

State of Colorado
Energy & Carbon Management Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203
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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 ECOM 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: PDC ENERGY INC	Operator No: 69175	Phone Numbers Phone: (303) 860-5800 Mobile: ()
Address: 1099 18TH STREET SUITE 1500		
City: DENVER	State: CO Zip: 80202	
Contact Person: Karen Olson	Email: taspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 26725 Initial Form 27 Document #: 403257000

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: LOCATION	Facility ID: 331536	API #: _____	County Name: WELD
Facility Name: EDWARDS-65N67W 9NESE		Latitude: 40.412080	Longitude: -104.890860
		** correct Lat/Long if needed: Latitude: 40.411688	Longitude: -104.889120
QtrQtr: NESE	Sec: 9	Twp: 5N	Range: 6W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use 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? Yes

Other Potential Receptors within 1/4 mile

Nearest Well: Monitoring / Sampling - 516' WNW; Surface Water: Intermittent Creek - 1,200' NW; Occupied Building: 1,032' S; FWS Wetlands: 1,200' NW Riverine (R4SBC).

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 Tables 1-4 & 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 October 12, 2023, field screening and confirmation soil sampling activities were conducted in accordance with the ECOM Rule 911 during the decommissioning of the Edwards 43-9 Tank Battery (Figure 1). On October 30, 2023, following the receipt of initial analytical results, it was determined that a historic release was discovered at above ground storage tank (AST). On November 3, 2023, mitigation activities were initiated and to date approximately 6 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under a PDC waste manifest.

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 October 12, 2023, one soil sample (AST01) was collected from impacted source material adjacent to the AST at approximately 0-6 inches below ground surface (bgs). The sample was submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH[C6-C36]), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB. Due to hold time constraints, the AST sample was unable to be analyzed for the full Table 915-1 analytical suite. As such, soil samples collected during mitigation activities (SS01-SS05) were submitted for analysis of the full Table 915-1 analytical suite. Analytical results indicated all Table 915-1 constituents were below the applicable standards in soil samples collected from the final excavation extent, except for cadmium in soil sample SS03 @ 0.5'.

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):

On October 12, 2023, soil encountered on-site and below production equipment was visually inspected and field screened for volatile organic compounds (VOC) concentrations using a photoionization detector (PID). Per the approved proposed sampling plan, samples were collected below and/or adjacent to the separator flowline & dump-line (SEP01-FL & SEP01-DL) and submitted for analysis of Table 915-1 Organic Compounds in Soil and TPH (C6-C36). Additionally, soil samples (PWV01-B & PWV01-S) were collected from the base and sidewall exhibiting the highest field screened PID response and submitted for analysis of Table 915-1 Organic Compounds in Soil, TPH (C6-C36), and Soil Suitability for Reclamation constituents. Analytical results indicated that the soil samples were in compliance with the applicable standards.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 10

Number of soil samples exceeding 915-1 2

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

Approximate areal extent (square feet) 100

NA / ND

-- Highest concentration of TPH (mg/kg) 62

-- Highest concentration of SAR 3.83

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 1

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 October 12 and November 3, 2023, four background soil borings (BKG01-BKG04) were advanced in native material adjacent to the tank battery location. Two soil samples were collected from each background soil boring at depths ranging between approximately 0.5 ft and 4 ft bgs and were submitted for laboratory analysis of Table 915-1 metals and pH.

On September 2, 2022, one background soil boring (BKG01) was advanced at the nearby Warner 42-09D tank battery location with samples collected at 1 ft, 3 ft, & 4 ft bgs and submitted for analysis of Table 915-1 metals, pH, and SAR.

On November 14, 2023, one background soil boring (BKG02) was advanced at the nearby B&B 10-12 wellhead location with samples collected at 4 ft & 6 ft bgs and submitted for analysis of pH.

Analytical results indicated that arsenic, barium, selenium, and pH concentrations 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) 6

Volume of liquid waste (barrels) 0

☐ Is further site investigation required?

Up to four (4) soil borings will be advanced to confirm and vertically and horizontally delineate the cadmium exceedance observed in soil sample SS03 @ 0.5'.

Up to three (3) additional background soil boring will be advanced adjacent to the former tank battery location in order to evaluate cadmium in native material. The proposed soil boring locations are illustrated on Figure 3.

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.

On November 3, 2023, approximately 6 cubic yards of impacted material were removed from the AST location and transported to the North Weld Waste Management Facility under PDC waste manifests.

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.

On November 3, 2023, source mass removal activities were initiated and five (5) soil samples (SS01-SS05) were collected from the sidewalls and base of the final AST excavation extent at depths ranging from 0.5 feet to 2 feet bgs and were submitted for laboratory analysis the full ECMC Table 915-1 analytical suite. Analytical results indicated that constituent concentrations were below the applicable ECMC Table 915-1 standards in all samples collected from the final excavation extent, except for cadmium in sidewall soil sample SS03 @ 0.5'. As such, up to four (4) soil borings will be advanced to confirm and vertically and horizontally delineate the cadmium exceedance observed in soil sample SS03 @ 0.5'.

Soil 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 & 2. The laboratory reports are included as Attachment A. The decommissioning and excavation field notes and photo logs are included in Attachment B.

Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
<input type="checkbox"/> Bioremediation (or enhanced bioremediation)	<input type="checkbox"/> Yes <input type="checkbox"/> Excavate and offsite disposal
<input type="checkbox"/> Chemical oxidation	<input type="checkbox"/> If Yes: Estimated Volume (Cubic Yards) <input type="text" value="6"/>
<input type="checkbox"/> Air sparge / Soil vapor extraction	<input type="checkbox"/> Name of Licensed Disposal Facility or ECMC Facility ID # <input type="text"/>
<input type="checkbox"/> Natural Attenuation	<input type="checkbox"/> Excavate and onsite remediation
<input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> Land Treatment
	<input type="checkbox"/> Bioremediation (or enhanced bioremediation)
	<input type="checkbox"/> Chemical oxidation
	<input type="checkbox"/> Other <input type="text"/>

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.

Groundwater was not encountered during decommissioning and mitigation activities conducted at the former Edwards 43-9 Tank Battery.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

☐ Quarterly☐ Semi-Annually☐ Annually☒ Other

Confirmation Sample Summary and Supplemental Site Investigation Proposal

☐ 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 Confirmation Sample Summary and Supplemental Site Investigation Proposal

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.

- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the ECMC 1000 Series.
- Source mass removal has been completed.
- Investigation and delineation is complete for organics in soil.
- Investigation and delineation is ongoing for cadmium in soil.

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: \$ 10000

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:

No beneficial use.

Volume of E&P Waste (solid) in cubic yards 6

E&P waste (solid) description Hydrocarbon impacted soils

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: North Weld Waste Management Facility

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

E&P waste (liquid) description

ECMC Disposal Facility ID #, if applicable:

Non-ECMC 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 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 and source mass removal activities, the location was be backfilled, compacted, and re-contoured to match preexisting conditions. The location will be reclaimed in accordance with the 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. 10/12/2023

Proposed date of completion of Reclamation. 11/03/2028

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. 08/15/2022

Actual Spill or Release date, or date of discovery. 10/30/2023

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/02/2023

Proposed site investigation commencement. 03/18/2024

Proposed completion of site investigation. 09/30/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/12/2023

Proposed date of completion of Remediation. 11/03/2028

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:

Based on soil analytical results received for samples collected during decommissioning and source mass removal activities, supplemental site investigation activities are needed to delineate the cadmium exceedance observed in soil sample SS03 @ 0.5'. Subsequently, an investigation will be conducted to assess cadmium concentrations in native material. Supplemental site investigation activities are proposed to be completed by the end of the third quarter 2024.

OPERATOR COMMENT

Soil samples collected during decommissioning activities returned below the applicable ECMC Table 915-1 standards for organic compounds in soils. To further evaluate native soil conditions of soil suitability for reclamation levels and Table 915-1 metal concentrations, PDC incorporated background soil samples collected from the nearby former Warner 43-09D Tank Battery (FID: 305224) and the former B&B10-12 Wellhead (API: 05-123-22754). Both of these former locations are between approximately 1,608 feet and 2,289 feet of the former Edwards 43-9 Tank Battery. All three sites share a soil classification of loam under the USDA web soil database, are in the same or adjacent plots of land, and each plot of land are identified for agricultural use. Furthermore, the background soil samples in each dataset exhibit consistent exceedances. pH, arsenic, and/or selenium have been observed at elevated levels across the backgrounds, while all remaining metals are consistently below ECMC Table 915-1 standards. For the aforementioned reasons, PDC believes background samples collected under these nearby projects should be considered as representative background material for the Edwards 43-9 Tank Battery. Relative locations of the previously mention sites are illustrated on Figure 4.

Incorporating the nearby background site data, cadmium in soil sample SS03 exhibits the only remaining constituent on-site in exceedance of the applicable ECMC Table 915-1 standard or representative background concentrations. Following the approval of this form and landowner approval, supplemental site investigation activities will be conducted to assess cadmium concentrations in the vicinity of soil sample SS03 @ 0.5'. Subsequently, an assessment of cadmium concentrations in native material adjacent to the Edwards 43-9 Tank Battery location will be conducted. 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.

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: 03/08/2024

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: Taylor Robinson

Date: 04/11/2024

Remediation Project Number: 26725

COA Type

Description

	Operator will submit a minimum of one soil sample for the proposed laboratory analysis from each soil boring advanced.
	Operator shall field log soil borings during monitoring well installation and provide boring logs/well construction diagrams with the next monitoring report.
	ECMC approves of the proposed soil boring locations. If field observations indicate that the proposed delineation borings are located inside the previous excavation extent additional soil borings will be required. Additionally, depending on the results of the current site investigation plan, Operator may be required to install additional soil borings to fully delineate soil impacts.

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

403704197	INVESTIGATION/REMEDIATION WORKPLAN (SUPPLEMENTAL)
403704348	SOIL SAMPLE LOCATION MAP
403704354	PHOTO DOCUMENTATION
403711915	SITE INVESTIGATION PLAN
403711917	SOIL SAMPLE LOCATION MAP
403711918	ANALYTICAL RESULTS
403713055	SITE MAP

Total Attach: 8 Files

General Comments

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

Total: 0 comment(s)