

State of Colorado Oil and Gas Conservation Commission

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Report taken by:

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 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>
Contact Person: <u>Karen Olson</u>	Email: <u>tasfillremediationcontractor@pdce.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10763 Initial Form 27 Document #: 401440234

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>LOCATION</u>	Facility ID: <u>331521</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>FOE-66N64W 20NWSE</u>		Latitude: <u>40.469140</u>	Longitude: <u>-104.571440</u>
		** correct Lat/Long if needed: Latitude: <u>40.468490</u>	Longitude: <u>-104.564910</u>
QtrQtr: <u>NWSE</u>	Sec: <u>20</u>	Twp: <u>6N</u>	Range: <u>64W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

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

FWS Wetlands are located approximately 718 feet south of the location. Occupied buildings are located approximately 115 feet south the location. There are no CPW Sensitive Wildlife Habitats identified within a 1/4-mile radius.

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	To Be Determined	To Be Determined
Yes	SOILS	Refer to Tables 1-2 and Figure 1	Excavation and sampling activities.

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 October 13, 2016, approximately 14 barrels of produced water were released within secondary containment at the Foe 33-20 tank battery. Upon discovery, the produced water dump line was shut in and spill response measures were completed. Between August 30 and September 7, 2017, approximately 1,360 cubic yards (CY) of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. Nine (9) soil samples (SS01-SS09) were collected from the sidewalls of the excavation at depths ranging between 12.5 and 13 feet bgs. Analytical results indicated that organic compounds were observed in exceedance of applicable COGCC Table 910-1 standards on the south sidewall of the excavation extent; however, excavation activities could not be continued as third-party infrastructure were still in place. Groundwater was encountered within the excavation at approximately 14.5 feet bgs. Approximately 134 barrels of groundwater was removed via vacuum trucks and transported to a licensed disposal facility. Analytical results from groundwater sample GW01 and subsequent groundwater samples collected from monitoring well BH01 indicated BTEX concentrations were below the applicable COGCC Table 910-1 groundwater standards.

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):

Between August 23 and September 9, 2021, approximately 4,214 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. One hundred three (103) soil samples (SS10 - SS90 and SS92 - SS113) were collected from the base and sidewalls of the final excavation extent at depths ranging between 12.5 and 19 feet bgs. Samples were submitted for laboratory analysis of the COGCC Table 915-1 Organic Compounds in Soils and TPH (C6-C36). Final analytical results received for the final excavation extent indicated that organic compound concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in soil samples SS65, SS69, and SS73. In addition, one soil sample (SS91) was collected at a depth of approximately 2.5 feet bgs and submitted for laboratory analysis of soil suitability for reclamation.

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):

Per correspondence with the COGCC, overburden material was stock piled on the surface in 500 cubic yard piles and subsequently sampled using a five point composite sampling method. Between August 26, and September 3, 2021, seven (7) composite samples (CS01 - CS07) were collected from the overburden material and submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron. Analytical results indicated that organic compound concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards; however, pH was observed in exceedance of the applicable regulatory standard in five composite samples.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 103

Number of soil samples exceeding 915-1 9

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

Approximate areal extent (square feet) 11180

NA / ND

-- Highest concentration of TPH (mg/kg) 1114

-- Highest concentration of SAR 0.026
6

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 17

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

0 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 September 7, 2021, one background soil sample (BKG01) was collected from native material on site and submitted for laboratory analysis of pH. Analytical results indicated that pH was in compliance of the applicable COGCC Table 915-1 standard in native material.

On April 29, 2022, two background soil borings were advanced to approximately 7 feet in native material on site. Six soil samples were collected from the soil borings at depths ranging from 2.5 to 7 feet below ground surface (bgs) and submitted for laboratory analysis of pH, EC, SAR, and boron. Background analytical results indicated that pH was in exceedance of the applicable COGCC regulatory standard in both soil boring locations.

