

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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Report taken by:
Taylor Robinson

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>(970) 313-5582</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>Jason Davidson</u>	Email: <u>ENspillremediationcontractor@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 17902 Initial Form 27 Document #: 402674196

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>TANK BATTERY</u>	Facility ID: <u>463941</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Kielian 2-2 battery</u>	Latitude: <u>40.335184</u>	Longitude: <u>-104.850155</u>	
** correct Lat/Long if needed: Latitude: <u>40.335184</u>		Longitude: <u>-104.850155</u>	
QtrQtr: <u>SESE</u>	Sec: <u>2</u>	Twp: <u>4N</u>	Range: <u>67W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications CL Most Sensitive Adjacent Land Use Residential
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

The Kielian 2-2 battery is surrounded by private ranching and agricultural mixed-use properties in all directions. There are residential properties ~400' west and ~300' southeast. The wellhead is located ~250' northwest of the battery. A small pond is in place ~60' west of the battery and a gravel pit is in place ~600' east. The Thompson and Platte Ditch is in place ~1,180' south of the battery. There is 1 groundwater well mapped within a 1/4 mile of the battery. Groundwater depth is unknown but is expected to be encountered at <20' bgs. The 100-year floodplain of the Big Thompson River drainage is mapped ~260' north of the battery. The battery is located within a Mule Deer Severe Winter Range Buffer and an Aquatic Native Species Conservation Waters buffer is mapped ~1,050' northwest of the battery.

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 Figure 4 and Table 2	Quarterly Groundwater Sampling Activities
Yes	SOILS	Refer to Figure 3 and Table 1	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.

During facility closure activities, soil and potential groundwater impacts were observed in test pits advanced to groundwater below the partially buried produced water tank and below the horizontal separator on May 5, 2021. A second test pit excavation investigation was conducted at the Site on June 7-8, 2021. On August 17, 2021, additional delineation activities were conducted by advancing 12 soil borings, six of which were completed as groundwater monitoring wells (MW01 through MW06). On January 20, 2022, three additional soil borings were advanced to further delineate soil impacts and were each completed as monitoring wells (MW07 through MW09)s. Quarterly groundwater monitoring has been ongoing at the Site since August 2021.

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):

Confirmation soil samples will be collected, pursuant to Rule 915 and in accordance with the Rule 915.e.(2) Guidance Document, from the floor and sidewalls of the final extent of excavation to demonstrate compliance with Table 915-1 Protection of Groundwater Soil Screening Levels (GWSSLs). The samples will be submitted to an accredited laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and Total Petroleum Hydrocarbons (TPH)-gasoline range organics (GRO) by US Environmental Protection Agency (EPA) Method 8260D, and TPH-diesel range organics (DRO) by EPA Method 8015D.

Proposed Groundwater Sampling

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

Quarterly groundwater sampling activities are ongoing in all 9 monitoring wells at the Site with the goal of achieving four consecutive events in compliance with applicable COGCC Table 915-1 groundwater standards in accordance with COGCC Rule 913.h.(3). The next quarterly groundwater sampling event is scheduled for July 2023.

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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 52
Number of soil samples exceeding 915-1 9
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 23655

NA / ND

-- Highest concentration of TPH (mg/kg) 1530
NA Highest concentration of SAR
BTEX > 915-1 Yes
Vertical Extent > 915-1 (in feet) 9

Groundwater

Number of groundwater samples collected 9
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 6
Number of groundwater monitoring wells installed 9
Number of groundwater samples exceeding 915-1 2

-- Highest concentration of Benzene (µg/l) 14
ND Highest concentration of Toluene (µg/l)
-- Highest concentration of Ethylbenzene (µg/l) 1.6
ND Highest concentration of Xylene (µg/l)
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) Volume of liquid waste (barrels)

Is further site investigation required?

