

State of Colorado
Energy & Carbon Management Commission

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Report taken by:
Alexander Ahmadian

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 #: 21589 Initial Form 27 Document #: 402902806

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>329872</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>MCLEOD-64N66W 29NESE</u>	Latitude: <u>40.281146</u>	Longitude: <u>-104.794021</u>	
** correct Lat/Long if needed: Latitude: <u>40.282597</u>		Longitude: <u>-104.795100</u>	
QtrQtr: <u>NESE</u>	Sec: <u>29</u>	Twps: <u>4N</u>	Range: <u>66W</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? Yes Is surface water within 1/4 mile? Yes
 Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

Nearest Well: Other - 920' WSW / Irrigation - 1,255' WNW; Surface Water: Irrigation Ditch - 920' E; Occupied Building: 750' E; FWS Wetlands: 1,130' SE
Freshwater Pond (PUBFx).

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste | <input type="checkbox"/> Other E&P Waste | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | |
| <input checked="" type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input checked="" type="checkbox"/> Condensate | <input type="checkbox"/> Pigging Waste | |
| <input type="checkbox"/> Drilling Fluids | <input type="checkbox"/> Rig Wash | |
| <input type="checkbox"/> Drill Cuttings | <input type="checkbox"/> Spent Filters | |
| | <input type="checkbox"/> Pit Bottoms | |
| | <input type="checkbox"/> Other (as described by EPA) | |

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Tables 1-5 & 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 March 21, 2022, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the McLeod 29-41 Tank Battery (Figure 1). Based on initial results, it was determined that a historic release was discovered below the former produced water vessel (PWV). Following the discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. Approximately 229 cubic yards (CY) of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC manifests.

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 March 24 and April 11, 2022, three (3) soil samples (PWV01-W, SS01, and SS03) were collected from impacted source material adjacent to and below the PWV between approximately 5 feet and 21 feet bgs. The samples were submitted for laboratory analysis of the full COGCC Table 915-1 analyte suite. Laboratory analytical results from the PWV source area indicated COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), fluorene, 1-M, and 2-M. Between March 24 and April 11, 2022, two (2) soil samples (SS02 & SS04) were collected from the base of the excavation at a depths of 16 and 25 feet bgs and submitted for laboratory analysis of BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36). SS04 was submitted for additional analysis of fluorene, 1-M, & 2-M. Final analytical results for the soil sample collected from the base of the excavation indicate that organic concentrations are in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater SSLs in SS04.

Proposed Groundwater Sampling

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

No

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 decommissioning activities conducted on March 21, 2022, soil encountered on-site and below production equipment was visually inspected and field screened for VOC concentrations using a PID. Per the approved proposed soil sampling plan, one soil sample (SEP01-DL) was collected adjacent to the separator dumpline risers, one sample (SEP01-FL) was collected beneath beneath the flowline riser at the separator, and one sample (AST01) was collected adjacent to the above ground storage tank. Additionally, one grab soil sample (ECD01 @ 0-6") was collected adjacent to the ECD and field screened for VOCs using a PID. Soil samples SEP01-DL, SEP01-FL, and AST01 were submitted for lab analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). Analytical results indicated that organic compounds were in compliance with the applicable COGCC Table 915-1 Protection of Groundwater SSLs in all three soil samples collected. The soil sample locations are illustrated on Figure 1.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 22

Number of soil samples exceeding 915-1 6

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

Approximate areal extent (square feet) 540

NA / ND

-- Highest concentration of TPH (mg/kg) 3220

-- Highest concentration of SAR 1.8

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 25

Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet)

Number of groundwater monitoring wells installed

Number of groundwater samples exceeding 915-1

Highest concentration of Benzene (µg/l)

Highest concentration of Toluene (µg/l)

Highest concentration of Ethylbenzene (µg/l)

Highest concentration of Xylene (µg/l)

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 21, 2022, two (2) background soil samples (BKG01) were collected at approximately 2.5 feet and 5 feet bgs from native material topographically up-gradient of the tank battery. All background soil samples were submitted for analysis of COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil. Based on these results, arsenic and selenium exceedances observed in soil sample PWV01-W, SS01, and SS03 are within 1.25x the background concentrations and indicative of native soil conditions, as referenced in footnote 11 of the Table 915-1.

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

Volume of solid waste (cubic yards) 229

Volume of liquid waste (barrels) 0

Is further site investigation required?

Due to the estimated depth of the remaining hydrocarbon impacts, mechanical excavation under a stamped Engineered Excavation Work Plan will be the selected remediation strategy to address the remaining source mass. Impacted material will be transported off-site to the North Weld Waste Management facility for disposal under PDC waste manifests. Confirmation soil samples will be collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the COGCC approved COC analyte suite (Document #403099614). Excavation activities are proposed to begin in August of 2023 and final analytical results will be summarized in a forthcoming Supplemental Form 27.

