

State of Colorado
Energy & Carbon Management Commission

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Document Number:
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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 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
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 #: 6926 Initial Form 27 Document #: 2223637

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>331069</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SEELE-64N67W 31NWNE</u>	Latitude: <u>40.275890</u>	Longitude: <u>-104.930170</u>	
	** correct Lat/Long if needed: Latitude: <u>40.276883</u>	Longitude: <u>-104.923421</u>	
QtrQtr: <u>NWNE</u>	Sec: <u>31</u>	Twps: <u>4N</u>	Range: <u>67W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

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

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

Surface water ~1,100' N, residential buildings ~ 1,000' S, ditch 80' E, depth to groundwater 7' bgs.

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 type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | |
| <input 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	GROUNDWATER	Refer to Figures 1-2 and Tables 1-2	Drilling and groundwater sampling
Yes	SOILS	Refer to ECMC Doc. #403355762	Excavation and 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 December 12, 2022, following the decommissioning of the existing tank battery on location, mechanical excavation activities were initiated to remove impacted source material from beneath the former tank battery pad. During excavation activities, groundwater was encountered in the excavation at approximately 14.5 feet below ground surface (bgs). To date, a total of 2,400 cubic yards (cy) of impacted material were excavated and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests.

Decommissioning activities were scheduled to be completed under Remediation Project #25742, however, based on the long standing remediation being conducted under Remediation Project #6926, a closure request was submitted for Remediation Project #25742, and was approved on March 3, 2023. All future activity will be reported under Remediation Project #6926.

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):

During initial excavation activities, two (2) soil samples (SS07 @ 10' & SS15 @ 10') were collected from impacted source material at approximately 10 feet bgs. The samples were submitted for laboratory analysis of the full ECMC Table 915-1 analyte suite. Analytical results indicated preliminary COCs for the historic release as: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), benzofluoranthene, chrysene, fluorene, pyrene, 1-M, 2-M, EC, pH and SAR. Between December 12, 2022 and January 5, 2023, 47 confirmation soil samples (SS06-SS23, SS26-SS28, & SS30-SS55) were collected from the base and sidewalls of the excavation at depths ranging from approximately 10 feet to 16.5 feet bgs and were submitted for laboratory analysis of the aforementioned COCs. Soil analytical results indicated that organic compound concentrations were in compliance with the applicable ECMC Table 915-1 regulatory standards in all samples collected from the final excavation extent.

Proposed Groundwater Sampling

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

Following remediation activities, monitoring wells will be advanced to evaluate dissolved-phase organic compounds and inorganic parameters within and adjacent to the former excavation extent and tank battery.

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):

Four soil samples (SS24-SS25, SS29, and SS56) were collected from within the root zone at approximately 2.5 feet bgs and were submitted for laboratory analysis of pH, EC, SAR, and boron. Inorganic concentrations were in compliance with the applicable regulatory standards in all four soil suitability sample locations. Additionally, SAR and/or pH concentrations were in exceedance of the applicable regulatory standards in soil samples SS06, SS09, SS11, SS12, SS19, SS23, SS36, SS39, SS40, SS47, SS48, SS50, SS53, and SS54 collected from the final excavation extent.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 58
Number of soil samples exceeding 915-1 18
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 5766

NA / ND

-- Highest concentration of TPH (mg/kg) 123.9
-- Highest concentration of SAR 8.53
BTEX > 915-1 Yes
Vertical Extent > 915-1 (in feet) 17

Groundwater

Number of groundwater samples collected 1
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 15
Number of groundwater monitoring wells installed 0
Number of groundwater samples exceeding 915-1 0

-- Highest concentration of Benzene (µg/l) 3.3
-- Highest concentration of Toluene (µg/l) 1.1
ND Highest concentration of Ethylbenzene (µg/l) _____
-- Highest concentration of Xylene (µg/l) 11
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?

Between December 21, 2022 and January 5, 2023, 18 background soil samples (BKG02-BKG05) were collected within native material adjacent to the former tank battery between depths of approximately 2.5 feet and 16.5 feet bgs and submitted for laboratory analysis of Table 915-1 metals and soil suitability for reclamation constituents. Analytical results indicated that pH, EC, SAR, boron, arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil. Based on the background analytical results, the arsenic, barium, and selenium exceedances observed in both of the source soil samples are within 1.25x the background concentrations and indicative of native soil conditions.

Between June 26, and July 13, 2023, two (2) background soil borings (BKG06 & BKG07) were advanced in native material to a depth of approximately 20 feet bgs. Background soil analytical results indicated that pH and SAR were in exceedance of the applicable ECMC regulatory standards.

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

Volume of solid waste (cubic yards) 2400 Volume of liquid waste (barrels) 0

Is further site investigation required?

Between July 13, and August 28, 2023, eleven (11) monitoring wells (BH12 – BH22) and one soil boring (SB01) were installed within and surrounding the former excavation extent to delineate dissolved-phase hydrocarbon impacts and delineate pH and SAR exceedances recorded during excavation activities. Lithologic descriptions and VOC concentrations measured using a PID were recorded for each monitoring well and soil boring. Forty-six (46) soil samples were collected from the monitoring wells and soil boring at depths ranging from approximately 12.5 feet to 20 feet bgs and were submitted to Summit Scientific Laboratory for analysis of pH and SAR.

