

State of Colorado
Energy & Carbon Management Commission

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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 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: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers Phone: <u>(970) 313-5582</u> Mobile: <u>()</u>
Address: <u>1099 18TH STREET SUITE 1500</u>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Jason Davidson</u>	Email: <u>FRspillremediationcontractor@pdce.comcom</u>	

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

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 86

Number of soil samples exceeding 915-1 43

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

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.

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

In Situ

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: _____

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.

The Raindance FD Off-Site #20-202HNX Facility is an active facility and there are no current plans for decommissioning or reclamation activities. pH and/or EC impacts greater than the ECMC 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 ECMC 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. 12/31/2024

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:

A reclamation Plan will be required to address elevated pH and SAR concentrations.

OPERATOR COMMENT

In ECMC-approved Form 27 Doc # 403826338, ECMC requested Table 915-1 metals, pH and EC background analyses from on-pad and off-pad locations. These additional data are provided with this supplemental Form 27. These metals analyses, along with the calculations of metals released as a result of the spill, indicate that Table 915-1 metals have been adequately remediated.

EC concentrations in background samples both on and off the pad are similar to those observed in the excavation samples as shown in Figure 11. Operator proposes that EC concentrations are within the natural variability of native concentrations and can be considered to be adequately resolved.

pH levels in one background sample exceeded the ECMC standard; this level is similar to those elevated levels observed in the excavation samples. Therefore, pH could be considered adequately remediated. If ECMC does not agree, a Reclamation Plan can be prepared to address elevated pH.

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

Signed: Paul Henehan

Title: Consultant

Submit Date: 10/07/2024

Email: FRspillremediationcontractor@pdce.comcom

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: 04/04/2025

Remediation Project Number: 36122

COA Type

Description

	ECMC agrees that Table 915-1 contaminants of concern at the site are in compliance with Table 915-1 or background concentrations with the exception of pH. Operator should address pH exceedances with through a Reclamation Plan pursuant to Rule 915.b. or verify the sole background sample result (BG-E-OFF 2 Ft) that exceeded Table 915-1 soil suitability for reclamation standards.
1 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.

<u>Att Doc Num</u>	<u>Name</u>
403947436	FORM 27-SUPPLEMENTAL-SUBMITTED
403947449	ANALYTICAL RESULTS
403948409	SITE INVESTIGATION REPORT

Total Attach: 3 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)