

State of Colorado Oil and Gas Conservation Commission

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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>1099 18TH STREET SUITE 1500</u>		Phone: <u>(303) 860-5800</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80202</u>		Mobile: <u>()</u>
Contact Person: <u>Karen Olson</u>	Email: <u>taspillremediationcontractor@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 21647 Initial Form 27 Document #: 402905269

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>123-21776</u>	County Name: <u>WELD</u>
Facility Name: <u>ECKHARDT 43-34</u>	Latitude: <u>40.354020</u>	Longitude: <u>-104.528640</u>	
** correct Lat/Long if needed: Latitude: <u>40.354040</u>		Longitude: <u>-104.528645</u>	
QtrQtr: <u>NESE</u>	Sec: <u>34</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 / Agricultural

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

Nearest Well: Domestic - 1,320' N; Surface Water: Irrigation Ditch - 575' S; Occupied Building: 655' SE; Livestock: 0' (Within Pasture); FWS Wetlands: 575' S Riverine (R5UBFx).

Flowline conflict - Flowline crosses under irrigation ditch approximately 645' SSE of the wellhead; flowline then runs east towards the tank 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 Table 1 & Figure 1	Confirmation Groundwater 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.

Between March 11 and 14, 2022, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning of the Eckhardt 43-34 wellhead (Figure 1). Based on observed soil staining and olfactory impacts, it was determined that a historic release was discovered adjacent to the former wellhead. Additionally, during the in-situ abandonment of the flowline, soil staining and olfactory impacts were observed, it was determined that a historic release was discovered adjacent to the separator flowline riser. Following the discovery of the releases, mitigation activities were initiated and to date, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. During excavation activities, groundwater was encountered at adjacent to the wellhead at approximately 6.5 feet bgs and approximately 5.5 feet bgs adjacent to the separator flowline riser. Groundwater vacuum recovery was not conducted during excavation activities.

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 March 11, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the wellhead at 6 feet bgs and submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), arsenic and lead, based upon analytical results. Additionally on March 11, 2022, ten (10) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were below the applicable COGCC Table 915-1 standards. One soil sample (SS11) was collected from the sidewall of the final excavation extent at approximately 2.5 feet bgs to evaluate soil suitability for reclamation.

Proposed Groundwater Sampling

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

On March 11, 2022, during excavation activities, groundwater was encountered adjacent to the wellhead at approximately 6.5 feet bgs. Consequently, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that organic compound concentrations were below the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

On March 14, 2022, during excavation activities, groundwater was encountered adjacent to the separator at approximately 5.5 feet bgs. Consequently, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that 1,2,4-TMB concentrations were in exceedance of the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

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):

On March 14, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the separator flowline riser at 4 feet bgs and submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, pyrene, 1-M and 2-M, based upon analytical results. Additionally on March 14, 2022, seven (7) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were in exceedance of the applicable COGCC Table 915-1 standards in multiple base and sidewall samples. Excavation activities were temporarily discontinued due to the active status of the tank battery.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 29

Number of soil samples exceeding 915-1 14

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

Approximate areal extent (square feet) 300

NA / ND

-- Highest concentration of TPH (mg/kg) 2780

-- Highest concentration of SAR 14.3

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 7

Groundwater

Number of groundwater samples collected 2

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

ND Highest concentration of Benzene (µg/l)

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 17

-- Highest concentration of Xylene (µg/l) 37

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 March 11, 2022, three (3) background soil samples (BKG01) were collected at approximately 2.5 feet, 4 feet, and 6 feet, bgs from native material adjacent to the wellhead. All background soil samples were submitted for analysis of SAR and COGCC Table 915-1 metals. Analytical results indicated that SAR, arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil adjacent to the wellhead. Additionally, on March 14, 2022, three (3) background soil samples (BKG02) were collected at approximately 4 feet, 6 feet, and 7 feet, bgs from native material adjacent to the separator flowline riser. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil adjacent to the wellhead.

