

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109



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Report taken by:
Taylor Robinson

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: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers
Address: <u>1775 SHERMAN STREET - STE 3000</u>		Phone: <u>(303) 860-5800</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80203</u>		Mobile: <u>()</u>
Contact Person: <u>Karen Olson</u>	Email: <u>taspillremediationcontractor@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 24352 Initial Form 27 Document #: 403113734

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: <u>LOCATION</u>	Facility ID: <u>478974</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Bost Farm 9N-8C-L</u>	Latitude: <u>40.414642</u>	Longitude: <u>-104.827929</u>	
	** correct Lat/Long if needed: Latitude: <u>40.414710</u>	Longitude: <u>-104.827990</u>	
QtrQtr: <u>Lot2</u> Sec: <u>7</u> Twp: <u>5N</u> Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>			
Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>482131</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Bost Farms</u>	Latitude: <u>40.414710</u>	Longitude: <u>-104.827990</u>	
	** correct Lat/Long if needed: Latitude: _____	Longitude: _____	
QtrQtr: <u>SWNW</u> Sec: <u>7</u> Twp: <u>5N</u> Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>			

SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Agricultural

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? Yes

Other Potential Receptors within 1/4 mile

Surface Water: Boomerang Ditch - 1,070 feet NW; Occupied Building: 1,470' E; Livestock: 1,412' WSW; FWS Wetlands: 915' SW Freshwater Emergent Wetland (PEM1F); HPH Sensitive Wildlife Habitat: Rule 1202.c: 1,331' SE - Aquatic Native Species Conservation Area.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> E&P Waste | <input type="checkbox"/> Other E&P Waste | <input type="checkbox"/> Non-E&P Waste |
| <input type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | |
| <input type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input type="checkbox"/> Condensate | <input type="checkbox"/> Pigging Waste | |
| <input checked="" type="checkbox"/> Drilling Fluids | <input type="checkbox"/> Rig Wash | |
| <input type="checkbox"/> Drill Cuttings | <input type="checkbox"/> Spent Filters | |
| | <input type="checkbox"/> Pit Bottoms | |
| | <input type="checkbox"/> Other (as described by EPA) | |

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Tables 1-5 & Figures 1-2	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 May 4, 2022, a release was discovered at the Bost Farms Drill Pad. A vibrating mud line leak resulted in the release of approximately ten (10) BBLS of drilling fluid outside of secondary containment. Following the discovery, mitigation activities were immediately initiated and five (5) BBLS of drilling fluid were recovered. Additionally, 8 cubic yards (CY) of drilling fluid impacted soil was scraped and transported to the North Weld Waste Management facility with other drilling waste material under PDC waste manifest documentation.

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):

On June 9, 2022, one soil sample (SB06) was collected from the impacted source material between ground surface and 6 inches bgs and was submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicated contaminants of concern (COC) include BTEX, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, naphthalene, and TPH (C6-C36). Additionally, ten (10) soil samples (SB01-SB05 & SB07-SB11) were collected from the release area between 0-6 inches bgs to confirm the absence of petroleum hydrocarbon impacts. Analytical results indicated that organic compounds were observed below the applicable Table 915-1 Protection of Groundwater SSLs with the exception of soil samples SB05 & SB06 both collected at 6 inches bgs.

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):

Soil analytical results are summarized in Table 1-4. GPS coordinates and PID readings for the soil samples collected during confirmation sampling activities are summarized in Table 5. Soil sample locations are illustrated on Figure 1 and Figure 2. The laboratory analytical reports are included in Attachment A. Field notes & photo log are included in Attachment B

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

NA / ND

Number of soil samples collected 11

-- Highest concentration of TPH (mg/kg) 26430

Number of soil samples exceeding 915-1 2 -- Highest concentration of SAR 0.181

Was the areal and vertical extent of soil contamination delineated? No BTEX > 915-1 No

Approximate areal extent (square feet) 1610 Vertical Extent > 915-1 (in feet) 1

Groundwater

Number of groundwater samples collected 0 Highest concentration of Benzene (µg/l) _____

Was extent of groundwater contaminated delineated? No Highest concentration of Toluene (µg/l) _____

Depth to groundwater (below ground surface, in feet) _____ Highest concentration of Ethylbenzene (µg/l) _____

Number of groundwater monitoring wells installed _____ Highest concentration of Xylene (µg/l) _____

Number of groundwater samples exceeding 915-1 _____ 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?