Soil analytical results indicated that pH or SAR were in exceedance of the applicable ECMC regulatory standards and greater than the background concentrations in 11 sample locations.

Due to elevated PID readings recorded in monitoring well BH16, the soil sample that exhibited the highest VOC concentration (BH16 @ 16.5') and the sample beneath the elevated PID reading (BH16 @ 18') were submitted for additional laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, total petroleum hydrocarbons (TPH)[C6-C36], benzo(k)anthracene, chrysene, fluorene, pyrene, 1-methylnaphthalene (M), and 2-M.

Soil analytical results indicated that organic compound concentrations were in compliance with the applicable regulatory standards in both soil sample locations.

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.

The source area was previously excavated as described in the Form 19 submitted on February 27, 2012.

Excavation activities were re-initiated on December 12, 2022. Between December 12, 2022, and January 5, 2023, approximately 2,400 cubic yards of impacted material were removed from site and transported to North Weld Waste Management for disposal 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.

Decommissioning activities were scheduled to be completed under Remediation Project #25742, however, based on the long standing remediation being conducted under Remediation Project #6926, a closure request was submitted for Remediation Project #25742, and was approved on March 3, 2023. All future activity will be reported under Remediation Project #6926.

Based on background soil analytical results, pH and/or SAR remains outside of ECMC Table 915-1 regulatory standards in 25 soil sample locations at a depth of 12.5 feet or greater. Per the condition of approval (COA) issued in the approved Supplemental Form 27 (Document No. 403559566), delineation activities will be readdressed following further groundwater assessment and landowner negotiations.

Enhanced fluid recovery (EFR) with air sparge (AS) was initiated in third quarter 2012 and continued through the fourth quarter 2015. Based on the analytical results received from quarterly groundwater monitoring events, monitored natural attenuation (MNA) was implemented as the selected remediation strategy during the fourth quarter 2015. EFR/AS was reinitiated during the second quarter 2016 due to a rebound in dissolved-phase hydrocarbon concentrations and continued until December 2022. MNA was reinitiated following source mass removal activities during the third quarter 2023 and will remain the selected remediation strategy through the third quarter 2024.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Yes Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) 2400

_____ 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.

During 2022/2023 excavation activities, all eight site monitoring wells (BH01R - BH03R & BH07 - BH11) were destroyed.

On June 7, 2024, groundwater monitoring was conducted at all 11 monitoring well locations (BH12-BH22). Eleven groundwater samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDS) by Method SM 2540C.

Second quarter 2024 analytical results indicated that organic compound concentrations were in compliance with the applicable ECMC regulatory standards in all 11 monitoring well locations.

Inorganic parameter trends were examined over time and compared to historic background data and groundwater flow direction. Based on this data, TDS and sulfate anion concentrations were in compliance with the applicable regulatory standards or within the 125% threshold of the historic maximum background concentration recorded in the up-/cross-gradient monitoring wells (BH15, BH18, and BH19) in all monitoring well locations. Chloride anion concentrations were in compliance with the applicable regulatory standards in all 11 monitoring well locations. The graphs illustrating the data are included as Attachment A.

During the second quarter 2024, four consecutive quarters of TDS and sulfate anion concentrations in compliance with the applicable ECMC regulatory standards were achieved. Consequently, PDC is requesting to remove TDS and sulfate from the quarterly sampling and analysis plan.

PDC will conduct quarterly groundwater monitoring at the 11 site monitoring wells (BH12 - BH22) until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5 -TMB by EPA Method 8260B, and chloride anions by EPA Method 300.0 in accordance with Table 915-1.

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.

Financial assurance information was included in the third quarter 2023 Supplemental Form 27 (Document No. 403559566). This section and estimate will be updated on an annual basis until closure criteria are achieved.

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 _____ 2400

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.

The excavation was backfilled, compacted, and re-graded to match pre-existing conditions. Following decommissioning of this facility, 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. 11/28/2022

Proposed date of completion of Reclamation. 03/24/2028

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. 01/09/2012

Actual Spill or Release date, or date of discovery. 01/09/2012

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 11/28/2022

Proposed site investigation commencement. 09/30/2024

Proposed completion of site investigation. 12/31/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 01/09/2012

Proposed date of completion of Remediation. 03/24/2028

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:

Per the condition of approval (COA) issued in the approved Supplemental Form 27 (Document No. 403559566), delineation activities will be readdressed following further groundwater assessment and landowner negotiations.

OPERATOR COMMENT

This Supplemental Form 27 was submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the second quarter 2024 at the former Seele 31, 41, 42-31 tank battery location.

Second quarter 2024 analytical results indicated that organic compound concentrations were in compliance with the applicable ECMC regulatory standards in the 11 monitoring well locations for the second consecutive quarter. Chloride anion concentrations were in compliance with the applicable ECMC regulatory standards for the third consecutive quarter.

During the second quarter 2024, four consecutive quarters of TDS and sulfate anion concentrations in compliance with the applicable ECMC regulatory standards were achieved. Consequently, PDC is requesting to remove TDS and sulfate from the quarterly sampling and analysis 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: Remediation Advisor

Submit Date: _____

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: _____

Date: _____

Remediation Project Number: 6926

COA Type

Description

0 COA	

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

403866726	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)