

State of Colorado
Energy & Carbon Management Commission

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404156843
Receive Date:
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Report taken by:
Candice (Nikki) Graber

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>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Jason Davidson</u>	Email: <u>jason.davidson@chevron.com</u>	Phone: <u>(970) 313-5582</u>
		Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 27449 Initial Form 27 Document #: 403297478

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>456832</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Bost Farm 5-7 Pad</u>	Latitude: <u>40.417976</u>	Longitude: <u>-104.829009</u>	
	** correct Lat/Long if needed: Latitude: <u>40.416581</u>	Longitude: <u>-104.829406</u>	
QtrQtr: <u>NWNW</u>	Sec: <u>7</u>	Twp: <u>5N</u>	Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>483472</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Bost Farms - Temp Tanks</u>	Latitude: <u>40.416581</u>	Longitude: <u>-104.829406</u>	
	** correct Lat/Long if needed: Latitude: _____	Longitude: _____	
QtrQtr: <u>NWNW</u>	Sec: <u>7</u>	Twp: <u>5n</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 Agricultural

Is domestic water well within 1/4 mile? No

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

Surrounded in all directions by agricultural fields.

Nearest Surface Water: Boomerang Ditch - 400 feet W; Occupied Building - 1,015 feet W; West Greeley Self Storage - 1,015 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	GROUNDWATER	Refer to Figure 4 and Tables 1-2	Quarterly Groundwater Sampling
Yes	SOILS	3,300' square x 7' deep	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 11/13/22, ~10 bbls of produced water was released inside lined secondary containment due to a frozen high-level sensor on a temporary frac tank. The produced water contacted roadbase used as bedding within the temporary frac tank containment and ~1 bbl was recovered. No produced water contacted soils outside the containment structure. The majority of the impacted roadbase, (~33 CY) was immediately excavated and hauled offsite for disposal. Due to operational constraints, some impacted roadbase was left in place. Prior to the temporary tanks being replaced, the impacted roadbase left in place was treated with BioSolve and clean roadbase was imported to bring the surface within containment to flat grade. On 11/15/22, prior to the tanks being replaced, Fremont Env. inspected the liner integrity, conducted field screening, and collected confirmation samples within the containment structure. 11 discrete soil samples were collected and field screened with a PID, and 1 of the 11 samples was analyzed for the full ECMC Table 915-1 suite of analytes. Fremont was unable to inspect the liner integrity due to the containment having been backfilled prior to their arrival.

On 6/7/23, removal of the secondary containment liner and underlying soil was conducted. At that time, it was determined that petroleum liquids had penetrated the bentonite impregnated liner and impacted the underlying soil. 9 test pits were excavated to determine the horizontal and vertical extent of hydrocarbon impacts. The footprint of the hydrocarbon impacted soil was ~30'x60'. The vertical impact in several test pits was ~7' bgs. Groundwater was present at ~7' bgs which limited further downward migration. 4 soil samples were collected and analyzed for Table 915-1 organic compounds and 2 of those samples exceeded their Table 915-1 standards. 1 groundwater sample was collected from a test pit and the laboratory analyses indicated it failed for BTX, 1,2,4 trimethylbenzene (TMB), and 1,3,5 TMB.

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):

A site investigation will be conducted contemporaneously with the removal of the temporary frac tanks and secondary containment structure to confirm whether the soils beneath the containment structure were impacted by the release. All investigation activities, field screening, and confirmation soil sampling activities will be conducted in accordance with ECMC 900 Series Rules and guidance documents. Discrete soil samples will be collected and analyzed pursuant to Rule 915, following the general sample collection guidance in Rule 915.e.(2).

Proposed Groundwater Sampling

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

Groundwater impacts were encountered at the Site on June 7, 2023, and the magnitude and extent of these impacts require additional delineation. A minimum of eight groundwater monitoring wells are proposed for installation at the Site. Groundwater will be sampled quarterly and analyzed by a certified laboratory for benzene, toluene, ethylbenzene, total xylenes, naphthalene (BTEXN), 1,2,4 TMB, and 1,3,5 TMB by Method 8260B, chloride and sulfate anions by EPA Method 300.0, and total dissolved solids (TDS) by SM2540C. Groundwater monitoring will continue with the goal of achieving four consecutive quarterly sampling events in compliance with Table 915-1 standards.

