

State of Colorado  
Energy & Carbon Management Commission

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403860260  
Receive Date:  
07/25/2024

Report taken by:  
Laurel Anderson

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: PDC ENERGY INC	Operator No: 69175	Phone Numbers Phone: (970) 313-5582 Mobile: ( )
Address: 1099 18TH STREET SUITE 1500		
City: DENVER	State: CO	Zip: 80202
Contact Person: Jason Davidson	Email: FRspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 33237 Initial Form 27 Document #: 403575609

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: SPILL OR RELEASE	Facility ID: 484969	API #: _____	County Name: WELD
Facility Name: Phelps 32 Sec Separator	Latitude: 40.011100	Longitude: -104.792570	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SENE	Sec: 32	Twp: 1N	Range: 66W 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**

Unnamed Drainage and associated Wetland: 100' S  
Irrigation Ditch: 630' SW  
Unnamed Ponds: 600' S, 580' SE, and 1,200' N  
Livestock: 660' N and 1,190' NW  
Domestic Water Wells: 845' NW, 1,110' SE, 1,120' SE, 1,180' NE, 1,210' SE, and 1,300' SE  
Residential Properties: 1,040' N, 1,130' S, and 1,160' SE

No other potential receptors are located within 1/4 mile of the Site.  
Above distances are approximations.

**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	Unknown	Not yet determined
Yes	SOILS	6' x 8' x 3' 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 8/19/23, a broken site glass on the Phelps 11-32 CHZ separator resulted in the release of less than 1 barrel of produced fluids. Impacted surface soil was excavated using a hydrovac.

During additional soil removal activities on 8/21/23, groundwater was encountered at a depth of approximately 3 feet below ground surface (bgs). Free phase condensate was observed on the surface of the groundwater.

Approximately 3 cubic yards of impacted soil and groundwater were removed from the impacted area via hydrovac and transported to Republic Services Tower Road Landfill in Commerce City, CO for disposal under PDC manifest in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

Soil samples were collected on 8/23/23 and analyzed for the full ECMC Table 915-1 suite of analytes by ECMC approved methods. A grab groundwater sample was also collected from the base of the excavation and analyzed for ECMC Table 915-1 Organic Compounds in Groundwater by ECMC approved methods. The laboratory data are summarized in Tables 1 to 6 and illustrated on Figure 3.

Based on the laboratory data, petroleum constituents in the unsaturated soil have been adequately remediated. However, arsenic, barium, electrical conductivity (EC) and/or sodium adsorption ratio (SAR) concentrations were above the ECMC Table 915-1 standards in the soil samples. Further, the benzene concentration in the groundwater sample exceeded the ECMC Table 915-1 standard.

## 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 ):

As shown on Figure 2, five groundwater monitoring wells are proposed. One soil sample will be collected from each soil boring and analyzed for the full ECMC Table 915-1 suite of analytes. In addition, five background soil borings will be advanced to collect background soil samples for analysis of arsenic, barium, EC, and SAR by ECMC approved methods.

### Proposed Groundwater Sampling

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

As shown on Figure 2, five monitoring wells are proposed. One groundwater sample will be collected from each monitoring well and analyzed for ECMC Table 915-1 Organic Compounds and Inorganic Parameters in Groundwater by ECMC approved methods. Groundwater sampling and analyses will be completed on a quarterly basis until four consecutive ECMC-compliant quarters are achieved. At that time, a request for a no further action (NFA) determination will be submitted.

### 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 1/10/24, five monitoring wells were advanced at the Site using hand auger equipment, as shown on the attached Figure 2. Soil samples were collected at a depth of 2 feet bgs from each boring and analyzed for the full ECMC Table 915-1 suite of analytes. The laboratory data indicate that arsenic, barium, selenium, and pH exceeded their respective Table 915-1 standards. All other analytes were in compliance with their respective Table 915-1 standards.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 15  
Number of soil samples exceeding 915-1 8  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 48

### NA / ND

-- Highest concentration of TPH (mg/kg) 650  
-- Highest concentration of SAR 12.6  
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 3

### Groundwater

Number of groundwater samples collected 5  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 6  
Number of groundwater monitoring wells installed 5  
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  
0 Number of surface water samples exceeding 915-1  
If surface water is impacted, other agency notification may be required.

## OTHER INVESTIGATION INFORMATION

Were impacts to adjacent property or offsite impacts identified?

Were background samples collected as part of this site investigation?

On 1/3/24, five background soil samples were collected off the location and analyzed for arsenic, barium, EC, and SAR. These data are shown on Figure 5.

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?

## 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 8/19/23, during initial excavation activities, impacted surface soils were removed using a hydrovac.  
During additional soil removal activities on 8/21/23, approximately 3 cubic yards of impacted soil and groundwater were removed from the impacted area via hydrovac and transported to Republic Services Tower Road Landfill in Commerce City, CO for disposal under PDC manifest in accordance with Rules 905 and 906. Copies of the waste manifests are available upon request.

