FORM 27 Rev 5/22

State of Colorado
Oil and Gas Conservation Commission

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

Document Number: 403274190
Receive Date:
Report taken by:

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: 1775 SHERMAN STREET - STE 3000
City: DENVER State: CO Zip: 80203
Contact Person: Jason Davidson Email: jason.davidson@pdce.com

Phone Numbers
Phone: (970) 313-5582
Mobile: ( )

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 8430 Initial Form 27 Document #: 2148921

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.
- [X] Other: Remediation of previously closed pit (Facility ID 115604)

SITE INFORMATION

No Multiple Facilities

Facility Type: WELL Facility ID: API #: 121-06411 County Name: WASHINGTON
Facility Name: FLESSNER 9 Latitude: 39.945350 Longitude: -103.693070
** correct Lat/Long if needed: Latitude: 39.947185 Longitude: -103.695874
QtrQtr: SWSE Sec: 19 Twp: 1S Range: 56W Meridian: 6 Sensitive Area? No

SITE CONDITIONS

General soil type - USCS Classifications CL
Most Sensitive Adjacent Land Use Agricultural
Is domestic water well within 1/4 mile? No
Is surface water within 1/4 mile? No
Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

None identified

SITE INVESTIGATION PLAN

TYPE OF WASTE:

[X] **E&P Waste**	[ ] **Other E&P Waste**	[ ] **Non-E&P Waste**
[X] 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
Yes	SOILS	6.5 acres by 0.5 to 10' deep	Soil sampling and visual/gps survey

INITIAL ACTION SUMMARY

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

Previous investigations identified an impacted area of approximately 6.5 acres that included the location of the former skim pits. During those investigations soil samples identified concentrations above the Colorado Oil and Gas Commission (COGCC) Table 915-1 Cleanup Concentrations for Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC). Hydrocarbons were not detected.

In March of 2020, a soil remediation plan was implemented that included ripping the upper 18-inches of soil, adding 2 tons per acre of corn stalks, 16 tons per acre of gypsum, 2 tons per acre of elemental sulfur and 100 pounds per acre of nitrogen.

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):

In response to COA #1 from the Supplemental Form 27 Document #403038653 approved by the COGCC on 5/16/2022, PDC is proposing to complete delineation activities and characterization soil sampling at the Site. A Geoprobe rig will be utilized to advance approximately 10 soil borings to delineate the horizontal and vertical extent of the historic produced water release. The soil borings will be advanced to 10 feet below ground surface (bgs) and soil samples will be collected at depths of 0 feet to 0.5 feet bgs, 1.0 foot to 1.5 feet bgs, 2.5 feet to 3.0 feet bgs, 4.5 feet to 5.0 feet bgs, and 9.5 to 10.0 feet bgs. All three samples from 0 feet to 3.0 feet bgs will be analyzed by an accredited laboratory for the Soil Suitability for Reclamation Parameters; EC, SAR, pH by Saturated Paste Method, and boron by Hot Water-Soluble Soil Extract Method. Previous soil sampling demonstrated that organic compounds were not detected and as such will not be included in the list of parameters analyzed.

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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected: 56

Number of soil samples exceeeding 915-1: 46

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet): 28300 0

NA / ND

NA — Highest concentration of TPH (mg/kg):

-- — Highest concentration of SAR: 45.4

BTEX > 915-1: No

Vertical Extent > 915-1 (in feet): 10

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?

Twenty background soil samples were collected from 4 soil borings advanced in areas outside the impacted area. Elevated levels of EC were detected in 3 of the 4 soil borings at depths that ranged from 5 to 10 feet below ground level. Elevated levels of SAR were detected in 3 of the 4 borings from 5 to 10 feet below ground level with only one sample above the cleanup concentrations at 3 feet below ground level. Elevated pH concentrations were identified in 3 of the 4 background soil borings at depths from 1.5 to 5 feet below ground level with the greatest pH concentration in all the samples analyzed at 0.19 units above the target concentration of 8.3. No boron levels were detected above the Table 915-1 Cleanup Concentration.

☐ 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.

Deep ripping of the soils will be conducted twice per year. Once before planting and once in the fall following planting to allow for increased penetration of precipitation.

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.

