

State of Colorado Oil and Gas Conservation Commission

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



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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 INFORMATION

Name of Operator: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers
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>
Contact Person: <u>Karen Olson</u>	Email: <u>tasfillremediationcontractor@pdce.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9300 Initial Form 27 Document #: 2315667

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>LOCATION</u>	Facility ID: <u>323755</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>JERKE UP-64N65W 7SENE</u>		Latitude: <u>40.328735</u>	Longitude: <u>-104.699419</u>
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SENE</u>	Sec: <u>7</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 NOT PROVIDED

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

Surf water ~695'SE. res ~1155'E, water wells ~650' east and west. Depth shallowest groundwater ~5'bgs

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 the attached Fig 1 & Tab1	Drilling & groundwater sampling
Yes	SOILS	Refer to the attached Fig 3 & Tab2	Excavation and 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 November 6, 2013, a historical release was discovered during the removal of the buried produced water vessel at the Jerke Up 8-7 (API # 05-123-13481) tank battery. A Form 19 was submitted to the COGCC but a spill tracking number has not been assigned for this location.

On December 15, 2022, an unknown volume of oil released into secondary containment at the Jerke UP 8-7 tank battery location. Based on the second release and data recorded during previous site investigation and groundwater monitoring activities, excavation activities were initiated prior to decommissioning activities. Due to the size of the excavation extent, decommissioning confirmation soil samples and photos were not collected during the removal of the production equipment. All former production equipment was within the excavation extent footprint. During excavation activities, groundwater was encountered in the excavation at approximately 7 feet below ground surface (bgs). To date, a total of 3,160 cubic yards (cy) of impacted material were excavated and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. In addition, groundwater vacuum recovery was conducted concurrent to excavation activities and to date 8,025 barrels (bbls) of groundwater were removed from the excavation and transported to NGL C6 for disposal under PDC waste manifests.

Decommissioning activities were scheduled to be completed under Remediation Project #25778, however, based on the long standing remediation being conducted under Remediation Project #9300, a closure request will be made for Remediation Project #25778, and all future activity will be reported under Remediation Project #9300.

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):

Between December 16, 2022, and January 26, 2023, three (3) soil samples (SS01 @ 0-6", WC01, and WC02) were collected from impacted source material between ground surface and approximately 10 feet bgs. The samples were submitted for laboratory analysis of the full COGCC Table 915-1 analyte suite. Analytical results indicated preliminary COCs for the historic release as: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), benzantracene, dibenzanthracene, fluorene, 1-M, 2-M, EC, boron, arsenic, and selenium.

Proposed Groundwater Sampling

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

Following remediation activities, monitoring wells will be advanced to evaluate dissolved-phase organic compounds and inorganic parameters within and adjacent to the former excavation extent and tank battery.

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 excavation activities, 64 confirmation soil samples (SS01-SS25, SS27-SS36, SS38-SS45, SS47-SS62, SS64-SS68) were collected from the base and sidewalls of the excavation at depths ranging from approximately 5 feet to 14 feet bgs and were submitted for laboratory analysis of the aforementioned COCs. Soil analytical results indicated that organic compound concentrations, EC, and boron were in compliance with the applicable COGCC Table 915-1 regulatory standards in all samples collected from the final excavation extent. Arsenic and/or selenium concentrations were in exceedance of the applicable regulatory standards in all samples collected.

Additionally, four soil samples (SS26, SS37, SS46, and SS63) were collected from within the root zone at approximately 2.5 feet bgs and were submitted for laboratory analysis of pH, EC, SAR, and boron. Inorganic concentrations were in compliance with the applicable regulatory standards in all four soil suitability sample locations.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 71

Number of soil samples exceeding 915-1 67

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 6165

NA / ND

Highest concentration of TPH (mg/kg)

Highest concentration of SAR

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 14

Groundwater

Number of groundwater samples collected 9

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 4

Number of groundwater monitoring wells installed 9

Number of groundwater samples exceeding 915-1 3

-- Highest concentration of Benzene (µg/l) 380

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 100

-- Highest concentration of Xylene (µg/l) 2000

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?

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

Volume of solid waste (cubic yards) 3160

Volume of liquid waste (barrels) 8025

☒ Is further site investigation required?

Twelve groundwater monitoring wells will be installed to replace the monitoring wells destroyed during excavation activities and delineate 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 soil 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.

Five background soil borings will be advanced to approximately 14 feet bgs. The background soil borings will be advanced adjacent to the former excavation extent to evaluate arsenic and selenium concentrations in native material on site. The proposed background soil boring locations are illustrated on Figure 5.

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.

The source area was previously excavated and impacted material was transported and disposed of as described in the Form 19.

Excavation activities were re-initiated following a release of oil into secondary containment on December 15, 2022. Between January 10, and February 1, 2023, approximately 3,160 cubic yards of impacted material were removed from site and transported to North Weld Waste Management for disposal under PDC waste manifests. In addition, groundwater vacuum recovery was conducted concurrent to excavation activities and to date 8,025 barrels (bbls) of groundwater were removed from the excavation and transported to NGL C6 for disposal under PDC waste manifests.

