. x 3' deep (Hydrocarbons)	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 3/22/2024, an equipment failure on a bulk separator resulted in a release of 170 barrels (bbls) of an oil/water fluid mix. Approximately 98 bbls of fluid were recovered via hydrovac. The fluid was contained within an unlined steel secondary containment area. Upon discovery, the facility was shut in and clean up operations commenced. Between 3/22/2024 and 4/9/2024, approximately 832 cubic yards (CY) of impacted soil were removed via hydrovac or hand digging.

### 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 ):

#### Proposed Groundwater Sampling

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

#### 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 ):

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 80

Number of soil samples exceeding 915-1 37

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

Approximate areal extent (square feet) 7000

### NA / ND

-- Highest concentration of TPH (mg/kg) 22038

-- Highest concentration of SAR 4.22

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 3

### Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet)

Number of groundwater monitoring wells installed

Number of groundwater samples exceeding 915-1

Highest concentration of Benzene (µg/l)

Highest concentration of Toluene (µg/l)

Highest concentration of Ethylbenzene (µg/l)

Highest concentration of Xylene (µg/l)

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?

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

Volume of solid waste (cubic yards)

Volume of liquid waste (barrels)

☒ Is further site investigation required?

Petroleum-impacted soil has been removed and Table 915-1 metals concentrations reported in confirmation soil samples collected at the Site have all been resolved. Refer to the Remediation Summary section under the Remedial Action Plan tab of this Form 27. Background soil samples will be collected and analyzed for Table 915-1 metals to provide additional information regarding metals concentrations.

Non-compliant levels of pH and/or electrical conductivity (EC) were reported in 30 confirmation soil samples. The horizontal and vertical extents of these impacts will be delineated during 3Q2024. In addition, background soil samples from comparable non-impacted soil will be collected and analyzed for pH and EC.

Following delineation, a Reclamation Plan will be developed in accordance with the ECOM Rule 915.b., and PDC will request to leave these impacts in place at this operating facility.

## REMEDIAL ACTION PLAN

### SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Approximately 832 CY of impacted soil were hauled offsite for disposal under PDC manifest to Republic Services Tower Road landfill in Commerce City, CO or to the Waste Management's North ern Weld County landfill in Ault, Colorado in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

### 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.

Immediately after the release was discovered, hydrovac crews initiated fluid and impacted soil removal in the affected areas. Approximately 832 CY of petroleum-impacted soil were excavated via hydrovac or hand digging and hauled offsite for disposal. The attached Tables 1-4 summarize the laboratory data from the 80 confirmation soil samples collected during the remedial excavation. Sample IDs with light brown shading denote soil samples that were removed by excavation. Figures 1-10 illustrate the soil locations and soil chemistry. These data indicate that petroleum-impacted soil has been removed from the Site.

Although petroleum-impacted soil has been removed, non-compliant concentrations of arsenic, barium, lead, selenium, pH, and EC are present.

On 6/3/2024, a produced fluids sample was collected from the bulk separator and analyzed for total recoverable metals. These data were used to determine the mass of metals that were released in the 72 bbl (net) release. This mass was compared to the calculated mass of metals removed as a result of the excavation. Table 5 (arsenic), Table 6 (barium), Table 7 (selenium), and Table 8 (lead) provide these calculations and comparisons.

As shown on Table 5, the amount of arsenic removed was approximately 560,864 times more than the amount of arsenic that was released.

As shown in Table 6, the amount of barium removed was approximately 387 times more than the amount of barium that was released.

As shown in Table 7, the amount of selenium removed was approximately 33,602 times more than the amount of selenium that was released.

As shown in Table 8, the amount of lead removed was approximately 994,061 times more than the amount of lead that was released.

Since the amount of arsenic, barium, selenium, and lead removed were significantly greater than the amount of these metals that were released, the additional metals removed can be attributed to native concentrations and have been adequately remediated.

## Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
_____ Bioremediation ( or enhanced bioremediation )	Yes _____ Excavate and offsite disposal
_____ Chemical oxidation	_____ If Yes: Estimated Volume (Cubic Yards) _____ 832
_____ 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

\_\_\_\_\_ 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.

Groundwater was not encountered during site investigation or remediation activities at the Site.

# 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 Site Investigation Report

## 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.

- Source mass removal is complete
- Petroleum-impacted soil has been removed and Table 915-1 metals concentrations reported in confirmation soil samples collected at the Site have all been resolved.
- PDC proposes to delineate the horizontal and vertical extents of non-compliant levels of pH and/or EC reported in confirmation soil samples at the Site during 3Q2024.
- A Reclamation Plan will be developed in accordance with the ECMC Rule 915.b., and PDC will request to leave these impacts in place.

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 832

E&P waste (solid) description Hydrocarbon Impacted Soil

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: Republic's Tower Road LF in Commerce City, CO and Waste Management's North Weld LF in Ault, CO

Volume of E&P Waste (liquid) in barrels 0

E&P waste (liquid) description

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility:

# 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.

The Raindance FD Off-Site #20-202HXX Facility is an active facility and there are no current plans for decommissioning or reclamation activities. pH and/or EC impacts greater than the ECOM Table 915-1 limits will remain in place at the Site. Following horizontal and vertical delineation, a Reclamation Plan will be developed in accordance with the ECOM Rule 915.b.

Is the described reclamation complete? \_\_\_\_\_

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. \_\_\_\_\_

Proposed date of completion of Reclamation. \_\_\_\_\_

## 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. 03/22/2024

Actual Spill or Release date, or date of discovery. 03/22/2024

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/22/2024

Proposed site investigation commencement. 03/22/2024

Proposed completion of site investigation. 09/30/2024

## REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/22/2024

Proposed date of completion of Remediation. 04/09/2024

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**

The produced water analysis will be submitted with a Form 43 during 3Q 2024.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Jason Davidson

Title: Remediation Advisor

Submit Date: 07/07/2024

Email: FRspillremediationcontractor@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: 07/08/2024

Remediation Project Number: 36122

**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**

403826338	INVESTIGATION/REMEDATION WORKPLAN (INITIAL)
403833180	ANALYTICAL RESULTS
403835001	REMEDATION PROGRESS REPORT
403847059	FORM 27-INITIAL-SUBMITTED

Total Attach: 4 Files

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

Environmental	<p>returned to draft:</p> <p>It appears that the descriptions regarding metals in the produced water analysis were mis-typed in the Remediation Summary Section. For example, " As shown in Table6, the amount of barium released was approximately 387 times more than the amount of barium that was released"</p> <p>Any reclamation plan needs to include background soil samples for pH and EC from comparable non-impacted soil.</p> <p>In addition, although the produced water sample analysis was provided, we still want to see background samples for metals so that an evaluation can be made based on the weight of total evidence at the site.</p> <p>Submit the produced water analysis on a Form 43 to COENV, use Spill ID 486346 as the Identification Number. If the bulk separator is commingled production, request a new sample Facility ID. If a single well is served check whether a sample ID exists.</p>	07/05/2024
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Total: 1 comment(s)