

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:  
Peter Gintautas

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>	<b>Phone Numbers</b>
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>COGCCSpillRemediation@pdce.com</u>	

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.
- 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>336534</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Niles Miller 3N66W20Y</u>	Latitude: <u>40.204907</u>	Longitude: <u>-104.793668</u>	
	** correct Lat/Long if needed: Latitude: <u>40.203401</u>	Longitude: <u>-104.793862</u>	
QtrQtr: <u>SESE</u> Sec: <u>20</u> Twp: <u>3N</u> Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>			
Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>480367</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Miller 5</u>	Latitude: <u>40.203428</u>	Longitude: <u>-104.793702</u>	
	** correct Lat/Long if needed: Latitude: _____	Longitude: _____	
QtrQtr: <u>SESE</u> Sec: <u>20</u> Twp: <u>3N</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 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:

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste      | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             | _____                                  |
| <input checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" type="checkbox"/> Condensate     | <input type="checkbox"/> Pigging Waste               |  |
| <input 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 1-4 and Figures 1-4	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 (Figures 1-3). 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

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 exceeding 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, and 14 feet bgs, respectively, from native material topographically up-gradient of the tank battery and submitted for analysis of arsenic, lead, selenium, SAR, and EC. Analytical results indicated that arsenic was in exceedance of EPA Residential Soil Screening Levels in native soil.

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?

Three (3) additional background soil borings will be advanced to approximately 14 feet bgs via hand auger drilling methods. The background soil borings will be advanced adjacent to the former excavation extent to evaluate Table 915-1 metals and pH in native material.

**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.

Soil sample analytical results indicated that organic compound concentrations as well as EC and SAR were below the applicable COGCC Table 915-1 Protection of Groundwater SSLs in the samples collected from the final excavation extent. Lead and selenium concentrations were above the COGCC Table 915-1 Protection of Groundwater SSLs but were below the Table 915-1 Residential SSLs. Per a conversation PDC held with the COGCC Environmental Protection Specialist on August 19, 2021, Table 915-1 metals would likely be evaluated under EPA Residential SSLs opposed to the Protection of Groundwater SSLs. The attached Table 1 details organic constituents, EC, and SAR as evaluated under the Protection of Groundwater SSLs. Conversely, arsenic, lead, and selenium utilize the EPA Residential SSLs. Analytical results indicated that arsenic and pH exceeded the applicable Table 915-1 standards.

A remediation strategy will be selected following the evaluation of confirmatory soil sampling analytical results.

**Soil Remediation Summary**

In Situ

Ex Situ

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

- 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.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

### Approved Reporting Schedule:

Quarterly     Semi-Annually     Annually     Other    Supplemental Site Investigation Proposal and Analyte Reduction 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:**     Groundwater Monitoring     Land Treatment Progress Report     O&M Report

Other    Supplemental Site Investigation Proposal and Analyte Reduction Request

## 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.

Reclamation will be conducted in accordance with COGCC 1004 Series Rules.

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. \_\_\_\_\_

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. 05/20/2021

Actual Spill or Release date, or date of discovery. \_\_\_\_\_

### SITE INVESTIGATION DATES

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

Proposed site investigation commencement. 08/06/2021

Proposed completion of site investigation. 03/31/2022

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/06/2021

Proposed date of completion of Remediation. \_\_\_\_\_

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 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.

Following the approval of this form, PDC will conduct a supplemental site investigation to evaluate Table 915-1 metal concentrations as well as pH in native material adjacent to the tank battery. This investigation will be conducted by the end of the first 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: 11/05/2021 \_\_\_\_\_

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: Peter Gintautas \_\_\_\_\_

Date: 11/05/2021 \_\_\_\_\_

Remediation Project Number: 18732 \_\_\_\_\_

**Condition of Approval****COA Type****Description**

	<p>The request to abbreviate the compounds of concern cannot be approved at this time. The sample indicated as the waste characterization sample does not have characteristics of significantly impacted soil. Characterization samples need to be collected from sources of the E&amp;P waste or from the most contaminated soils at the site.</p> <p>No supporting documentation justifying use of residential soil screening thresholds in place of protection of groundwater thresholds has been provided.</p>
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**

402860148	FORM 27-SUPPLEMENTAL-SUBMITTED
402862583	PHOTO DOCUMENTATION
402862958	ANALYTICAL RESULTS
402862959	SOIL SAMPLE LOCATION MAP

Total Attach: 4 Files

**General Comments****User Group****Comment****Comment Date**

Environmental	added spill 480367 to facilities as this remediation project was the basis for closure of the spill.	11/05/2021
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Total: 1 comment(s)