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 8/25/23, the eight proposed monitoring wells were installed (see attached well logs). A cross section is provided as Figure 5. One soil sample was collected from each of the borings and analyzed for Table 915-1 organic compounds and metals. The Suitability for Soil Reclamation constituents were not analyzed since previous analyses conducted on July 12, 2023, indicated that all samples achieved their respective Table 915-1 standards (see attached Table 3). The laboratory results for the soil samples collected from the monitoring well borings are summarized in Tables 1, 2, and 4, as well as shown on Figure 4. These data indicate that all constituents are in compliance with the Table 915-1 standards except for arsenic and barium. Refer to the Background Samples Collected and Remediation Summary sections of this Form 27 for further discussion.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 17
 Number of soil samples exceeding 915-1 17
 Was the areal and vertical extent of soil contamination delineated? No
 Approximate areal extent (square feet) 3300

NA / ND

ND Highest concentration of TPH (mg/kg) _____
-- Highest concentration of SAR 0.913
 BTEX > 915-1 Yes
 Vertical Extent > 915-1 (in feet) 7

Groundwater

Number of groundwater samples collected 8
 Was extent of groundwater contaminated delineated? Yes
 Depth to groundwater (below ground surface, in feet) 3
 Number of groundwater monitoring wells installed 8
 Number of groundwater samples exceeding 915-1 0

ND Highest concentration of Benzene (µg/l) _____
ND Highest concentration of Toluene (µg/l) _____
ND Highest concentration of Ethylbenzene (µg/l) _____
ND Highest concentration of Xylene (µg/l) _____
NA 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 8/25/23, five borings were advanced off-location for the collection of background soil samples. Soil samples were collected at a depth of 5 feet bgs and analyzed for arsenic and barium only.
 All background samples exceeded the Table 915-1 RSSL for arsenic. However, the background arsenic concentrations were all lower than the arsenic concentrations reported in the confirmation soil samples collected from the excavation base and sidewalls and from the monitoring well borings.
 One background sample exceeded the Table 915-1 PGWSSL for barium. The PGWSSL for barium was also exceeded in one confirmation soil sample collected from the excavation sidewall and four soil samples collected from the monitoring well borings.

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

Volume of solid waste (cubic yards) _____ Volume of liquid waste (barrels) _____

Is further site investigation required?

In accordance with COA #1 issued by the ECMC in Supplemental Form 27 Doc #403840761, groundwater will continued to be sampled for Table 915-1 inorganic parameters until a downward trend in the data is established. Once a downward trend in the data is established, PDC will request an NFA for Remediation Project #27449.

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 11/13/22, ~33 CY of roadbase was hauled offsite for disposal under PDC manifest to Waste Management's North Weld Landfill in Ault, CO in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

On 6/7/23, ~50 CY of material from the former frac tank temporary containment area was removed and transported offsite for disposal under PDC manifest to Waste Management's North Weld Landfill in Ault, CO in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

On 7/12/23 and 7/13/23, ~310 CY of impacted soil from the former frac tank area were removed and transported for offsite disposal under PDC manifest to Waste Management's North Weld Landfill in Ault, CO in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

Confirmation soil samples were collected from the floor and sidewalls of the excavation and submitted to Summit Scientific Laboratory (Summit) in Golden, CO, for analyses of the full Table 915-1 suite of analytes by ECMC approved methods. These data indicate that petroleum and Suitability for Soil Reclamation constituents have been removed from the impacted area. However, arsenic and barium concentrations exceeded the Table 915-1 standards.

Groundwater entered the floor of the excavation and grab samples were collected in two locations. These samples were submitted to Summit for analyses of BTEXN, 1,2,4 TMB, and 1,3,5 TMB. Benzene and 1,2,4 TMB exceeded their respective Table 915-1 standards. Therefore, eight groundwater monitoring wells have been installed to delineate the magnitude and extent of impacts.

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.

Based on confirmation soil sampling completed after the July 2023 excavation, soil impacts have been removed except for arsenic and barium.

