

State of Colorado
Energy & Carbon Management Commission

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Document Number:
403540311
Receive Date:
10/16/2023
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 INFORMATION

Name of Operator: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers Phone: <u>(303) 860-5800</u> Mobile: <u>()</u>
Address: <u>1099 18TH STREET SUITE 1500</u>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Karen Olson</u>	Email: <u>taspillremediationcontractor@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 20066 Initial Form 27 Document #: 402802849

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>123-25595</u>	County Name: <u>WELD</u>
Facility Name: <u>CHURCHILL 5</u>	Latitude: <u>40.374268</u>	Longitude: <u>-104.559313</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NWNW</u>	Sec: <u>28</u>	Twp: <u>5N</u>	Range: <u>64W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Residential / Agriculture
Is domestic water well within 1/4 mile? No 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

Surface Water: Freshwater Pond - 478 feet E-SE, Occupied Buildings - 993 feet NW, Livestock - 0 feet (appears to be located within pastureland), FWS Wetlands: Freshwater Emergent Wetland (PEM1C) - 421 feet SE

Flowline conflict likely as wellhead is located within both pastureland and 1/4-mile bound of Bald Eagle Active Nest Site (1202.c NSO); flowline crosses unrelated flowline at approximately 565' from wellhead

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- E&P Waste Other E&P Waste Non-E&P Waste
- 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	GROUNDWATER	Refer to Table 5 & Figure 1	Confirmation Groundwater Sampling
Yes	SOILS	Refer to Tables 1-4 & 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 October 20, 2021, field screening and confirmation soil sampling was conducted in accordance with the ECMC Rule 911 during the decommissioning and closure of the former Churchill 5 Wellhead (Figure 1) and associated flowline (Figure 2). During excavation activities, hydrocarbon impacted groundwater was encountered in the excavation at approximately 6 feet below ground surface (bgs). Analytical results for the excavation groundwater sample indicated that organic compound concentrations were in exceedance of the ECMC Table 915-1 standards.

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 October 20, 2021, wellhead decommissioning and confirmation sampling activities were completed at the Churchill 5 Wellhead. Two soil samples (WH01 and FLR01) were collected adjacent to the cut and capped well casing at approximately 6 feet bgs and below the flowline riser at approximately 3 feet bgs. The samples were submitted for the Table 915-1 Organic compounds in soil, TPH (C6-C36), and soil suitability for reclamation. Following the discovery of the release, soil sample WH01 was additionally submitted for analysis of Table 915-1 metals. Analytical results indicated that organic compound concentrations were below the applicable Table 915-1 Protection of Groundwater SSLs.

Proposed Groundwater Sampling

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

On October 20, 2021, one groundwater sample (GW05) was collected from the excavation. The groundwater sample was submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that organic compound concentrations were in exceedance of the ECMC Table 915-1 standards in sample GW05.

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 October 20, 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 the flowline riser at the separator, along the flowline at significant direction changes and where the flowline is in close proximity to High Priority Habitats as well as between ground surface and 6 inches in the four cardinal directions surrounding the wellhead.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 9
Number of soil samples exceeding 915-1 3
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 25

NA / ND

ND Highest concentration of TPH (mg/kg) _____
-- Highest concentration of SAR 2.01
BTEX > 915-1 No
Vertical Extent > 915-1 (in feet) 6

Groundwater

Number of groundwater samples collected 1
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 6
Number of groundwater monitoring wells installed 0
Number of groundwater samples exceeding 915-1 1

-- Highest concentration of Benzene (µg/l) 7.1
-- Highest concentration of Toluene (µg/l) 13
ND Highest concentration of Ethylbenzene (µg/l) _____
-- Highest concentration of Xylene (µg/l) 11
NA 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 October 22, 2021, two background soil sample (BKG01) were collected at approximately 3 feet and 6 feet bgs, respectively, and submitted for analysis of pH, arsenic, and selenium. Analytical results indicate arsenic and selenium were in exceedance of the applicable regulatory standards.

On August 12, 2022, three background soil borings (BKG02 – BKG04) were advanced to a depth of approximately 6 feet bgs in native material surrounding the former wellhead location. Six samples were collected at depths of approximately 3 feet and 6 feet bgs and were submitted for laboratory analysis of the Table 915-1 metals suite. Background analytical results indicated that arsenic and selenium concentrations were in exceedance of the applicable ECMC Table 915-1 regulatory standards in native soil on site.

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?