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

Volume of solid waste (cubic yards) 18

Volume of liquid waste (barrels) 0

☒ Is further site investigation required?

On October 10, 2022, five (5) groundwater monitoring wells were installed to confirm the absence of dissolved-phase hydrocarbon impacts within and surrounding the former wellhead excavation extent. Volatile organic concentrations (VOC) using a photoionization detector (PID) and lithologic descriptions were recorded for each borehole.

Additionally, five background soil borings (BKG02 – BKG06) were advanced in native soil surrounding the former wellhead to a depth of approximately 7 feet bgs. Twenty background samples were collected from the background soil borings at depths ranging from 2.5 to 7 feet bgs and were submitted to Summit Scientific Laboratory (Summit) for analysis of the Table 915-1 metals suite by EPA Method 6020B.

Background soil analytical results indicated that arsenic, barium, lead, and selenium concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in native soil on site.

Based on analytical results and per the COA issued in the approved Supplemental Form 27 (Document No. 403221432), on March 29, 2023, nine soil borings (SB01-SB09) were advanced to approximately 7 feet and 10 feet bgs to vertically and horizontally delineate arsenic and lead exceedances recorded during excavation activities. Volatile organic concentrations (VOC) using a photoionization detector (PID) and lithologic descriptions were recorded for each borehole. Forty-two (42) soil samples were collected from the soil borings at depths ranging from 4 feet to 10 feet bgs and were submitted to Summit Scientific Laboratory for analysis of arsenic and lead.

Soil analytical results indicated that arsenic and/or lead concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in 36 sample locations. Based on the data, further delineation is necessary to vertically and horizontally define the arsenic and lead exceedance on location. The proposed soil boring 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.

Between March 11 and 14, 2022, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. No groundwater was recovered during excavation activities.

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 results received from the initial groundwater assessment, monitored natural attenuation was selected as the remediation strategy for this location during the fourth 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)

Yes Excavate and offsite disposal

Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) 18

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.

Per the approved Supplemental Form 27 (Document No. 403221432), chloride and sulfate anions and TDS were removed from the quarterly sampling and analysis plan following the fourth quarter 2022.

Groundwater monitoring will continue on a quarterly basis at the five site monitoring wells (BH01 - BH05) until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B in accordance with Table 915-1.

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

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.

Wellhead:

- Investigation and delineation has been completed for organics in soil. Metals delineation is ongoing.
- Source mass removal has been completed.
- 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 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: \$ 20000

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

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 _____

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 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. 01/10/2022

Proposed date of completion of Reclamation. 05/30/2027

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. 11/18/2021

Actual Spill or Release date, or date of discovery. 03/11/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/10/2022

Proposed site investigation commencement. 09/30/2023

Proposed completion of site investigation. 09/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/11/2022

Proposed date of completion of Remediation. 05/30/2027

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:

Based on the soil analytical results received during March 2023 supplemental site investigation activities, further delineation is necessary to vertically and horizontally define the arsenic and lead exceedance on location. The proposed soil boring locations are illustrated on Figure 4. Site investigation activities will be completed pending landowner negotiations.

OPERATOR COMMENT

This Supplemental Form 27 was submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the second quarter 2023 at the former Eckhardt 43-34 wellhead location.

Second quarter 2023 groundwater analytical results indicated that organic compound concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in all five monitoring wells for the third consecutive quarter.

Soil analytical results received for samples collected during March 2023 supplemental site investigation activities indicated that arsenic and/or lead concentrations were in exceedance of the applicable COGCC Table 915-1 regulatory standards in 36 sample locations.

Based on the data, further delineation is necessary to vertically and horizontally define the arsenic and lead exceedance on location. The proposed soil boring locations are illustrated on Figure 4. Site investigation activities will be completed pending landowner negotiations.

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: 21647

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

403424295	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)