### 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.

Petroleum constituents have been adequately remediated via excavation and natural attenuation (see approved Form 27 Doc #403575609). Non-compliant concentrations of arsenic, barium, selenium, pH, EC, and SAR in unsaturated soil are present at the Site. These constituents have all been adequately remediated or delineated except for pH and selenium (see approved Form 27 Doc #403770398).

On 2/28/24, a produced fluids sample was collected from the separator and analyzed for total recoverable metals (see Table 5). This data was used to determine the mass of selenium released in the 1 bbl spill. This mass was compared to the calculated mass of selenium removed as a result of the excavation. Table 4 provides these calculations and comparisons.

As shown in Table 4, the amount of selenium removed was approximately 5,743 times more than the amount of selenium that was released. Since the amount of selenium removed was significantly greater than the amount of selenium released, the additional selenium removed can be attributed to native concentrations and the presence of selenium in the monitoring well sample can be considered resolved.

Non-compliant pH levels were present in three of the five soil borings/monitoring wells. The vertical extent of pH exceedance was delineated by the excavation floor sample on 8/23/23. The pH levels have been delineated to the north, east and west by soil samples from MW-5, HA-E and MW-2, respectively. PDC has advanced several hand augered soil borings in an attempt to delineate pH to the south. These include borings HA-S, SS-SS, and SS-SSS as shown in Figure 6. The pH levels in these soil samples exceed the Table 915-1 standards even though boring SS-SSS is off the facility in a swampy area. Surface flow is from north to south and a small drainage channel is present to the south of the facility that flows from east to west as indicated on Figure 1. Therefore, PDC proposes that pH be considered adequately delineated.

### Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation ( or enhanced bioremediation )	Yes	Excavate and offsite disposal
_____ Chemical oxidation	_____	If Yes: Estimated Volume (Cubic Yards) _____ 3
_____ 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

Yes Other Removed via hydrovac and transported to Republic Services Tower Road Landfill in Commerce City, CO.

### 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 7/3/24, groundwater samples were collected from the five monitoring wells and analyzed for BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, total dissolved solids, chloride ion and sulfate ion. As shown on Tables 2 and 3, these constituents were all less than their respective Table 915-1 limits. The groundwater elevation contours for the July 2024 sampling event indicate the flow direction is to the southwest. These data are shown on Figures 3 and 4.

Groundwater samples will continue to be collected from each monitoring well and analyzed for BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB. Groundwater sampling and analyses will be completed on a quarterly basis until four consecutive ECMC-compliant quarters are achieved.

Sampling and analysis of dissolved selenium in monitoring well MW-3 had been previously proposed; however, PDC has determined that the selenium exceedance in MW-3 was due to native concentrations. Therefore, PDC proposes to delete the dissolved selenium sampling from the monitoring program.

# 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.

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 is complete
- Quarterly groundwater sampling and analyses will continue until four consecutive of Table 915-1 compliant concentrations are achieved

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: \$ 15000

## 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 3

E&P waste (solid) description Hydrocarbon impacted soil

ECMC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-ECMC Disposal Facility: Republic Services Tower Road Landfill in Commerce City, 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? \_\_\_\_\_

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 Phelps 12-32NHZ facility is an active facility and there are no current plans for decommissioning or reclamation activities. To address residual levels of pH, EC, and SAR in soil at the Site, PDC will prepare a Reclamation Plan in accordance with ECMC Rule 915.b. This Reclamation Plan will be submitted in a future quarterly Supplemental Form 27.

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. 08/24/2023

Actual Spill or Release date, or date of discovery. 08/21/2023

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 08/19/2023

Proposed site investigation commencement. 08/21/2023

Proposed completion of site investigation. 07/03/2024

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/19/2023

Proposed date of completion of Remediation. 01/31/2025

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:

Proposed Completion of Site Investigation date updated based on most recent laboratory analytical results from delineation soil samples collected on 7/3/24.  
Proposed date of Completion of Remediation date updated based on most recent laboratory analytical results from groundwater monitoring samples collected on 7/3/24.

**OPERATOR COMMENT**

Denied 10/16/2024 The total produced fluids sample (PW) data collected on 2/28/2024 was submitted on Form 43 Document #403866542. This Form 43 is included as a Related Form.

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

Signed: Jason Davidson

Title: Remediation Advisor

Submit Date: 07/25/2024

Email: FRspillremediationcontractor@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: 33237

**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**

403860260	FORM 27-SUPPLEMENTAL-SUBMITTED
403865351	SITE INVESTIGATION REPORT

Total Attach: 2 Files

**General Comments****User Group****Comment****Comment Date**

Environmental	<p>ECMC has denied this Form 27. Operator reporting indicates:</p> <p>"On 8/19/23, a broken site glass on the Phelps 11-32 CHZ separator resulted in the release of less than 1 barrel of produced fluids. Impacted surface soil was excavated using a hydrovac. During additional soil removal activities on 8/21/23, groundwater was encountered at a depth of approximately 3 feet below ground surface (bgs). Free phase condensate was observed on the surface of the groundwater."</p> <p>This is indicative of a modern spill and historical release. The historic release has not been quantified and therefore the current process to utilize produced water analysis is invalid.</p> <p>Operator shall propose a plan for selenium exceedances.</p>	10/16/2024
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Total: 1 comment(s)