

State of Colorado
Energy & Carbon Management Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203
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403962134

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10/17/2024

Report taken by:

Nick Cholas

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: 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: ENspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 32028 Initial Form 27 Document #: 403546839

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: 327089	API #: _____	County Name: WELD
Facility Name: LEE-64N65W 5NWNW		Latitude: 40.346655	Longitude: -104.693509
		** correct Lat/Long if needed: Latitude: 40.346655	Longitude: -104.693509
QtrQtr: NWNW	Sec: 5	Twp: 4N	Range: 6W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

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

Is domestic water well within 1/4 mile? Yes 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

Closest Domestic Well within quarter mile – 1140' NNW
Additional Domestic Wells – None within a quarter mile
Nearest Surface Water – None within a quarter mile
Nearest Occupied Building – Residential building 250' N
Additional Occupied Buildings – Residential buildings 785' W, 700' NW, 895' SW

No other potential receptors are located within ¼ 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	Refer to Fig 2 and Tables 2-4	Excavation/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.

Hydrocarbon impacted soils were identified adjacent to the separator dump line and at the partially buried produced water vessel (PWV) during initial facility closure activities. Excavation was conducted and the identified soil was removed from adjacent to the separator dump line and transported offsite for disposal. Analytical results reported for both excavation confirmation soil samples (EX01@6 and EX02@3) collected from the final extents of the excavation were compliant with their applicable Table 915-1 GWSSLs, or less than 1.25x the highest background concentrations for arsenic (7.16 mg/kg).

A waste characterization soil sample (WC01@5) was collected from the area that exhibited the highest degree of impacts and identified impacted soil was removed at the PWV. Analytical results for WC01@5 reported benzene, ethylbenzene, naphthalene, 1,2,4-TMB, and TPH above their respective Table 915-1 GWSSLs. There were also detections of total xylenes, fluoranthene, and pyrene. PDC is currently in the process of source mass removal of hydrocarbon impacted material at the Site.

Please refer to the Source Removal Summary section below for a summary of the source removal activities conducted at the Site.

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):

Analytical results for all facility closure confirmation soil samples submitted for analysis are compliant with Table 915-1 GWSSLs or less than 1.25x the highest background concentrations for arsenic (7.16 mg/kg). Analytical results for soil sample WC01@5 reported benzene, ethylbenzene, naphthalene, 1,2,4-TMB, TPH, and arsenic above their respective Table 915-1 GWSSLs. There were also detections of total xylenes, fluoranthene, and pyrene.

PDC plans to conduct source mass removal activities at the Site during 3Q or 4Q2024. All confirmation soil samples collected from final extents of the excavation will be analyzed for Table 915-1 Organics (BTEXN, TMBs, TPH, and PAHs).

Proposed Groundwater Sampling

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

If groundwater is encountered during excavation activities, a grab sample will be collected as soon as practical. If contaminated soil is in contact with groundwater or if free product/hydrocarbon sheen are observed, the release will be reported in accordance with Rule 912.b. In accordance with the COA listed in the Supplemental Form 27 document number 403670510, approved on February 2, 2024, groundwater samples will be submitted for laboratory analysis of inorganic parameters (chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDs) by Method SM 2540C) in addition to BTEX, naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260.

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 23

Number of soil samples exceeding 915-1 3

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

Approximate areal extent (square feet) 1400

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

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.

NA / ND

-- Highest concentration of TPH (mg/kg) 1340

-- Highest concentration of SAR 0.316

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 10

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)

OTHER INVESTIGATION INFORMATION

☐ Were impacts to adjacent property or offsite impacts identified?

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

Eleven site-specific background samples were collected from seven background soil borings (BKG01 through BKG07) from approximately 3 ft., 5 ft., and 7 ft-bgs in areas away from oil and gas infrastructure and were submitted for analysis of EC, pH, SAR, arsenic, cadmium and lead by ECMC approved methods.

☐ 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?

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.

During initial facility closure activities, hydrocarbon impacted soils were discovered adjacent to the separator dump line. Approximately 3 cubic yards were removed and transported offsite for disposal. One confirmation soil sample (EX01@6) was collected from the floor of the excavation at approximately 6 ft-bgs and one confirmation soil sample was collected from the sidewall of the excavation at approximately 3 ft-bgs. The final extent of the excavation was approximately 3 feet by 5 to a total depth of 6 ft-bgs.

Hydrocarbon impacted soils were also discovered at the PWV and was reported as a historic release in Form 19 document number 403644729. One waste characterization soil sample (WC01@5) was collected at approximately 5 ft-bgs from the area exhibited the highest degree of impacts and a total of approximately 20 cubic yards of impacted soil was removed. The current extent of the excavation is approximately 10 feet by 11 to a total depth of 5 ft-bgs.

In total, approximately 23 cubic yards of impacted soil has been hauled offsite for disposal under PDC manifest to Waste Management's North Weld Landfill in Ault, CO 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.

