

State of Colorado
Energy & Carbon Management Commission

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



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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 ECMC 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 #: 18732 Initial Form 27 Document #: 402721552

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

Yes Multiple Facilities

Facility Type: <u>LOCATION</u>	Facility ID: <u>336534</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Niles Miller 3N66W20Y</u>	Latitude: <u>40.204907</u>	Longitude: <u>-104.793668</u>	
** correct Lat/Long if needed: Latitude: <u>40.203401</u>		Longitude: <u>-104.793862</u>	
QtrQtr: <u>SESE</u>	Sec: <u>20</u>	Twp: <u>3N</u>	Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>
Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>480367</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Miller 5</u>	Latitude: <u>40.203428</u>	Longitude: <u>-104.793702</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SESE</u>	Sec: <u>20</u>	Twp: <u>3N</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 Agriculture

Is domestic water well within 1/4 mile? Yes

Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Nearest Well: Domestic - 760 feet W-NW, Occupied Buildings: 736 feet NW

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	SOILS	Refer to Document No. 403538088	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 August 6, 2021, field screening and confirmation soil sampling was conducted in accordance with the ECMC Rule 911 during the decommissioning and closure of the Miller 5, Tank Battery. Based on initial results, it was determined that a historic release was discovered below the former produced water vessel. Following the discovery, mitigation activities were initiated to delineate and remove hydrocarbon impacts. To date, approximately 1,910 cubic yards (CY) of impacted material were removed and transported to the Buffalo Ridge 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):

On August 6, 2021, one soil sample (SS01) was collected from the source area at approximately 5 feet below ground surface (bgs) and submitted to Summit Scientific Laboratories for analysis of the full ECMC Table 915-1 analyte list. Preliminary analytical results indicate that contaminants of concern (COCs) include benzene, toluene, ethylbenzene, xylene(s) (BTEX), naphthalene (N), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, total petroleum hydrocarbons (TPH), arsenic, lead, and selenium. Between August 11 and 26, 2021, eighty-nine soil samples (SS02-SS14, SS16-SS87, SS89-SS92) were collected from the sidewalls and base of the excavation at depths ranging from 5 to 14 feet bgs and were submitted for laboratory analysis of the above referenced COCs as well as electrical conductivity (EC) and sodium adsorption ratio (SAR) per the request of the ECMC. In addition, one soil sample (Soil Suitability) was collected at 2.5 feet bgs and submitted for Table 915 soil suitability constituents.

Proposed Groundwater Sampling

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

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 closure activities conducted on August 6, 2021, soil encountered on site and below production equipment was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Per the approved proposed soil sampling plan, samples were collected below and/or adjacent to the above ground storage tanks (AST), separator flowline (SEP-FL), and separator dump line (SEP-DL). Samples were submitted for analysis of BTEX, N, 1,2,4-TMB, 1,3,5-TMB, and TPH. Analytical results indicated that constituents were in compliance with the applicable ECMC Table 915-1 standards in all laboratory sample locations.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

NA / ND

Number of soil samples collected 115 -- Highest concentration of TPH (mg/kg) 53.1
 Number of soil samples exceeding 915-1 13 -- Highest concentration of SAR 6.16
 Was the areal and vertical extent of soil contamination delineated? No BTEX > 915-1 Yes
 Approximate areal extent (square feet) 5019 Vertical Extent > 915-1 (in feet) 15

Groundwater

Number of groundwater samples collected 2 NA Highest concentration of Benzene (µg/l) _____
 Was extent of groundwater contaminated delineated? No NA Highest concentration of Toluene (µg/l) _____
 Depth to groundwater (below ground surface, in feet) 29 NA Highest concentration of Ethylbenzene (µg/l) _____
 Number of groundwater monitoring wells installed 1 NA Highest concentration of Xylene (µg/l) _____
 Number of groundwater samples exceeding 915-1 0 NA Highest concentration of Methane (mg/l) _____

Surface Water

0 Number of surface water samples collected
0 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 August 25, 2021, six background soil samples (BKG01) were collected. On May 13, 2022, twenty four (24) background soil samples (BKG02-BKG05) were collected. Additionally on April 12, 2023 and June 7, 2023, thirty-one (31) background soil samples (BKG06-BKG09) were collected. All background soil samples were collected at depths ranging between 2.5 feet & 14 feet bgs, from native material topographically up-gradient of the tank battery & submitted for various analysis of the Table 915-1 metals, pH, EC, & SAR. Analytical results indicated that pH, arsenic, barium, cadmium lead, nickel & selenium were in exceedance of the applicable regulatory standards in native soil.

