FORM
27
Rev 5/22

State of Colorado
Oil and Gas Conservation Commission

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Report taken by: Jason Kosola

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: Karen Olson Email: COGCCSpillRemediation@pdce.com

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 18732 Initial Form 27 Document #: 402721552

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.
- [ ] 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.
- [x] 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: LOCATION Facility ID: 336534 API #: County Name: WELD
Facility Name: Niles Miller 3N66W20Y Latitude: 40.204907 Longitude: -104.793668
** correct Lat/Long if needed: Latitude: 40.203401 Longitude: -104.793862
QtrQtr: SESE Sec: 20 Twp: 3N Range: 66W Meridian: 6 Sensitive Area? Yes

Facility Type: SPILL OR RELEASE Facility ID: 480367 API #: County Name: WELD
Facility Name: Miller 5 Latitude: 40.203428 Longitude: -104.793702
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: SESE Sec: 20 Twp: 3N Range: 66W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Agriculture

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

Nearest Well: Domestic - 760 feet W-NW, Occupied Buildings: 736 feet NW

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [X] **E&P Waste**
  - [X] Produced Water
  - [X] Oil
  - [X] 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
Yes	SOILS	Refer to Tables 1-5 and 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 August 6, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the Miller 5, Tank Battery. Based on initial results, it was determined that a historic release was discovered below the former produced water vessel. Following the discovery, mitigation activities were initiated to delineate and remove hydrocarbon impacts. Approximately 1,770 cubic yards (CY) of impacted material were removed and transported to the Buffalo Ridge Waste Management Facility for disposal under PDC Manifests.

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):

On August 6, 2021, one soil sample (SS01) was collected from the source area at approximately 5 feet below ground surface (bgs) and submitted to Summit Scientific Laboratories for analysis of the full COGCC Table 915-1 analyte list. Preliminary analytical results indicate that contaminants of concern (COCs) include benzene, toluene, ethylbenzene, xylene(s) (BTEX), naphthalene (N), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, total petroleum hydrocarbons (TPH), arsenic, lead, and selenium. Between August 11 and 26, 2021, eighty-nine soil samples (SS02-SS14, SS16-SS87, SS89-SS92) were collected from the sidewalls and base of the excavation at depths ranging from 5 to 14 feet bgs and were submitted for laboratory analysis of the above referenced COCs as well as electrical conductivity (EC) and sodium adsorption ratio (SAR) per the request of the COGCC. In addition, one soil sample (Soil Suitability) was collected at 2.5 feet bgs and submitted for Table 915 soil suitability constituents.

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):

During initial closure activities conducted on August 6, 2021, soil encountered on site and below production equipment was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Per the approved proposed soil sampling plan, samples were collected below and/or adjacent to the above ground storage tanks (AST), separator flowline (SEP-FL), and separator dumpline (SEP-DL). Samples were submitted for analysis of BTEX, N, 1,2,4-TMB, 1,3,5-TMB, and TPH. Analytical results indicated that constituents were in compliance with the applicable COGCC Table 915-1 standards in all laboratory sample locations. Soil analytical results are summarized in Tables 1-4. GPS coordinates and field screened VOC concentrations are summarized in Table 5. Field screened and laboratory sample locations are illustrated on Figures 1-4.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 95

Number of soil samples exceeeding 915-1 7

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

Approximate areal extent (square feet) 5019

NA / ND

-- Highest concentration of TPH (mg/kg) 53.1

Highest concentration of SAR

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 14

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

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 August 25, 2021, six background soil samples (BKG01) were collected at approximately 2.5 feet, 5 feet, 8 feet, 10 feet, 12 feet, & 14 feet bgs, respectively, from native material topographically up-gradient of the tank battery & submitted for analysis of arsenic, lead, selenium, SAR, & EC. Analytical results indicated that arsenic was in exceedance of EPA Residential Soil Screening Levels in native soil.

Additionally, on May 13, 2022, twenty four (24) background soil samples (BKG02-BKG05) were collected between 2.5 feet & 14 feet bgs from native material adjacent to the tank battery. All background soil samples were submitted for analysis of the COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, lead, & selenium were in exceedance of the applicable regulatory standards in native soil. Based on these results, arsenic, lead, & selenium exceedances observed in eighty three of the eighty nine excavation soil samples are indicative of native soil conditions.

