

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 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 #: 32673 Initial Form 27 Document #: 403569450

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>WELL</u>	Facility ID: _____	API #: <u>123-11299</u>	County Name: <u>WELD</u>
Facility Name: <u>BUNN, M. 1-34</u>	Latitude: <u>40.442782</u>	Longitude: <u>-104.757560</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NESE</u>	Sec: <u>34</u>	Twp: <u>6N</u>	Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

Facility Type: <u>OFF-LOCATION FLOWLINE</u>	Facility ID: <u>471439</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Wellhead Line 34NESE</u>	Latitude: <u>40.442011</u>	Longitude: <u>-104.757315</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NESE</u>	Sec: <u>34</u>	Twp: <u>6N</u>	Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications GW

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

Wellhead:

Closest Domestic Well within quarter mile – 780' SSE

Additional Domestic Wells – 870' W, 1120' SSW, 1170' SE

Nearest Surface Water – Cache La Poudre River 870' NW

Nearest Occupied Building – 800' SSE

Additional Occupied Buildings – 1095' SE, 1140' SSW, 1040' SE

Freshwater Forested/Shrub Wetland – 900' NW

Freshwater Pond – 530' NW, 890' NW

100-Year Effective Floodplain – 60' N

Aquatic Native Species Conservation Waters – 400' NW

No other potential receptors are located within ¼ mile of the Site

Above distances are approximations

Additional Flowline Receptors:

No other potential receptors are located in proximity to the flowline

Above distances are approximations

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 Figures 1-2 & Tables 1-4	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 7 & 8, 2024, field screening and confirmation soil sampling activities were conducted in accordance with the ECMC Rule 911 during the decommissioning of the Bunn M. 1-34 wellhead (Figure 1) and removal of the associated flowline (Figure 2). On March 8, 2024, it was determined that a historic release was discovered at the wellhead when analytical results returned with organic compound exceedances at soil sample location WH01-B. On March 7, 2024, mitigation activities were initiated and to date approximately 9 cubic yards of impacted material were removed from the wellhead excavation and transported to the North Weld Waste Management Facility for disposal under a PDC waste manifest. Due to the location being adjacent to a public park, excavation activities were not re-initiated.

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 7, 2024, one waste characterization soil sample (WC01) was collected from the wellhead source area at approximately 4 feet below ground surface (bgs). The sample was submitted for laboratory analysis of the full ECMC Table 915-1 analytical suite. Analytical results indicated that site specific COCs include: benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH[C6-C36]), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, acenaphthene, anthracene, benzanthracene, chrysene, fluoranthene, fluorene, pyrene, 1-methylnaphthalene (M), 2-M, arsenic, barium, and selenium.

Proposed Groundwater Sampling

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

If groundwater is encountered during supplemental site investigation activities, a grab sample will be collected as soon as practical. If contaminated soil is in contact with groundwater or if free product/hydrocarbon sheen are observed, the release will be reported in accordance with Rule 912.b. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB by EPA Method 8260, chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDs) by Method SM 2540C.

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 7 & 8, 2024, 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). Due observed hydrocarbon impacts and excavation activities at the wellhead, soil samples (WH01-B & WH01-N) collected from the base and sidewall exhibiting the highest PID response were submitted for analysis of the full Table 915-1 analytical suite. 6 soil samples (FL01-01 - FL01-05 & DL01-01) were collected every 250 feet along the flowline, at the changes in direction, and along a dump line at the tank battery. Soil samples (FL01-01 - FL01-05 & DL01-01) were submitted for laboratory analysis of the full Table 915-1 analytical suite. Analytical results indicated that organic and inorganic compounds were in exceedance of the applicable standards in soil sample WH01-B. Arsenic, barium, lead, and/or pH was in exceedance of the applicable standards in the remaining soil samples.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 9
Number of soil samples exceeding 915-1 9
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) 5600
-- Highest concentration of SAR 4.67
BTEX > 915-1 Yes
Vertical Extent > 915-1 (in feet) 6

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 8, 2024, eight background soil samples (BKG01 & BKG02) were collected from native material topographically up-gradient of the wellhead & tank battery location between depths of approximately 0.5 feet and 4 feet bgs and submitted for laboratory analysis of ECMC Table 915-1 Metals. Analytical results indicated that arsenic, barium, & selenium were observed in exceedance of the applicable regulatory standards in native material.

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

Volume of solid waste (cubic yards) 9 Volume of liquid waste (barrels) 0

Is further site investigation required?

Based on the final analytical results, supplemental source mass removal activities are proposed to be initiated to remove remaining hydrocarbon impacted material via mechanical excavation adjacent to and below soil sample WH01-B. Confirmation soil samples will be collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the ECMC approved COCs. However, due to the location of this site being next to a public park, PDC believes the least intrusive strategy is to advance boreholes to delineate the remaining impacts before excavation activities commence. As such, up to five (5) soil borings will be advanced to confirm as well as vertically and horizontally delineate the organic hydrocarbon impacts observed in soil samples WH01-B. Remaining inorganic and metals exceedances in WH01-B and WH01-N will be addressed during the excavation and confirmation soil sampling phase.

