

State of Colorado
Oil and Gas Conservation Commission

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Report taken by:
Kari Brown

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>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80203</u>
Contact Person: <u>Karen Olson</u>	Email: <u>COGCCSpillRemediation@pdce.com</u>	
		Phone: <u>(303) 860-5800</u>
		Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 18936 Initial Form 27 Document #: 402719490

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>WELL</u>	Facility ID: _____	API #: <u>123-12813</u>	County Name: <u>WELD</u>
Facility Name: <u>WILLMAN 42-16</u>	Latitude: <u>40.314433</u>	Longitude: <u>-104.660546</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SENE</u>	Sec: <u>16</u>	Twp: <u>4N</u>	Range: <u>65W</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? Yes
 Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Nearest Well: Domestic/Livestock - 494 feet NE, Surface Water: Unnamed (Livestock) Pond - 575 feet E, Occupied Buildings: 480 feet NE, Livestock: 580 feet SE, FWS Wetlands: Freshwater Emergent Wetland - 1,580 feet SW

Battery/Flowline conflict unlikely, but end of flowline and facility is located ~140 feet from surface water

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	GROUNDWATER	Refer to Table 5 & Figures 1 & 3	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Tables 1-4 & Figures 1-3	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 September 30, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the former Willman 42-16 Wellhead (Figure 1) and associated flowline (Figure 2). During decommissioning activities, historic hydrocarbon impacts were discovered at the wellhead. Following this discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. During excavation activities, groundwater was encountered in the excavation at approximately 6 feet below ground surface (bgs). Approximately 35 cubic yards (CY) of impacted material were excavated and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. Additionally, approximately 5 barrels (bbls) of impacted groundwater were removed from the excavation and transported to the NGL C6 facility for disposal under PDC waste 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 September 30, 2021, one soil sample (WH01) was collected adjacent to the cut and capped wellhead from the impacted source material at approximately 6 feet bgs and submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicated contaminants of concern (COC) include BTEX, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, naphthalene, TPH (C6-C36), anthracene, fluorene, 1-Methylnaphthalene (M), and 2-M. Additionally, on October 7, 2021, nine soil samples (SS01-SS09) were collected from the base and sidewalls of the excavation at depths ranging between 4 feet and 8 feet bgs. The samples were submitted for laboratory analysis of the above referenced COCs. Analytical results indicated that organic compound concentrations were below the applicable COGCC Table 915-1 Protection of Groundwater SSLs in all samples collected from the final excavation extent.

Proposed Groundwater Sampling

Will groundwater samples be collected as part of this investigation? (Number, analyses, and locations of samples):

On September 30, 2021, one groundwater sample (GW01) was collected from the wellhead excavation and was submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that all analyzed constituents were below the applicable COGCC Table 915-1 Standards. The groundwater sample locations are illustrated on Figures 1 and 3 and the analytical results are summarized on Table 5.

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 September 30, 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, one soil sample (FLR01) was collected below the flowline riser at approximately 4 feet bgs and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, TPH (C6-C36), PAHs, pH, EC, SAR, and boron. Analytical results indicated that organic compound concentrations were below the applicable COGCC Table 915-1 Protection of Groundwater SSLs. Field screening locations are illustrated on Figure 1.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 12

Number of soil samples exceeding 915-1 1

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

Approximate areal extent (square feet) 221

NA / ND

-- Highest concentration of TPH (mg/kg) 3.4

-- Highest concentration of SAR 4.69

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 6

Groundwater

Number of groundwater samples collected 1

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 6'

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 915-1 0

ND Highest concentration of Benzene (µg/l) _____

ND Highest concentration of Toluene (µg/l) _____

ND Highest concentration of Ethylbenzene (µg/l) _____

ND Highest concentration of Xylene (µg/l) _____

NA 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 30, 2021, two background soil samples (BKG01) were collected at approximately 4 feet and 6 feet bgs, respectively, from native material topographically up-gradient of the wellhead, due to laboratory hold times constraints, this sample was not analyzed for COGCC Table 915-1 metals. Additionally on October 7, 2021, one background soil sample (BKG02) was collected from approximately 8 feet bgs from native material topographically up-gradient of the wellhead and was submitted for analysis of COGCC Table 915-1 metals. Analytical results indicate arsenic and selenium were in exceedance of the applicable regulatory standards in native soil.

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

Volume of solid waste (cubic yards) 35

Volume of liquid waste (barrels) 5

Is further site investigation required?

Five (5) groundwater monitoring wells will be installed via direct-push drilling methods to confirm the absence of dissolved-phase hydrocarbon impacts within and surrounding the former excavation extent. Volatile organic compound (VOC) concentrations using a photoionization detector (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 COGCC approved COCs. Proposed monitoring well locations are illustrated on Figure 4.

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.

On October 7, 2021, approximately 35 CY of impacted solids were removed from the excavation and transported to North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Additionally, groundwater vacuum recovery was conducted concurrent with excavation activities and approximately 5 barrels of groundwater were removed from the excavation and transported to the NGL C6 facility for disposal under PDC waste manifests.

REMEDICATION 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.

A remediation strategy will be selected following the evaluation of groundwater analytical results.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 35

_____ 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 analytical data collected during source mass removal activities, PDC will conduct quarterly groundwater monitoring at the five proposed monitoring wells until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB by EPA Method 8260B in accordance with Table 915-1. In addition, site specific inorganic parameters, including total dissolved solids (TDS), chlorides, and sulfates, will be evaluated at all proposed monitoring wells. Contingent on analytical results, inorganic parameter analysis will be discontinued after four sampling events.

REMEDATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other Confirmation Sampling Summary, Analyte Reduction Request, Supplemental Site Investigation Proposal

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 Confirmation Sampling Summary, Analyte Reduction Request, Supplemental Site Investigation Proposal

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 35

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 5

E&P waste (liquid) description Hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: NGL C6

REMEDATION COMPLETION REPORT

REMEDATION 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 wellhead and flowline abandonment activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. 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. 10/07/2021

Proposed date of completion of Reclamation. 03/18/2027

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. 05/26/2021

Actual Spill or Release date, or date of discovery. 10/04/2021

SITE INVESTIGATION DATES

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

Proposed site investigation commencement. 07/12/2021

Proposed completion of site investigation. 06/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/07/2021

Proposed date of completion of Remediation. 03/18/2027

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 analytical results for the waste characterization sample WH01 collected from the wellhead source area, PDC is requesting that the COCs for the historic release discovered at the Willman 42-16 Wellhead be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), anthracene, fluorene, 1-methylnaphthalene (M), and 2-M.

Following the approval of this form, PDC will install and conduct quarterly groundwater monitoring at the five (5) proposed monitoring wells until closure criteria are met at the Willman 42-16 Wellhead.

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: 03/21/2022

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: Kari Brown

Date: 03/24/2022

Remediation Project Number: 18936

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

	COGCC agrees to the amended sampling plan
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**

402976471	FORM 27-SUPPLEMENTAL-SUBMITTED
402976608	SITE INVESTIGATION PLAN
402976609	SOIL SAMPLE LOCATION MAP
402976615	ANALYTICAL RESULTS
402976619	PHOTO DOCUMENTATION
402988574	SOIL SAMPLE LOCATION MAP
402989095	SOIL SAMPLE LOCATION MAP

Total Attach: 7 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)