On July 28, 2022, three (3) background soil samples (BKG01, BKG02, BKG03) were collected from native material adjacent to the release location. Soil samples were collected between ground surface and 6 inches bgs and were submitted for laboratory analysis of pH, arsenic and selenium. Analytical results indicated that arsenic and selenium were in exceedance of the applicable regulatory standards in native soil. Based on these results, arsenic and selenium exceedances observed in soil sample SB06 are within 1.25x the background concentrations and indicative of native soil conditions, as referenced in footnote 11 of the Table 915-1.

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?

Based on the final analytical results and pending landowner approval, supplemental source mass removal activities will be initiated during the first quarter of 2023 to remove remaining hydrocarbon impacted material via mechanical excavation. Soil samples will be collected from the final excavation extent and submitted for laboratory analysis of BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, and TPH (C6-C36).

Analytical results will be summarized in a forthcoming supplemental 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.

Following the release, five (5) BBLs of drilling fluid were recovered. Additionally, 8 cubic yards (CY) of drilling fluid impacted soil was scraped and transported to the North Weld Waste Management facility with other drilling waste material under PDC waste manifest documentation.

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 September 12, 2022, ten confirmation soil samples (SB12-SB18) were collected between approximately 1 foot and 3 feet bgs, from native material within and adjacent to the release area. All soil samples collected from soil borings SB12 through SB18 were submitted for laboratory analysis of BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, and TPH (C6-C36). Analytical results indicated that the organic and inorganic constituents were in compliance with the applicable Table 915-1 standards for all soil samples collected from soil borings SB12 through SB18 with the exception of TPH (C6-C26) in soil samples SB16 @ 1' and SB17 @ 2', and pH in SB17 @ 3'. Analytical results are summarized in Tables 1 through 4. GPS coordinates and field screened VOC concentrations are summarized in Table 5. The soil boring locations are illustrated on Figure 3. The laboratory reports are included as Attachment A. The field notes, photo logs, and soil boring logs are included as Attachment B.

The remaining hydrocarbon impacts identified to the north of the former tank battery will be removed via mechanic excavation pending landowner approval. Impacted material will be transported off-site to the North Weld Waste Management facility for disposal under PDC waste manifests. Confirmation soil samples will be collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the above referenced COC's.

Soil Remediation Summary

In Situ

_____ Bioremediation (or enhanced bioremediation)
_____ Chemical oxidation
_____ Air sparge / Soil vapor extraction
_____ Natural Attenuation
_____ Other _____

Ex Situ

_____ Excavate and offsite disposal
_____ If Yes: Estimated Volume (Cubic Yards) _____
_____ Name of Licensed Disposal Facility or COGCC 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.

Groundwater was not encountered during mitigation or delineation activities conducted between May 4 and September 12, 2022, at the Bost Farms Drill Pad.

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, & Supplemental Source Mass Removal Proposal

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 at the former tank battery.
- Source mass removal will be conducted pending landowner approval.

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: \$ 30000

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 8

E&P waste (solid) description Drilling fluid impacted soils

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 5

E&P waste (liquid) description Drilling fluid

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: North Weld Waste Management 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.

The Bost Farms Drill Pad is an active facility and there are no current plans for decommissioning or reclamation activities.

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. _____

Actual Spill or Release date, or date of discovery. 05/04/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/04/2022

Proposed site investigation commencement. 01/01/2023

Proposed completion of site investigation. 03/31/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 05/04/2022

Proposed date of completion of Remediation. 11/18/2027

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

Based on analytical results for the waste characterization samples collected from the Bost Farms Pad release area, PDC is requesting that the COCs for the release discovered at the Bost Farms Pad be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, and TPH (C6-C36).

Following the approval of this form and landowner approval, PDC will initiate supplemental source mass removal activities at the Bost Farm Pad pending landowner approval. Confirmation soil samples will be collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the above referenced COC's. 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

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: 11/30/2022

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: Taylor Robinson

Date: 02/22/2023

Remediation Project Number: 24352

COA Type

Description

	Operator will continue quarterly reporting until the site investigation is complete and the implementation schedule can be updated.
	COGCC agrees to the reduced analyte list based on the waste characterization sample.
2 COAs	

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

403234080	FORM 27-SUPPLEMENTAL-SUBMITTED
403234135	ANALYTICAL RESULTS
403234137	PHOTO DOCUMENTATION
403243981	SOIL SAMPLE LOCATION MAP

Total Attach: 4 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)