Additionally, analytical results indicated that arsenic, barium, lead, and/or pH were in exceedance of the applicable standards in soil samples FL01-01 - FL01-05. As such, up to five (5) additional background soil borings will be advanced in native material adjacent to the final wellhead excavation extent and along the flowline to evaluate arsenic, barium, lead, pH, and selenium in native material. The proposed soil boring locations are illustrated on Figures 3 & 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.

Any hydrocarbon impacted material will be transported off-site to a licensed disposal facility in accordance with Rules 905 and 906.

REMIEDIATION 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 March 8, 2024, a historic release was discovered following receipt of preliminary analytical results from soil samples collected during decommissioning activities at the Bunn M. 1-34 Wellhead. On March 7, 2024, two (2) soil samples (WH01-B & WH01-N) were collected from the base and sidewall exhibiting the highest PID response from the wellhead excavation. On March 8, 2024, six (6) soil samples (FL01-01 - FL01-05 & DL01-01) were collected along the flowline every 250 feet, at the significant direction changes, and along the dump line at the tank battery. Soil samples (FL01-01 - FL01-05) were submitted for laboratory analysis of the full Table 915-1 analytical suite. Analytical results indicated that organic and inorganic compound concentrations were in exceedance of the applicable Table 915-1 standards in the following samples:

WC01: Benzene, ethylbenzene, xylene, 1,2,4 & 1,3,5-TMB, naphthalene, TPH (C6-C36), benzanthracene, 1-M, 2-M, arsenic, barium, & selenium
 WH01-B: 1,2,4 & 1,3,5-TMB, TPH (C6-C36), benzanthracene, 1-M, 2-M, & selenium
 WH01-N: pH, arsenic, & barium
 FL01-01: arsenic & lead
 FL01-02, FL01-03, & FL01-05: arsenic
 FL01-04: arsenic & barium

Soil analytical results are summarized in Tables 1-4. GPS coordinates and PID readings for the soil sample collected during decommissioning activities 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 and the decommissioning field notes and photo log are included in Attachment B.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 9

_____ 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

_____ 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 of the wellhead and removal of the flowline.

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 Confirmation Sample Summary, Analyte Reduction Request, SSMRP, SSIP

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.

- Source mass removal and confirmation sampling will be conducted to remove impacted soil adjacent to the flowline release.
- Native material assessment of pH, arsenic, barium, lead, & selenium is ongoing.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the ECMC 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: \$ 50000

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 9

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 wellhead decommissioning and flowline removal activities, the location was backfilled, compacted, and re-contoured to match preexisting conditions. The location will be reclaimed in accordance with the ECMC 1000 series.

Following additional source mass removal activities, the location will 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. 03/07/2024

Proposed date of completion of Reclamation. 03/07/2029

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. 09/11/2023

Actual Spill or Release date, or date of discovery. 03/08/2024

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/07/2024

Proposed site investigation commencement. 06/04/2024

Proposed completion of site investigation. 09/30/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/07/2024

Proposed date of completion of Remediation. 03/07/2029

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 activities, supplemental source mass removal activities are required in the vicinity of soil sample WH01-B. However, due to the site location being next to a public park, PDC proposed delineating the hydrocarbon impacts prior to initiating excavation activities. Additionally, an investigation will be conducted to assess pH, arsenic, barium, lead, & selenium concentrations in native material. Supplemental site investigation activities are proposed to be completed by the end of third quarter 2024.

OPERATOR COMMENT

Based on final analytical results for the waste characterization soil sample WC01 collected from the wellhead source area, PDC is requesting that the COCs for the historic release discovered at the Bunn M. 1-34 wellhead location be reduced to the following: benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH[C6-C36]), 1,2,4- trimethylbenzene (TMB), 1,3,5-TMB, acenaphthene, anthracene, benzanthracene, chrysene, fluoranthene, fluorene, pyrene, 1-methylnaphthalene (M), 2-M, arsenic, barium, and selenium.

Following the approval of this form and landowner approval, supplemental site investigation activities will be initiated at the former Bunn M. 1-34 wellhead and along the associated flowline to evaluate pH, arsenic, barium, lead, and selenium concentrations in native material. While PDC recognizes the need for supplemental source mass removal activities in the vicinity of soil sample WH01-B, an attempt to minimize impacts to the area, which contains a public park, will be made by first delineating the hydrocarbon impacts via soil borings.

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: 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: 32673

COA Type

Description

0 COA	
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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
403812891	PHOTO DOCUMENTATION
403815301	SITE INVESTIGATION PLAN
403815302	SOIL SAMPLE LOCATION MAP
403815304	SITE INVESTIGATION PLAN
403815306	SOIL SAMPLE LOCATION MAP
403815308	ANALYTICAL RESULTS

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)