REMEDATION 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.

Confirmation samples collected during excavation activities conducted in January and February 2023 are illustrated on Figure 3. Soil analytical results are summarized in Tables 2 – 5. GPS coordinates and field observed VOC concentrations are summarized in Table 6. The laboratory reports are included in Attachment A and the excavation field notes and photo logs are included as Attachment B.

Based on the long standing remediation being conducted under Remediation Project #9300, a closure request will be made for Remediation Project #25778, and all future activity will be reported under Remediation Project #9300.

Enhanced fluid recovery (EFR) and air sparge (AS) was initiated at the site during the first quarter 2014 and continued through April 20, 2018. Monitored natural attenuation (MNA) was selected as the remediation strategy for the remainder of the second quarter 2018 and continued through the third quarter 2020. Based on persisting organic compound concentrations, EFR/AS were re-initiated in November 2020 and continued through the fourth quarter 2022. The remediation strategy will be re-evaluated following review of the next groundwater monitoring event.

Soil Remediation Summary

☐ In Situ

☒ Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) 3160

_____ 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

No _____ Air sparge / Soil vapor extraction

Yes _____ Natural Attenuation

No _____ 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.

During the first quarter 2023, groundwater monitoring was conducted the 17 site monitoring wells (BH01R, BH02R, BH03 - BH05, BH06R, BH07, BH08R, BH09R, BH10-BH14, and BH16-BH18). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B. Per the approved Supplemental Form 27s (Document Nos. 402705426 and 402874102), total dissolved solids (TDS) and chloride and sulfate anions were removed from the quarterly sampling and analysis plan. Due to snow drifts and frozen ground on site, monitoring wells BH06R and BH18 were not sampled. Additionally, monitoring wells BH02R and BH04 were not sampled due to the presence of measurable light non-aqueous phase Liquids (LNAPL). First quarter 2023 groundwater analytical results indicated that organic compound concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in monitoring wells BH10 and BH11. Organic compound concentrations were in compliance with the applicable regulatory standards in the remaining 11 sampled locations. Following the first quarter 2023 sampling event, the monitoring wells listed above were destroyed during source mass removal activities.

Following monitoring well installation activities, quarterly groundwater monitoring will resume at the former Jerke Up 8-7 tank battery location. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0 and total dissolved solids (TDS) by Method SM 2540C in accordance with Table 915-1. Groundwater monitoring will continue until closure criteria are achieved.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

☒ Quarterly☐ Semi-Annually☐ Annually☒ Other

Confirmation Sample Summary, 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 Sample Summary, 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.

Financial assurance information was reported on the second quarter 2022 Supplemental Form 27 (Document No. 403055814). This section and estimate will be updated on an annual basis until closure criteria are achieved.

Operator anticipates the remaining cost for this project to be: \$ 55000

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 3160

E&P waste (solid) description Hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: Weld Waste Management

Volume of E&P Waste (liquid) in barrels 8025

E&P waste (liquid) description Groundwater

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: NGL C6

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 source mass removal activities, the excavation was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be re-claimed in accordance with the COGCC 100 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. 01/10/2023

Proposed date of completion of Reclamation. 02/10/2028

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. 11/08/2013

Actual Spill or Release date, or date of discovery. 11/06/2013

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). _____

Proposed site investigation commencement. 11/06/2013

Proposed completion of site investigation. 06/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 02/01/2014

Proposed date of completion of Remediation. 02/10/2028

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:

Supplemental source mass removal activities were completed on February 1, 2023. Following the approval of this form, 12 monitoring wells will be installed within and surrounding the former excavation extent. Additionally, further site investigation is required to assess arsenic and selenium concentrations in native soil on site.

OPERATOR COMMENT

This Supplemental Form 27 was submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the first quarter 2023 at the Jerke Up 8-7 tank battery location.

First quarter 2023 groundwater analytical results indicated that organic compound concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in monitoring wells BH10 and BH11. Organic compound concentrations were in compliance with the applicable regulatory standards in the remaining 11 sampled monitoring well locations.

Soil analytical results received for samples collected during source mass removal activities indicated that organic compounds, EC, and boron were in compliance with the applicable COGCC Table 915-1 regulatory standards in all samples collected from the final excavation extent. Arsenic and/or selenium concentrations were in exceedance of the applicable regulatory standards in all samples collected. Additionally, inorganic parameters were in compliance with the applicable regulatory standards in all four soil suitability sample locations.

Following the approval of this form, PDC will install and conduct quarterly groundwater monitoring at the 12 proposed monitoring wells until closure criteria are met. Additionally, PDC will conduct a supplemental site investigation to evaluate arsenic and selenium concentrations in native material adjacent to the former excavation.

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: _____

Email: taspillremediationcontractor@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: 9300

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**

403338406	MONITORING REPORT
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Total Attach: 1 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)