Was investigation derived waste (IDW) generated as part of this investigation?
 Volume of solid waste (cubic yards) 1910 Volume of liquid waste (barrels) 0

Is further site investigation required?
 Based on the final analytical results for soil samples collected during the supplemental site investigations, lead and selenium constituents remain in exceedance of the Table 915-1 Protection of Groundwater Site Soil Screening Levels (SSLs) in multiple locations. However, all soils are within background concentrations or below EPA Residential Screening Levels (RSLs).
 In accordance to a conversation held with the ECMC EPS on September 21, 2023, one temporary monitoring well was advanced on December 4, 2023, in the vicinity of elevated soil lead and selenium concentrations on-site.
 Based on groundwater analytical results, four additional monitoring wells will be installed in each cardinal direction surrounding the former excavation extent to delineate the dissolved selenium exceedance, establish local groundwater flow direction, and assess background dissolved selenium concentrations on site. The proposed monitoring well locations are illustrated on Figure 2.

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 August 6 and 25, 2021, and on April 12, 2023, a total of approximately 1,910 cubic yards (CY) of impacted material were excavated adjacent to the tank battery and transported to the Buffalo Ridge Landfill for disposal under PDC waste manifests.
 Following source mass removal activities conducted on April 12, 2023, six soil samples (SS93-SS98) were collected from the base and sidewalls of the final excavation extent between depths of approximately 12 feet and 14 feet bgs. The soil samples were submitted for laboratory analysis of the approved COC analyte list: benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) [C6-C36], 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, arsenic, lead, selenium, sodium absorption ratio (SAR) and electrical conductivity (EC). Analytical results indicated all soil samples were below the Table 915-1 SSLs or respective background concentrations.

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.

On April 12, 2023, one soil boring (TP01) was advanced in the vicinity of soil sample SS08 to vertically delineate lead exceedances recorded during the 2021 excavation. Four soil samples were collected at 11 feet, 12 feet, 13 feet and 14 feet bgs and were submitted for laboratory analysis of lead. The sample collected from 11 feet bgs were submitted for additional laboratory analysis of selenium. Analytical results indicated lead and selenium concentrations were below the applicable table 915-1 SSLs.

In accordance to a COA issued on the previously approved SF27, previous background soil boring BKG05 was collected within the well pad area and may not be used to achieve compliance. Consequently on April 12, 2023 and June 7, 2023, thirty-one (31) background soil samples (BKG06-BKG09) were collected at depths ranging between 2.5 feet & 14 feet bgs from native material topographically up-gradient of the tank battery & submitted for laboratory analysis of arsenic, lead, and selenium. Analytical results indicated arsenic, lead, and selenium were observed in exceedance of applicable Table 915-1 Protection of Groundwater SSLs in native material. Following evaluation of native material metal concentrations, all excavation extent and soil boring soil samples are below native material concentrations for arsenic and nine (9) soil samples remain in exceedance of the highest observed background selenium concentration.

On December 4, 2023, PDC advanced one temporary monitoring well in the vicinity of elevated soil lead and selenium concentrations on-site. Based on the results of the December 2023 and February 2024 groundwater sampling events, protection of groundwater has been demonstrated for lead. Consequently, the RSL was used to compare to site lead soil concentrations. All confirmation soil samples exhibit lead concentrations below the applicable RSLs and PDC is requesting to remove lead as a contaminate of concern for this remediation project.

Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
_____ Bioremediation (or enhanced bioremediation)	Yes _____ Excavate and offsite disposal
_____ Chemical oxidation	If Yes: Estimated Volume (Cubic Yards) _____ 1910
_____ Air sparge / Soil vapor extraction	Name of Licensed Disposal Facility or ECMC 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.

On December 29, 2023 and February 28, 2023, groundwater sampling activities were conducted at the one site monitoring well (BH01). Groundwater samples were collected from the monitoring well and submitted to Summit Scientific Laboratory for analysis of dissolved lead and dissolved selenium by EPA Method 200.8.