PDC plans to conduct additional source mass removal activities at the Site during Q4 of 2024. Confirmation excavation soil samples will be collected from the floor and sidewalls of the excavation and submitted for analysis of the full suite of Table 915-1 analytes. If groundwater is encountered, a grab groundwater sample will be collected and submitted for analysis of Table 915-1 groundwater parameters.

Please refer to the Operator Comments section of this Form 27 for additional discussion.

Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
<input type="checkbox"/> Bioremediation (or enhanced bioremediation)	<input type="checkbox"/> Yes <input type="checkbox"/> Excavate and offsite disposal
<input type="checkbox"/> Chemical oxidation	<input type="checkbox"/> If Yes: Estimated Volume (Cubic Yards) <input type="text" value="23"/>
<input type="checkbox"/> Air sparge / Soil vapor extraction	<input type="checkbox"/> Name of Licensed Disposal Facility or ECMC Facility ID # <input type="text"/>
<input type="checkbox"/> Natural Attenuation	<input type="checkbox"/> Excavate and onsite remediation
<input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Land Treatment
	<input type="checkbox"/> Bioremediation (or enhanced bioremediation)
	<input type="checkbox"/> Chemical oxidation
	<input type="checkbox"/> Other <input type="text"/>

Groundwater Remediation Summary

<input type="checkbox"/> Bioremediation (or enhanced bioremediation)
<input type="checkbox"/> Chemical oxidation
<input type="checkbox"/> Air sparge / Soil vapor extraction
<input type="checkbox"/> Natural Attenuation
<input type="checkbox"/> Other <input type="text"/>

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 initial decommissioning nor during initial excavation activities. Groundwater was encountered during soil boring delineation soil sampling, but a sample was not able to be collected with the sampling equipment onsite due to the boreholes sluffing off. During additional excavation activities, if groundwater is encountered, a grab groundwater sample(s) will be collected per the proposed groundwater sampling section above.

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 and Remediation Progress 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.

- Facility closure activities and confirmation soil sampling were conducted at the Lee 1-5 production facility on January 2 and 3, 2024.
- Investigation and delineation of organic compounds in soil was completed on July 12, 2024.
- Source mass removal is ongoing.

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: \$ 255000

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 23

E&P waste (solid) description Hydrocarbon impacted soil

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: Waste Management's North Weld Landfill, 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.

Reclamation will be conducted in accordance with ECMC 1004 Series Rules.

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. 03/31/2025

Proposed date of completion of Reclamation. 03/31/2027

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. 08/28/2023

Actual Spill or Release date, or date of discovery. 01/04/2024

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/02/2024

Proposed site investigation commencement. 01/02/2024

Proposed completion of site investigation. 07/12/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 01/03/2024

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:

OPERATOR COMMENT

This Supplemental Form 27 was prepared for the 4Q24 timeline update for the Lee 1-5 production facility (Site).

Hydrocarbon impacted soils were identified at the former produced water vessel during facility closure activities. One waste characterization soil sample (WC01@5) was collected at approximately 5 ft-bgs from the area exhibited the highest degree of impacts and a total of approximately 20 cubic yards of impacted soil was removed. A reduced analyte list for subsequent confirmation samples was requested in Form 27 Supplemental Document Number 403766708 on April 23, 2024, and approved by the ECMC on May 7, 2024.

On July 12, 2024, delineation of soil impacts at the former PWV was conducted by advancing 6 soil borings (SB01 through SB06) at the Site. Soil samples were collected from 5 ft., 10 ft., and 15 ft-bgs at each soil boring, and all soil samples were submitted for analysis of the approved reduced analytes list. Naphthalene, 1,3,5-TMB, 1-methylnaphthalene and 2-methylnaphthalene were reported above their respective GWSSLs in soil samples SB01@10 and SB04@10. All other soil samples submitted for analysis were compliant with their respective standards, providing vertical and lateral delineation, except for the area east of SB04. Soil boring locations are provided on Figure 3, and analytical results for the soil boring delineation samples are provided in Table 2 and Table 3. Boring logs for the soil borings are also included.

PDC plans to conduct additional source mass removal activities at the Site during Q4 of 2024. Confirmation excavation soil samples will be collected from the floor and sidewalls of the excavation and submitted for analysis of the full suite of Table 915-1 analytes. If groundwater is encountered, a grab groundwater sample will be collected and submitted for analysis of Table 915-1 groundwater parameters.

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: 10/17/2024

Email: ENspillremediationcontractor@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: Nick Cholas

Date: 01/17/2025

Remediation Project Number: 32028

COA Type

Description

	See comments/COA's on SF27 Doc #404051696. SF27 Doc #404051696 was submitted more recently at the time of review of this Doc (Doc #403962134).
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.

Att Doc Num

Name

403962134	FORM 27-SUPPLEMENTAL-SUBMITTED
403962139	ANALYTICAL RESULTS
403962140	SOIL SAMPLE LOCATION MAP
403962141	MAP
403962142	LOGS
403962143	ANALYTICAL RESULTS

Total Attach: 6 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)

Date Run: 1/17/2025 Doc [#403962134]

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