

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.

Refer to Rules 340, 905, 906, 907, 908, 909, and 910

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>karen.olson@pdce.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10604Initial Form 27 Document #: 401433998

PURPOSE INFORMATION

- | | |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination | <input checked="" type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water |
| <input type="checkbox"/> 909.c.(1), Rule 905: Pit or PW vessel closure | <input type="checkbox"/> Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b. |
| <input checked="" type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation | <input type="checkbox"/> Rule 909.e.(2)B.: Closure of remediation project |
| <input type="checkbox"/> 909.c.(3), Rule 907.e.: Land treatment of oily waste | <input type="checkbox"/> Rule 906.c.: Director request |
| <input type="checkbox"/> 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure | <input type="checkbox"/> Other _____ |

SITE INFORMATION

N Multiple Facilities (in accordance with Rule 909.c.)

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>452298</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Meyring 13-27 flowline</u>		Latitude: <u>40.541333</u>	Longitude: <u>-104.654861</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>SWSW</u>	Sec: <u>27</u>	Twp: <u>7N</u>	Range: <u>65W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications CLMost Sensitive Adjacent Land Use CroplandIs domestic water well within 1/4 mile? YesIs surface water within 1/4 mile? YesIs groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Lone Tree Creek.

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	water is being vac trucked daily	vac trucks and booms
Yes	SOILS	still determining	excavation and removal

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Removed both points of failed flowline, pressure tested the liner (shown to have good integrity), and have dug out each area. The flowlines will be seamed to new flowlines and pressure tested. The East Dig site is currently believed to be clean and is ready for sampling. The West side is continuing to be monitored and cleaned as needed. Booms are in place within the dug out area, as well as by the creek to prevent any contamination of creek water.

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):

Please see the attached diagrams and analysis

Proposed Groundwater Sampling

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

Please see the attached diagrams and analysis

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):

Continue to monitor and clean/vac out West Side and continue to sample until area is clean.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 14

Number of soil samples exceeding 910-1 2

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

Approximate areal extent (square feet) 5000

NA / ND

-- Highest concentration of TPH (mg/kg) 389

NA Highest concentration of SAR

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 8

Groundwater

Number of groundwater samples collected 4

Was extent of groundwater contaminated delineated? Yes

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

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 910-1 3

-- Highest concentration of Benzene (µg/l) 1215

-- Highest concentration of Toluene (µg/l) 1964

-- Highest concentration of Ethylbenzene (µg/l) 103

-- Highest concentration of Xylene (µg/l) 726

NA Highest concentration of Methane (mg/l)

Surface Water

0 Number of surface water samples collected

Number of surface water samples exceeding 910-1

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) 3060

Volume of liquid waste (barrels) 6400

☒ Is further site investigation required?

We will continue to monitor and clean the West dig site. The East Dig site is ready for sampling. Additional samples will be submitted in a Supplemental Form 27 when the results are received.

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.

Impacted soil removal was conducted by Bayswater Exploration and Production (Bayswater) in October 2017. Due to the two release points along the flowline, two excavation areas were present and designated with the identification of "West Dig Site" and "East Dig Site". Confirmation soil samples were collected from the final excavation extent.

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.

Twelve (12) monitoring wells (MW01 - MW12) were installed during the fourth quarter 2017 by the selected Bayswater environmental contractor, LT Environmental. Upon site divestiture, remediation and monitoring activities were transferred to the PDC Energy environmental contractor, Tasman Geosciences. Due to the elevated benzene concentrations detected during the first quarter 2018 monitoring event, enhanced fluid recovery (EFR) and air sparge (AS) activities will be initiated during the first or second quarter of 2018, contingent on landowner approval.

Soil Remediation Summary

☐ In Situ

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

☒ Ex Situ

Yes _____ Excavate and offsite disposal
If Yes: Estimated Volume (Cubic Yards) _____ 3500
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
Yes _____ 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.

Twelve (12) monitoring wells (MW01 - MW12) were installed during the fourth quarter 2017 (Figure 1). Prior to site divestiture, Bayswater completed baseline groundwater sampling at the site monitoring wells (Table 2). Following the divestiture, PDC initiated quarterly groundwater monitoring on February 7, 2018. Groundwater samples were collected from the site monitoring wells and submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX) using United States Environmental Protection Agency (USEPA) Method 8260B. Analytical results indicated benzene concentrations were in exceedance of COGCC Table 910-1 standards at four (4) monitoring well locations (MW01, MW02, MW03, and MW05) [Figure 1]. Based on this data and the calculated groundwater flow direction (Figure 2), PDC will install three (3) monitoring wells to establish point-of-compliance (Figure 3). In addition, three (3) remediation wells will be installed adjacent to monitoring wells MW01 and MW02 for EFR/AS remediation purposes (Figure 3). Quarterly monitoring will continue until four consecutive quarters of post-remediation BTEX concentrations in compliance with COGCC groundwater standards are achieved.

REMEDATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☐ Quarterly ☐ Semi-Annually ☐ Annually ☐ Other _____

Report Type: ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report
☐ Other _____

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? _____

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: _____

REMEDATION COMPLETION REPORT

REMEDATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No _____

Do all soils meet Table 910-1 standards? _____

Does the previous reply indicate consideration of background concentrations? _____

Are the only residual soil impacts pH, SAR, or EC at depths greater than 3 feet below ground surface? _____

Does Groundwater meet Table 910-1 standards? _____

Is additional groundwater monitoring to be conducted? _____

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.

The excavation area was backfilled and re-contoured to match pre-existing conditions.

Is the described reclamation complete? No _____

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

☐ Interim? ☐ Final?

Did the Surface Owner approve the seed mix? _____

If NO, does the seed mix comply with local soil conservation district recommendations? _____

IMPLEMENTATION SCHEDULE

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 09/22/2017

Actual Spill or Release date, if known. 09/22/2017

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 09/22/2017

Date of commencement of Site Investigation. 10/10/2017

Date of completion of Site Investigation.

REMEDIAL ACTION DATES

Date of commencement of Remediation. 12/11/2017

Date of completion of Remediation.

SITE RECLAMATION DATES

Date of commencement of Reclamation.

Date of completion of Reclamation.

OPERATOR COMMENT

A Change in Operator occurred on January 4, 2018. Remediation #10604 was issued to the previous operator, Bayswater Exploration and Production, LLC. Subsequent remediation and monitoring activities will be conducted by PDC Energy, Inc. in accordance with the approved Form 27 - Remediation Work 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: Snr. EHS Manager

Submit Date:

Email: karen.olson@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: 10604

COA Type

Description

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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

401554683	GROUND WATER SAMPLE LOCATION
401554684	GROUND WATER ELEVATION MAP
401554686	MAP
401554687	ANALYTICAL RESULTS

Total Attach: 4 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)