

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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Report taken by:

Kyle Waggoner

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
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 & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 36400 Initial Form 27 Document #: 403842963

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: TANK BATTERY	Facility ID: 430148	API #: _____	County Name: WELD
Facility Name: Hoffman 33-19 Tank Battery	Latitude: 40.362746	Longitude: -104.554987	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NENW	Sec: 33	Twp: 5N	Range: 64W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION	Facility ID: 430149	API #: _____	County Name: WELD
Facility Name: Hoffman 33-19 Tank Battery	Latitude: 40.362746	Longitude: -104.554987	
** correct Lat/Long if needed: Latitude: 40.362700		Longitude: -104.555247	
QtrQtr: NENW	Sec: 33	Twp: 5N	Range: 64W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SW _____

Most Sensitive Adjacent Land Use Grassland _____

Is domestic water well within 1/4 mile? No _____

Is surface water within 1/4 mile? Yes _____

Is groundwater less than 20 feet below ground surface? No _____

Other Potential Receptors within 1/4 mile

Freshwater Emergent Wetland 0.21mi E
Residential 0.05mi N, 0.05mi NW, 0.19/0.24mi W
Farm Structure 0.04/0.06/0.24mi NE, 0.21/0.24mi W

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
UNDETERMINED	GROUNDWATER	Undetermined	Lab analysis or Field Screening, if encountered
Yes	SOILS	Refer to Tables and Figures	Lab analysis or Field Screening

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

A site investigation was conducted pursuant to ECMC Rule 911 at the Hoffman B 33-19 Facility and Tank Battery location.

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):

Grab confirmation soil samples were collected from the produced water vessel(s) excavation, beneath the ground oil tank(s), at the risers for the flowline (s) and dumphine(s) of any separator(s). In addition, the on-site dump lines located between the separator and tank battery was removed by pulling from either end. Soil samples were analyzed by a certified laboratory for the full extent of Table 915-1, including but not limited to: TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons) organic compounds in soil per ECMC Table 915-1, and EC, SAR, pH, metals, and boron. All samples collected were analyzed by a certified laboratory using approved ECMC laboratory analysis methods.

Please note that the flowline riser at the separator was sampled in conjunction with decommissioning of the associated flowline on May 10th, 2024. Please refer to sample FL01R-S collected under Remediation number 35156.

Proposed Groundwater Sampling

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

If groundwater is encountered during the site investigation a grab groundwater will be collected and analyzed for all organic and inorganic compounds per ECMC Table 915-1; this sample analysis includes, but is not limited to BTEX, naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260, chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDS) by Method SM 2540C.

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):

Visual inspection at the tank battery area occurred during abandonment activities. Field personnel field screened all disturbed areas using visual and olfactory senses. Additionally, discrete soil samples were collected from the base of the excavation and excavation sidewall in areas most likely to be impacted and exhibiting the highest field screened VOC concentration. A detailed summary of decommissioning activities, including field notes, site photos, figures, and laboratory analytical results, is attached to this Form 27.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 11

Number of soil samples exceeding 915-1 11

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

Approximate areal extent (square feet) 700

Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? Yes

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) 1117

-- Highest concentration of SAR 9.46

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 6

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?

Four background soil samples were collected near the tank battery and analyzed for metals in soil per ECMC Table 915-1, pH, SAR, EC, and boron. Background soil samples were collected from depths ranging between 0-0.5 and 6 feet below ground surface (ft. bgs). The maximum background concentrations with a 1.25x multiplier applied for arsenic and barium were calculated to be 4.16 mg/kg and 96.9 mg/kg, respectively. All arsenic and barium concentrations observed during decommissioning were below background levels. As such, arsenic and barium should not be considered contaminants of concern.

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

Volume of solid waste (cubic yards) 9

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

Following the discovery of the historic release at the former produced water vessel location (N-PWV01-B) associated with the Hoffman B 33-19 tank battery, source mass removal activities are not scheduled at this time. Source mass removal activities will be initiated at sample location N-PWV01-B following land owner negotiations.

Based on ECMC Table 915-1 exceedances identified during decommissioning, PDC proposes to limit future soil sampling to BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH, chrysene, fluorene, pyrene, 1-M, 2-M and pH.

If soil that is more heavily impacted with hydrocarbon compounds (based on PID readings, visual and / or olfactory indicators) is discovered during the SSI, a soil sample will be collected from that location and analyzed for full ECMC Table 915-1 contaminants of concern. If additional analytes are discovered from this new waste characterization sample in exceedance of ECMC Table 915-1 standards beyond those proposed in the above amended sampling plan request, those compounds will be added to the sampling plan.