Groundwater analytical results indicated that the dissolved lead concentration was in compliance of the applicable CDPHE Domestic Water Supply Standard in monitoring well BH01 during both sampling events. The dissolved selenium concentration was in exceedance of the CDPHE Agricultural Standard during both sampling events. Based on the data, four additional monitoring wells will be installed in each cardinal direction surrounding the former excavation extent to delineate the dissolved selenium exceedance, establish local groundwater flow direction, and assess background dissolved selenium concentrations on site. The proposed monitoring well locations are illustrated on Figure 2.

Following monitoring well installation, groundwater samples will be collected from the one site monitoring well (BH01) and four proposed monitoring wells and submitted for laboratory analysis of dissolved selenium.

Does Groundwater meet Table 915-1 standards? _____

Is additional groundwater monitoring to be conducted? _____

Operator shall comply with the ECMC 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 tank battery decommissioning activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with ECMC 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. 08/06/2021

Proposed date of completion of Reclamation. 08/10/2027

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. 05/20/2021

Actual Spill or Release date, or date of discovery. 08/06/2021

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/12/2021

Proposed site investigation commencement. 06/30/2024

Proposed completion of site investigation. 06/30/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/06/2021

Proposed date of completion of Remediation. 11/22/2027

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 groundwater analytical results, four additional monitoring wells will be installed in each cardinal direction surrounding the former excavation extent to delineate the dissolved selenium exceedance, establish local groundwater flow direction, and assess background dissolved selenium concentrations on site. The proposed monitoring well locations are illustrated on Figure 2.

OPERATOR COMMENT

This Supplemental Form 27 is being submitted to summarize analytical results collected during the fourth quarter 2023 and first quarter 2024 at the Miller 5 Tank Battery location.

On December 29, 2023 and February 28, 2023, groundwater sampling activities were conducted at the one site monitoring well (BH01). Groundwater samples were collected from the monitoring well and submitted to Summit Scientific Laboratory for analysis of dissolved lead and dissolved selenium by EPA Method 200.8.

Groundwater analytical results indicated that the dissolved lead concentration was in compliance of the applicable CDPHE Domestic Water Supply Standard in monitoring well BH01 during both sampling events. The dissolved selenium concentration was in exceedance of the CDPHE Agricultural Standard during both sampling events.

Based on the results of the December 2023 and February 2024 groundwater sampling events, protection of groundwater has been demonstrated for lead. Consequently, the RSL was used to compare to site lead soil concentrations. All confirmation soil samples exhibit lead concentrations below the applicable RSLs and PDC is requesting to remove lead as a contaminate of concern for this remediation project.

Based on the results for dissolved selenium, four additional monitoring wells will be installed in each cardinal direction surrounding the former excavation extent to delineate the dissolved selenium exceedance, establish local groundwater flow direction, and assess background dissolved selenium concentrations on site. The proposed monitoring well locations are illustrated on Figure 2.

Following monitoring well installation, groundwater samples will be collected from the one site monitoring well (BH01) and four proposed monitoring wells and submitted for laboratory analysis of dissolved 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: Remediation Advisor

Submit Date: 03/28/2024

Email: taspillremediationcontractor@pdce.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: Alexander Ahmadian

Date: 04/30/2024

Remediation Project Number: 18732

COA Type

Description

	Operator shall field log soil borings during monitoring well installation and provide boring logs/well construction diagrams with the next monitoring report. Operator shall provide boring logs in accordance with standard environmental practices. This includes at a minimum; lithology description, USCS classifications, PID readings, sample collection depths, depth to water, and well construction.
	In accordance with Rule 914, if impacts are observed during monitoring well installation a step out monitoring well(s) shall be installed to define the horizontal extent of impacts to soil and groundwater and the monitoring wells shall be installed within 45 days of observations.
	Operator will submit a minimum of one soil sample for the proposed laboratory analysis from each soil boring advanced during monitoring well installation.
3 COAs	

ATTACHMENT 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

403732449	FORM 27-SUPPLEMENTAL-SUBMITTED
403732777	ANALYTICAL RESULTS
403732794	SITE INVESTIGATION PLAN
403734060	GROUND WATER SAMPLE LOCATION

Total Attach: 4 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
Agency	ECMC agrees to the reduced analyte list in removing lead as a contaminate of concern for this remediation project.	04/30/2024

Total: 1 comment(s)