A remediation strategy will be determined following supplemental source mass removal activities.

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 April 11, 2022, approximately 229 cubic yards of impacted material were excavated below and adjacent to the former PWV and transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests.

Remaining hydrocarbon impacted material will be removed via mechanical excavation and transported to the North Weld Waste Management Facility in Ault, Colorado under PDC waste manifests.

REMEDICATION 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.

During initial site investigative activities, deep soil impacts in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater Soil Screening Levels (SSLs) were discovered below 20 feet bgs. Due to the depth of the remaining impacts, source mass removal activities were discontinued.

On November 21 & 22, 2022, supplemental site investigation activities were conducted to delineate remaining hydrocarbon impacts discovered during decommissioning activities on March 8, 2022. Seven soil borings (SB01-SB07) were advanced to a depth between approximately 30 feet and 32 feet bgs. Two soil samples were collected from the section exhibiting the highest PID reading and the terminus of each boring and submitted for the COGCC approved COCs (document no. 403099614). Analytical results indicated that all samples from the soil borings were in compliance with the applicable COGCC Table 915-1 standards, with the exception of one soil sample (SB01 @ 25'-27').

In addition, during supplemental site investigation activities, groundwater was encountered in the borings at approximately 26 feet bgs. During supplemental source mass removal activities, a groundwater sample will be collected immediately upon encountering groundwater

Analytical results are summarized in Tables 1-4. GPS coordinates and field screened VOC concentrations are summarized in Table 5. Field screening and laboratory sample locations are illustrated on Figures 1-3. The laboratory report is included as Attachment A, the field notes and photo log are included as Attachment B, and the soil boring logs are included as Attachment C.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) _____ 229

_____ 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

_____ 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.

Following source mass removal activities, PDC will install monitoring wells and conduct quarterly groundwater monitoring until closure criteria are met. Prior to installation, a proposed monitoring well location map will be submitted for COGCC approval.

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.

- Partial source mass removal activities have been conducted.
- Additional source mass removal is required.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.
- Installation of monitoring wells.
- Quarterly groundwater sampling.

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: \$ 115000

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 229

E&P waste (solid) description Hydrocarbon Impacted Soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: North Weld Waste Management

Volume of E&P Waste (liquid) in barrels 0

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 supplemental source mass removal activities at the former tank battery location, the location will be 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. 03/21/2022

Proposed date of completion of Reclamation. 04/25/2028

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. 09/24/2021

Actual Spill or Release date, or date of discovery. 03/21/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/07/2022

Proposed site investigation commencement. 08/01/2023

Proposed completion of site investigation. 09/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/21/2022

Proposed date of completion of Remediation. 04/25/2028

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:

Due to landowner request and current active crop, supplemental source mass removal activities will be conducted following the harvest and is tentatively scheduled to commence in August 2023.

OPERATOR COMMENT

This form has been prepared to provide a third quarter 2023 timeline update for the former McLeod 29-41 tank battery.

Following landowner approval, supplemental source mass removal activities will be initiated under the stamped Engineered Excavation Work Plan and is proposed to begin in August of 2023. Per the COA issued on document no. 403099614, Supplemental Form 27s will be prepared and submitted on a quarterly schedule to provide updates and progress of the remediation until closure criteria has been achieved.

Based on correspondence with the ECMC Environmental Protection Specialist on July 31, 2023 and analytical results received from the three waste characterization samples collected (PWV01-W, SS01, and SS03), PDC is requesting that the contaminants of concern (COCs) for this historic release at the McLeod 29-41 tank battery be reduced to the following: BTEX, naphthalene, TPH (C6-C36), 1,2,4-TMB, 1,3,5-TMB, fluorene, 1-M, 2-M, arsenic, and selenium.

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: 08/01/2023

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: Alexander Ahmadian

Date: 08/02/2023

Remediation Project Number: 21589

COA Type

Description

	Background samples were not collected from depths that are representative of native soil conditions near the spill. These samples shall be omitted from future background determination calculations.
	Operator shall remove background section under "OTHER INVESTIGATION INFORMATION" under the Site Investigation Report tab.
	ECMC agrees to the reduced analyte list of BTEX, naphthalene, TPH (C6-C36), 1,2,4-TMB, 1,3,5-TMB, fluorene, 1-M, 2-M, arsenic, and selenium based on the waste characterization sample; this approval is contingent on background sampling for metals.
2 COAs	

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
403474998	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
403475003	ANALYTICAL RESULTS
403475004	PHOTO DOCUMENTATION
403475005	LOGS
403475006	SOIL SAMPLE LOCATION MAP
403475007	SOIL SAMPLE LOCATION MAP
403475009	SOIL SAMPLE LOCATION MAP
403485031	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 8 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)