FORM 27 Rev 5/22

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 INFORMATON

Name of Operator: PDC ENERGY INC Operator No: 69175
Address: 1099 18TH STREET SUITE 1500
City: DENVER State: CO Zip: 80202
Contact Person: Karen Olson Email: taspillremediationcontractor@pdce.com

Phone Numbers
Phone: (303) 860-5800
Mobile: ( )

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.
- [X] Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- [X] 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: 331521 API #: County Name: WELD
Facility Name: FOE-66N64W 20NWSE Latitude: 40.469140 Longitude: -104.571440
** correct Lat/Long if needed: Latitude: 40.468490 Longitude: -104.564910
QtrQtr: NWSE Sec: 20 Twp: 6N Range: 64W 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

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:

- [X] **E&P Waste**
  - [X] Produced Water
  - [ ] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

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

[X] 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 exceeeding 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: 0.0266

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?

[X] 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.

[X] Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards): 4214

Volume of liquid waste (barrels): 0

[X] 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 January 31, 2023, two monitoring wells (BH02 & BH03) were installed in the immediate vicinity of the former failed sample locations (SS65, SS69, & SS73) to confirm the absence of dissolved-phase hydrocarbon impacts adjacent to the above ground structure on location. Lithologic descriptions and volatile organic compound (VOC) concentrations measured using a photoionization detector (PID) were recorded for each monitoring well. Due to elevated PID readings recorded in monitoring well BH03 (24.0 ppm), one sample was collected from the interval exhibiting the elevated PID reading at approximately 17 feet bgs, as well as from the terminus at approximately 20 feet bgs. Both samples were submitted for laboratory analysis of the Table 915-1 Organic Compounds in Soil, total petroleum hydrocarbons (TPH)[C6-C36], pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron.

Soil analytical results indicated that all constituent concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in both soil samples collected. Monitoring well locations are illustrated on Figure 1. Soil analytical results are summarized on Tables 1 and 2. GPS coordinates and field recorded VOC concentrations are summarized on Table 3. The laboratory analytical report is included in Attachment A and boring and well completion logs are included as Attachment B. Due to a field based error, the boring and well completion log for monitoring well BH03 was misplaced and is not included in Attachment B.

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.

On January 31, 2023, with direct COGCC on-site approval, two monitoring wells (BH02 & BH03) were installed in the immediate vicinity of the former failed sample locations (SS65, SS69, & SS73) to confirm the absence of dissolved-phase hydrocarbon impacts adjacent to the above ground structure on location. Soil samples were collected from the interval exhibiting the highest PID reading, as well as from the terminus of the soil boring and submitted for laboratory analysis of the Table 915-1 Organic Compounds in Soil. Soil analytical results indicated that all constituent concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in both soil samples. Based on the results, the hydrocarbon impacts left in place during September 2021 excavation activities have naturally attenuated and concentrations are no longer above Protection of Groundwater SSLs.

Soil Remediation Summary

☐ **In Situ**

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

☒ **Ex Situ**

- Yes Excavate and offsite disposal
  - If Yes: Estimated Volume (Cubic Yards) 4214
  - 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.

On February 8, 2023 groundwater monitoring was conducted at the two site monitoring wells (BH02 and BH03). Both groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0 and total dissolved solids (TDS) by Method SM 2540C in accordance with Table 915-1. Due to dry conditions and insufficient water columns, a second groundwater monitoring event was conducted on March 30, 2023. Groundwater samples were collected from monitoring wells BH02 and BH03 and were submitted to Pace Analytical for laboratory analysis of benzo (a)anthracene, 1-methylnaphthalene (M), and 2-M by Method 8270C-SIM.

Groundwater analytical results indicated that organic compound concentrations were in compliance with the applicable regulatory standards in both monitoring well locations. Sample locations and corresponding analytical results are illustrated on Figure 1. Groundwater analytical results are summarized in Table 4. The laboratory analytical report is included in Attachment A.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

[X] Quarterly [ ] Semi-Annually [ ] Annually [X] Other No Further Action (NFA) Request

[ ] **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: [X] Groundwater Monitoring [ ] Land Treatment Progress Report [ ] O&M Report

[X] Other No Further Action (NFA) Request

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.

Financial assurance information was included in the second quarter 2022 Supplemental Form 27 (Document No. 403123184). Based on analytical results collected during the first quarter 2023, this remediation project has been competed and no further action is required at this time.

Operator anticipates the remaining cost for this project to be: $ 1000

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? Yes

If YES:

[X] Compliant with Rule 913.h.(1).

[ ] Compliant with Rule 913.h.(2).

[X] Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? Yes

Does Groundwater meet Table 915-1 standards? Yes

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?

[X] 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. 04/17/2024

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. 03/30/2023

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.

[X] Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

Based on soil and groundwater analytical results collected during the first quarter 2023, the request from the COGCC has been satisfied and no further remediation is required at this time.

OPERATOR COMMENT

On January 31, 2023, with direct COGCC on-site approval, two monitoring wells (BH02 & BH03) were installed in the immediate vicinity of the former failed sample locations (SS65, SS69, & SS73) to confirm the absence of dissolved-phase hydrocarbon impacts adjacent to the above ground structure on location. Soil samples were collected from the interval exhibiting the highest PID reading, as well as from the terminus of the soil boring and submitted for laboratory analysis of the Table 915-1 Organic Compounds in Soil. Soil analytical results indicated that all constituent concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in both soil samples. Based on the results, the hydrocarbon impacts left in place during September 2021 excavation activities have naturally attenuated and concentrations are no longer above Protection of Groundwater SSLs.

Groundwater analytical results indicated that organic compound concentrations were in compliance with the applicable regulatory standards in both monitoring well locations.

Based on the soil and groundwater analytical results collected during the first quarter 2023, the November 2022 request from the COGCC has been satisfied. Based on this data, as well as the absence of groundwater during 2021 excavation activities, PDC is requesting a No Further Action (NFA) determination for this remediation project.

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: 05/18/2023 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: 05/23/2023

Remediation Project Number: 10763

COA Type	Description
	Based on the information presented, it appears that no further remedial action is necessary at this time and the COGCC approves the closure request. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards or if groundwater is found to be impacted, then further investigation and/or remediation activities may be required. The surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.
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
403374974	INVESTIGATION/REMEDIATION WORKPLAN (SUPPLEMENTAL)
403375076	ANALYTICAL RESULTS
403375078	LOGS
403375084	GROUND WATER SAMPLE LOCATION
403410056	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)