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 February 3 and March 21, 2023, approximately 6,065 cubic yards of impacted soil was excavated and transported to Waste Management's North Weld Landfill in Ault, Colorado for disposal. In addition, approximately 32,035 barrels of impacted groundwater were removed from the excavation and transported to NGL's C3 Water Disposal Facility. All waste was transported under PDC waste manifests and in accordance with COGCC Rules 905 and 906.

Please refer to the attached Remediation Progress Report.

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.

Analytical results for six excavation confirmation soil sample locations collected from the west sidewall were reported above their respective standards. Additional excavation to the west was limited by the landowner's fence and proximity to the stock pond, the edge of which was ~35 feet west of the west sidewall of the excavation during the time that excavation activities were occurring. Historical aerial imagery suggests that the pond surface is generally lower in elevation during the summer months. PDC proposes to return to the Site in the late Summer of 2023 to excavate further west of the existing western sidewall of the excavation.

Monitored natural attenuation (MNA) has been selected as the remediation strategy for groundwater impacts for this Site and will continue as the strategy following completion of additional source removal activities to the west.

Please refer to the Source Removal Summary above and to the attached Remediation Progress Report for a summary of the remediation activities proposed at the Site.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)	Yes	Excavate and offsite disposal
_____ Chemical oxidation	_____	If Yes: Estimated Volume (Cubic Yards) _____ 6065
_____ 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

Yes _____ Other 32,035 barrels of groundwater were pumped from the base of the excavation

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 excavation activities, groundwater monitoring wells MW05, MW06, MW08 and MW09 were destroyed and replacement wells MW05R, MW06R, MW08R and MW09R were installed on April 4, 2023, at the same locations where they had been removed.

On April 6, 2023, groundwater monitoring was conducted in monitoring wells MW01 through MW09R. Depth to groundwater measurements were collected with an oil-water interface probe, and free product was not detected in any of the monitoring wells. Groundwater samples were collected into laboratory provided containers, placed on ice, and delivered with a completed chain-of-custody form to Summit Scientific in Golden, CO for laboratory analysis of BTEX, 1,2,3-TMB, 1,3,5-TMB, and naphthalene by EPA Method 8260D per Supplemental Form 27 document number 403300214, submitted and approved on February 1, 2023.

Benzene was reported above the Table 915-1 groundwater standard of 5 ug/l in groundwater samples collected from MW06R (14 ug/l) and MW09R (8.9 ug/l). All other laboratory analytical results were reported as compliant with their respective Table 915-1 groundwater standards. The groundwater analytical results are summarized in Table 2 and presented on Figure 4 in the attached Remediation Progress Report. The laboratory analytical report and boring logs for the four replacement wells are also included.

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 Remediation Progress and Groundwater Monitoring Report

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.

- Source mass removal is mostly complete.
- Quarterly groundwater monitoring is ongoing.
- Removal of remaining source mass material will be conducted, pending landowner approval, when the stock pond surface is at its lowest elevation during the late Summer 2023.
- 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: \$ 180000

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:

Volume of E&P Waste (solid) in cubic yards 6065

E&P waste (solid) description Hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Waste Management's North Weld Landfill in Ault, CO

Volume of E&P Waste (liquid) in barrels 32035

E&P waste (liquid) description Hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: NGL's C3 Water 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? _____

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. 11/15/2023

Proposed date of completion of Reclamation. 11/15/2027

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. 04/13/2021

Actual Spill or Release date, or date of discovery. 05/05/2021

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/30/2021

Proposed site investigation commencement. 08/16/2021

Proposed completion of site investigation. 01/20/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 02/03/2023

Proposed date of completion of Remediation. 10/31/2026

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

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Jason Davidson

Title: Senior Env. Specialist

Submit Date: 04/27/2023

Email: ENspillremediationcontractor@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: Taylor Robinson

Date: 05/24/2023

Remediation Project Number: 17902

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

403386536	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
403386731	REMEDATION PROGRESS REPORT
403412458	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)