In March of 2020, a soil remediation plan was implemented in the area of the former pits that included ripping the upper 18-inches of soil and adding 2 tons per acre of corn stalks to improve infiltration, and adding 16 tons per acre of gypsum, 2 tons per acre of elemental sulfur, and 100 pounds per acre of nitrogen to reduce EC and SAR.

Soil Remediation Summary

[X] In Situ

- ____ Bioremediation (or enhanced bioremediation)
- ____ Chemical oxidation
- ____ Air sparge / Soil vapor extraction
- Yes Natural Attenuation
- Yes Other Enhanced permeability, Soil amendments (gypsum, sulfur, nitrogen)

[ ] 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 this site investigation. A review of Colorado Division of Water Resources GIS Maps was conducted to identify depth to groundwater at the Site. The nearest well is located approximately 1.3 miles to the west. The well has a total depth of 51 feet and is designated as a stock well. All other wells in the vicinity are greater than 1.5 miles from the impacted area. Based on the research of available data the depth to groundwater is expected to be encountered between 40 and 50 feet below grade. Domestic use wells within the township range from depths of 90 to 165 feet below grade.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

☐ Quarterly ☒ Semi-Annually ☐ Annually ☐ Other Remediation Progress Report

☐ **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 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.

- Investigation and delineation is complete for inorganics in soil.
- Deep ripping of the soils will be conducted twice per year.
- Soil samples will be collected twice per year to monitor soil conditions within the 0.5 to 3 foot depths.
- 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: $ 45000

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation?

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards

E&P waste (solid) description

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility:

Volume of E&P Waste (liquid) in barrels

E&P waste (liquid) description

COGCC Disposal Facility ID #, if applicable:

Non-COGCC 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 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.

Following NFA status, PDC will return the land to the landowner for agricultural use. If necessary, the site will be reclaimed in accordance with COGCC 1004 series rules.

Is the described reclamation complete? No

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. 04/06/2026

Proposed date of completion of Reclamation. 04/06/2028

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.

Actual Spill or Release date, or date of discovery. 07/27/2015

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/27/2017

Proposed site investigation commencement. 10/04/2022

Proposed completion of site investigation. 10/04/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/02/2020

Proposed date of completion of Remediation. 03/05/2026

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:

Proposed site investigation commencement and completion dates were updated based the actual date of the investigation.

OPERATOR COMMENT

Please refer to the attached Site Investigation - Soil Delineation Report.

Photographic evidence suggests that the remediation activities completed in March of 2022 had a positive outcome on the ability of the impacted area to support plant growth. Photos taken at the site in September 2022 are included in the attached Report for reference. The site is situated within an area designated as non-irrigated agricultural land use and does not receive supplemental irrigation water other than naturally occurring. The US Drought Monitor for the State of Colorado indicates that the portion of Washington County in which the site is located is designated as a D2 (Severe Drought) area as shown in Figure 2 in the attached Report. The remediation measures taken in 2020 require time and water to reduce the elevated concentrations of SAR and EC. Due to the drought conditions, the remediated area has not received enough precipitation to drive expected reactions. In addition, soil encountered at the site has sufficiently low hydraulic conductivity to suggest little to no vertical migration and depth to groundwater is expected to be encountered between 40 and 50 feet below grade. As such, the remediation options will focus on the upper 3 feet within the impacted area.

PDC is proposing to allow the existing remediation in the impacted area to continue with the following modifications:
• Continue to monitor soil conditions within the 0.5 to 3 foot depths from four monitoring points within the impacted area. Soil samples will be analyzed for SAR, EC, and Boron. Elevated pH was not detected within that zone and will not be analyzed for future compliance monitoring.
• Samples will be collected twice per year, once before planting and once after harvest. Sample results will be submitted to the COGCC via Form 27.
• Deep ripping of the soils will be conducted twice per year. Once before planting and once in the fall following planting to allow for increased penetration of precipitation.
• Compliance samples will be evaluated on an annual basis to monitor the progress of the remediation and, if necessary, the remediation work plan may be revised.

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

Signed: Jason Davidson Title: Senior Env. Consultant

Submit Date: Email: jason.davidson@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: Date:

Remediation Project Number: 8430

COA Type	Description
0 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
403274198	SITE INVESTIGATION REPORT

Total Attach: 1 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)