A supplemental site investigation (SSI) will be completed to vertically and horizontally delineate the pH exceedance recorded at the separator flowline riser sample FL01R-S observed during flowline removal. A proposed SSI map is attached to this Form 27. Concurrently with the SSI, additional background samples will be collected to determine if pH is attributed to native soil conditions at the site. The SSI will be completed in accordance with the proposed implementation schedule, and the results of the SSI will be submitted on a subsequent Form 27.

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.

An approximately 9 cubic yard portion of source materials was excavated and transported off-site for disposal. No other source material has been generated at this time.

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.

On August 21, 2024, a historic release was discovered following receipt of analytical results from a soil sample collected during decommissioning activities at the Hoffman B33-19 tank battery at the former produced water vessel. Based on the analytical results, organic and inorganic concentrations were in exceedance of the applicable Table 915-1 standards in the following samples:

FL01R-S: pH
N-PWV01-B: pH, 1,2,4-TMB, TPH, 1-M, & 2-M

GPS coordinates and PID readings for the soil samples collected during decommissioning activities are summarized in Table 1. Soil analytical results are summarized in Tables 2-5. Site topography is illustrated in Figure 1. Field screening and laboratory sample locations are illustrated on Figure 2. Proposed soil borings are illustrated on Figure 3.

Soil Remediation Summary

☐ In Situ

☒ Ex Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Air sparge / Soil vapor extraction

_____ Natural Attenuation

_____ Other _____

Yes _____ Excavate and offsite disposal

If Yes: Estimated Volume (Cubic Yards) _____ 9

Name of Licensed Disposal Facility or ECMC Facility ID # _____

_____ Excavate and onsite remediation

_____ 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.

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 Confirmation Sample Summary, Analyte Reduction Request, SSMRP, SSIP

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.

- Further soil investigation/delineation is required

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: \$ 15000

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 9

E&P waste (solid) description Source material

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: WM - Ault

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 in accordance with ECMC 1000 Series Rules.

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. 05/10/2024

Proposed date of completion of Reclamation. 09/04/2026

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. 02/01/2024

Actual Spill or Release date, or date of discovery. 08/21/2024

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/10/2024

Proposed site investigation commencement. 09/04/2024

Proposed completion of site investigation. 03/04/2025

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/04/2025

Proposed date of completion of Remediation. 03/04/2026

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:

Based on the discovery of historic hydrocarbon impacts at the former produced water vessel associated with the Hoffman B 33-19 tank battery, source mass removal activities will be initiated following land owner negotiations. The Implementation Schedule has been updated to reflect these changes.

OPERATOR COMMENT

This Form 27 is being submitted to include the decommissioning results and historic reportable release discovered at the former Hoffman B 33-19 Tank Battery location.

Four background samples (BKG01) were collected from adjacent to the tank battery location and the lithology between the site and background samples were observed to be silty to well graded sands. The maximum background concentrations with a 1.25x multiplier applied for arsenic and barium were calculated to be 4.16 mg/kg and 96.9 mg/kg respectively. All arsenic and barium concentrations observed during decommissioning were below background levels. As such, PDC requests arsenic and barium to not be considered contaminants of concern.

Based on the contaminants of concern identified during decommissioning, PDC proposes to limit future soil sampling to BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH, chrysene, fluorene, pyrene, 1-M, 2-M and pH. Concurrent with delineation activities, additional background samples will be collected to determine if pH observed at this location is indicative of native material conditions.

Following approval of this form and landowner approval, supplemental source mass removal activities will be initiated at the Hoffman B33-19 tank battery location at the former produced water vessel location in the vicinity of soil sample N-PWV01-B.

The flowline endpoint sample (FL01R-S) was collected under the Hoffman B 33-19 flowline. All further site investigation related to the pH exceedance observed at sample location FL01R-S will proceed under this remediation project.

Quarterly reporting will be conducted until closure criteria are achieved for the remediation project. The results of the supplemental site investigation will be submitted on a subsequent Form 27.

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

Signed: Karen Olson

Title: Remediation Advisor

Submit Date: 09/20/2024

Email: taspillremediationcontractor@pdce.com

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

ECMC Approved: Kyle Waggoner

Date: 10/14/2024

Remediation Project Number: 36400

COA Type

Description

	Operator will continue quarterly reporting until the site investigation is complete and Table 915-1 standards are met within the remediation area.
	ECMC approves PDC proposal to limit future soil sampling to BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH, chrysene, fluorene, pyrene, 1-M, 2-M and pH.
2 COAs	

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

403896588	FORM 27-SUPPLEMENTAL-SUBMITTED
403929387	PHOTO DOCUMENTATION
403929389	ANALYTICAL RESULTS
403929393	SITE MAP
403929395	SOIL SAMPLE LOCATION MAP
403929397	SITE INVESTIGATION PLAN
403929398	ANALYTICAL RESULTS
403929399	ANALYTICAL RESULTS
403929400	ANALYTICAL RESULTS

Total Attach: 9 Files

General Comments

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

Total: 0 comment(s)