On August 12, 2022, five monitoring wells (BH01 – BH05) were installed to delineate dissolved-phase hydrocarbon impacts within and adjacent to the former excavation extent (Figure 1). Lithologic descriptions and volatile organic compound (VOC) concentrations, measured using a photoionization detector (PID), were recorded for each borehole.

One soil sample was collected from each soil boring (BH01 – BH05) at the interval exhibiting the highest VOC concentration. Due to staining and slightly elevated PID readings observed in monitoring well BH01, one sample was also collected from clean material beneath the elevated readings. Six soil samples were collected at depths ranging from approximately 5 feet to 10 feet bgs and were submitted to Summit Scientific Laboratory for analysis of the full Table 915-1 analytical suite.

Soil analytical results indicated that organic compound concentrations, pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron were in compliance with the applicable ECMC Table 915-1 regulatory standards in all monitoring well locations. Arsenic and selenium concentrations were in exceedance of the applicable regulatory standards in all monitoring well locations. Additionally, the barium concentration was in exceedance of the applicable regulatory standard in monitoring well BH03.

Based on these results, the arsenic and selenium concentrations recorded in soil samples collected from monitoring well BH01 are below or within 1.25x the background concentrations of background soil samples collected from similar depths. Additionally, based on the location of the point of compliance (POC) monitoring wells (BH02 – BH05), and the absence of organic compound detections or elevated EC and SAR, the arsenic, barium, and selenium concentrations recorded in these monitoring wells are representative of native soil conditions.

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.

No investigative derived waste was generated as part of the Churchill 5 wellhead decommissioning and sampling activities. Any hydrocarbon impacted material generated in supplemental site investigative activities will be transported off-site to a licensed disposal facility in accordance with Rules 905 and 906.

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.

Based on analytical data received from the initial groundwater monitoring event, monitored natural attenuation (MNA) was the selected remediation strategy for the third quarter 2022 and will remain the selected remediation strategy through the third quarter 2023.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____

_____ 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

Yes _____ 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 September 5, 2023, groundwater monitoring was conducted at all five monitoring wells (BH01 – BH05). Five groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB by EPA Method 8260B, sulfate and chloride anions by EPA Method 300.0, and total dissolved solids (TDS) by Method SM 2540C in accordance with Table 915-1 standards.

Third quarter 2023 analytical results indicated that the organic compound concentrations were in compliance with the applicable ECMC Table 915-1 regulatory standards in all five monitoring well locations. Additionally, inorganic parameters were in compliance with the applicable ECMC Table 915-1 regulatory standards or within 1.25x the background concentrations of the up-gradient monitoring wells (BH03 and BH04) in all monitoring well locations.

During the third quarter 2023, four consecutive quarters of inorganic parameters in compliance with the applicable ECMC Table 915 regulatory standards were achieved. Consequently, PDC is requesting to remove TDS, chloride, and sulfate from the quarterly sampling and analysis plan.

PDC will continue groundwater monitoring at the five site monitoring wells until closure criteria are achieved. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

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
 Other _____

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 have been completed in soil and groundwater.
- Monitoring wells were installed and groundwater will continue to be monitored for natural attenuation.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the CECMC 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? No _____

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 wellhead and flowline removal activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the ECMC 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. 10/20/2021

Proposed date of completion of Reclamation. 12/17/2026

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. 08/05/2021

Actual Spill or Release date, or date of discovery. 10/20/2021

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 09/27/2021

Proposed site investigation commencement. 09/27/2021

Proposed completion of site investigation. 08/12/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/20/2021

Proposed date of completion of Remediation. 12/17/2026

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:

OPERATOR COMMENT

This Supplemental Form 27 has been submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the third quarter 2023 at the former Churchill 5 wellhead location.

Third quarter 2023 analytical results indicated that the organic compound concentrations were in compliance with the applicable ECMC Table 915-1 regulatory standards in all five monitoring well locations.

Additionally, inorganic parameters were in compliance with the applicable ECMC regulatory standards or within 1.25x the background concentrations in all monitoring well locations for the fourth consecutive quarter. Consequently, PDC is requesting to remove TDS, chloride, and sulfate from the quarterly sampling and analysis plan.

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: 10/16/2023

Email: tasfillremediationcontractor@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: 12/26/2023

Remediation Project Number: 20066

COA Type

Description

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

403540311	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
403560300	MONITORING REPORT
403636027	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 3 Files

General Comments

User Group

Comment

Comment Date

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)