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

Volume of solid waste (cubic yards) 1770 Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

Based upon analytical results, up to ten (10) soil borings will be advanced in native material directly adjacent to and surrounding the soil sample locations exhibiting COGCC Table 915-1 metals exceedances above background levels in order to vertically and horizontally delineate the exceedances. Soil samples will be collected from each soil boring at corresponding depths of the former failed sample confirmation samples to obtain necessary vertical or horizontal delineation. All soil boring samples will be submitted for laboratory analysis of the respective metal that is in exceedance. Confirmation sampling is expected to be conducted during the fourth quarter of 2022.

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 6 and 25, 2021, approximately 1,770 cubic yards of impacted material were excavated adjacent to the tank battery and transported to the Buffalo Ridge Landfill 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 May 13, 2022, four background soil borings (BKG02 through BKG05) were advanced adjacent to the tank battery via hand auger to evaluate COGCC Table 915-1 metal concentrations in native material. Lithologic descriptions and field screened VOC concentrations were collected using a PID in 1 foot intervals. Six soil samples were collected from each respective background soil boring between 2.5 feet and 14 feet bgs. All soil samples were submitted for laboratory analysis of COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, lead, and selenium were in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater SSLs in native material. A statistical analysis of the Table 915-1 metals data for the excavation and background soil samples was conducted and was discussed with the COGCC Environmental Protection Specialist as well as the COGCC East Environmental Supervisor on July 19, 2022. This analysis indicated that Table 915-1 metals were highly variable with no recognizable correlation between background soil sample metal concentration and depth. The same observation was found in soil samples collected from the final excavation extent. Furthermore, mean arsenic, lead, and selenium concentrations were found to be very similar in both native material and confirmation soil samples. Based on this evaluation and the similarities across the spectrum of native material and confirmation sample Table 915-1 metal analytical results, PDC utilized the highest background value observed for arsenic, lead, & selenium was applied when evaluating the soil samples collected from the final excavation extent. Consequently, the exceedances observed in eighty three of the eighty nine excavation extent soil samples are indicative of native soil conditions. Six excavation extent soil sample locations remain above background concentrations and require delineation.

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) 1770
  - 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 initial decommissioning or supplemental site investigation activities.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

[X] 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

[X] Other Confirmation Sample Summary and Supplemental Site Investigation 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.

- Investigation and delineation has been completed for organics in soil. Delineation of Table 915-1 metals are ongoing.
- Source mass removal has been completed.
- 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: $ 10000

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 1770

E&P waste (solid) description Hydrocarbon impacted soils

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: Buffalo Ridge Waste Management Facility

Volume of E&P Waste (liquid) in barrels 0

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 tank battery decommissioning activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with 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. 08/06/2021

Proposed date of completion of Reclamation. 08/10/2027

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. 05/20/2021

Actual Spill or Release date, or date of discovery. 08/06/2021

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/12/2021

Proposed site investigation commencement. 10/01/2022

Proposed completion of site investigation. 12/31/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/06/2021

Proposed date of completion of Remediation. 08/10/2027

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 the evaluation of the analytical results and field conditions described herein for the Miller 5 Tank Battery and results for the waste characterization sample SS01 collected at 5 feet bgs, PDC is requesting that the COCs for the historic release discovered at the Miller 5 tank battery be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, N, TPH, arsenic, lead, selenium, EC, SAR. Based on the absence of hydrocarbon indicators and organic compound concentrations in the soil samples collected from the final excavation extent, PDC has adequately delineated organic impacts to below the Protection of Groundwater SSLs for the above mentioned COCs as identified in source material characterization sample SS01.

Following the approval of this form and landowner approval, PDC will conduct a supplemental site investigation to delineate the vertical and horizontal extent of elevated COGCC Table 915-1 metals present in the six remaining soil samples with levels in exceedance of background soil samples. Pending approval of this Form this site investigation will be conducted by the end of the fourth quarter 2022.

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: 08/15/2022 Email: COGCCSpillRemediation@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: Jason Kosola Date: 10/11/2022

Remediation Project Number: 18732

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
403110434	FORM 27-SUPPLEMENTAL-SUBMITTED
403110931	LOGS
403110933	ANALYTICAL RESULTS
403131261	SOIL SAMPLE LOCATION MAP
403131262	ANALYTICAL RESULTS

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)