Arsenic concentrations exceeded the Table 915-1 RSSL in all nine excavation base and sidewall samples, all eight monitoring well borings, and all five background borings. Arsenic concentrations in the background samples were all lower than the arsenic concentrations in the soil samples collected from the excavation base and sidewall and from the monitoring well borings. Barium concentrations exceeded the Table 915-1 PGWSSL in one soil sample collected from the excavation sidewall, four soil samples collected from the monitoring well borings, and one soil sample collected from the background borings.

As described in ECMC-approved Form 27 (Doc #403648954), a comparison was made between the mass of arsenic and barium released by the spill and the mass excavated during remediation. The mass of arsenic and barium excavated was significantly greater; therefore, ECMC agreed that arsenic and barium concentrations had been adequately remediated and that residual concentrations were due to native conditions.

Soil Remediation Summary

<input type="checkbox"/> In Situ _____ Bioremediation (or enhanced bioremediation) _____ Chemical oxidation _____ Air sparge / Soil vapor extraction _____ Natural Attenuation _____ Other _____	<input checked="" type="checkbox"/> Ex Situ Yes _____ Excavate and offsite disposal If Yes: Estimated Volume (Cubic Yards) _____ 393 Name of Licensed Disposal Facility or ECMC Facility ID # _____ _____ Excavate and onsite remediation _____ Land Treatment _____ Bioremediation (or enhanced bioremediation) _____ Chemical oxidation _____ Other _____
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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 2/10/2025, groundwater samples were collected from the eight monitoring wells. These samples were submitted to Summit for analyses of BTEXN, 1,2,4 TMB, 1,3,5 TMB, sulfate, chloride, and TDS by ECMC approved methods. However, a secured analytical data report is not yet available. Upon receipt of the secured report, analytical findings will be summarized and provided in the next quarterly Supplemental Form 27.

ECMC-approved Form 27 #403840761 discontinued organic analyses on 8/28/24; however, Operator has elected to continue analyzing for organics.

In accordance with COA #1 issued by the ECMC in Supplemental Form 27 Doc #404045258, groundwater will continue to be sampled for Table 915-1 inorganic parameters until a downward trend in the data is established. Once a downward trend in the data is established, PDC will request an NFA for Remediation Project #27449.

The next quarterly round of sampling is scheduled for May 2025.

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 Groundwater Monitoring and Remediation Progress Report

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 has been completed.
- Eight monitoring wells have been installed.
- Groundwater will continued to be sampled for Table 915-1 parameters until a downward trend in the data is established.

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: \$ 7000

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 393

E&P waste (solid) description Hydrocarbon impacted soil

ECMC Disposal Facility ID #, if applicable: _____

Non-ECMC Disposal Facility: Waste Management's North Weld Landfill in Ault, CO

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? Yes _____

Does the previous reply indicate consideration of background concentrations? Yes _____

Does Groundwater meet Table 915-1 standards? No _____

Is additional groundwater monitoring to be conducted? Yes _____

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 Bost Farms 5-7 facility is an active facility and there are no current plans for decommissioning or reclamation activities.

Is the described reclamation complete? _____

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. _____

Proposed date of completion of Reclamation. _____

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. 11/13/2022

Actual Spill or Release date, or date of discovery. 11/13/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 11/13/2022

Proposed site investigation commencement. 11/15/2022

Proposed completion of site investigation. 06/30/2025

REMEDIAL ACTION DATES

Proposed start date of Remediation. 11/13/2022

Proposed date of completion of Remediation. 07/13/2023

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:

Updated Proposed Completion of Site Investigation date due to not having received analytical results from the 1Q25 quarterly groundwater monitoring activities at the Site.

OPERATOR COMMENT

This SF27 represents a 1Q25 TU for Remediation Project #27449. Quarterly groundwater monitoring activities were conducted February 10, 2025. However, a secured analytical data report is not yet available. Upon receipt of the secured report, analytical findings will be summarized and provided in the next quarterly Supplemental Form 27.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Chris Lattes

Title: Consultant

Submit Date: 04/08/2025

Email: chrisl@fremontenv.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: Candice (Nikki) Graber

Date: 07/29/2025

Remediation Project Number: 27449

COA Type

Description

COA Type	Description
1 COA	ECMC has processed this form as an update; no analytical was attached thus approval of this form does not imply any agreement with comments on completion of site investigation. All ongoing/unaddressed comments/COAs from previous Forms remain applicable.

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

Att Doc Num	Name
404156843	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
404298390	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)