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

Volume of solid waste (cubic yards) 4214

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

During supplemental site investigation activities conducted on April 29, 2022, groundwater was observed in soil borings SB01 through SB05 at approximately 13.5 feet bgs. Per correspondence with the COGCC on November 10, 2022, two groundwater monitoring wells will be installed in the vicinity of the former failed sample locations (SS65, SS69, and SS73) to confirm the absence of dissolved-phase hydrocarbon impacts adjacent the above ground structure on location. VOC concentrations using a PID and lithologic descriptions will be recorded for each borehole. If elevated VOC concentrations are encountered during the investigation, a sample will be collected from the interval exhibiting the highest VOC concentration from the borehole and submitted for laboratory analysis of the Table 915-1 Organic Compounds in Soil, TPH (C6-36), and Soil Suitability for Reclamation. Proposed monitoring well locations are illustrated on Figure 1.

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.

Between August 23 and September 9, 2021, approximately 4,214 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests.

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 April 29, 2022, five (5) soil borings (SB01-SB05) were advanced via direct push drilling methods to the south of the excavation extent in order to delineate hydrocarbon impacted material in the vicinity of the structure on site. Soil analytical results indicated that organic and inorganic compound concentrations were in compliance with the applicable COGCC Protection of Groundwater SSLs or representative of native soil conditions in all five soil boring locations. Additionally, groundwater was observed in soil borings SB01 through SB05 at approximately 13.5 feet bgs. Based on correspondence with the COGCC, two groundwater monitoring wells will be installed to confirm the absence of dissolved-phase hydrocarbon impacts within the vicinity of the former failed sample locations. The proposed monitoring well locations are illustrated on Figure 1.

Groundwater monitoring well activities and final groundwater analytical results will be summarized in a forthcoming Supplemental Form 27. A remediation strategy will be selected following the evaluation of groundwater analytical results.

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) 4214
_____ Air sparge / Soil vapor extraction	_____ Name of Licensed Disposal Facility or COGCC 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.

Based on the observation of groundwater in the soil borings completed on April 29, 2022, PDC will install two groundwater monitoring wells and conduct quarterly groundwater monitoring. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5 -TMB by EPA Method 8260B, and benz(a)anthracene, 1-methylnaphthalene, and 2-methylnaphthalene by EPA Method 8270D.

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 Timeline Update

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.

- Investigation and delineation has been completed in soil.
- Investigation and delineation is on-going for groundwater.
- Source mass removal has been partially completed.
- A remediation strategy is currently being developed to address hydrocarbon impacts beneath the residential structure on site.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.

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: \$ 28000

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 5574

E&P waste (solid) description Hydrocarbon 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 136

E&P waste (liquid) description Hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: NGL C6

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 excavation was backfilled and re-contoured to match pre-existing conditions and the third party underground infrastructure has been removed. The location will be reclaimed in accordance with the COGCC 1000 series.

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. 10/13/2016

Proposed date of completion of Reclamation. 01/10/2028

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. 11/04/2016

Actual Spill or Release date, or date of discovery. 10/13/2016

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 10/13/2016

Proposed site investigation commencement. 01/31/2023

Proposed completion of site investigation. 01/31/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/30/2017

Proposed date of completion of Remediation. 01/10/2028

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:

Following evaluation of the soil analytical results and site characteristics, additional site investigation activities will be conducted to evaluate dissolved-phase hydrocarbon impacts adjacent to the third-party structure. The proposed date of site investigation commencement and the proposed date of the completion of site investigation was adjusted to January 31, 2023 to reflect the scheduled groundwater monitoring drilling event.

OPERATOR COMMENT

This form is being submitted as a first quarter 2023 timeline update for the former Foe 33-20 Tank Battery.

Per the correspondence with the COGCC on November 10, 2022, PDC will install two monitoring wells within the immediate vicinity of the remaining hydrocarbon impacts located along the former southern excavation extent at the former Foe 33-20 tank battery. Drilling and well installation activities are scheduled for January 31, 2023.

Groundwater monitoring will be conducted at the two proposed monitoring wells and groundwater samples will be submitted for analysis of the Table 915-1 Organic Compounds in Groundwater, benz(a)anthracene, 1-methylnaphthalene, and 2-methylnaphthalene. Quarterly monitoring will continue until closure criteria is 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: 01/26/2023

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: RICK ALLISON

Date: 01/26/2023

Remediation Project Number: 10763

COA Type

Description

	Install the western monitoring well as close to soil sample location SS65 as possible.
1 COA	

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

403283890	FORM 27-SUPPLEMENTAL-SUBMITTED
403303430	SITE INVESTIGATION PLAN

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)