

State of Colorado
Energy & Carbon Management Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203
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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 7. 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. These data are provided in Tables 1-4 and shown on Figure 7. Boring logs for the monitoring wells are attached.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 13

Number of soil samples exceeding 915-1 6

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) 8

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

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 summarized in Tables 3 and 4 and shown on Figure 7.

☐ 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?

PDC is currently evaluating alternative methods to address the unresolved concentrations of selenium and pH in soil samples collected at the Site.

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.

Non-compliant concentrations of arsenic, barium, selenium, pH, EC, and SAR in unsaturated soil are present at the Site.

The highest arsenic background concentration of 4.95 mg/kg was observed in sample BG N-C. 125% of that concentration is 6.19 mg/kg. All samples were less than that amount. Therefore, arsenic is resolved.

The highest barium background concentration of 138 mg/kg was observed in sample BG N-C. 125% of that concentration is 172.5 mg/kg. All samples were less than that amount. Therefore, barium is resolved.

The highest selenium background concentration of 0.293 mg/kg was observed in sample BG N-C. 125% of that concentration is 0.366 mg/kg. The selenium concentration in soil sample MW-3 2 Ft is 0.416 mg/kg. Therefore, selenium is not resolved.

Non-compliant EC and SAR concentrations were present in sample E-2, collected along the east wall of the August 2023 excavation. The horizontal and vertical extent of those exceedances have been delineated by the other excavation samples and the monitoring well soil borings.

Non-compliant pH levels were present in three of the five monitoring well soil borings. The vertical extent of pH exceedance was delineated by the excavation floor sample on 8/23/23. pH levels have been delineated to the north and west by soil samples from MW-5 and MW-2, respectively. On 4/11/24, two soil borings were advanced using hand auger equipment to delineate the extent of pH exceedances to the east and south. In the eastern boring (HA-E), pH levels were reported at 7.98. However, in the southern boring (HA-S), pH levels were reported at 8.41, which exceeds the Table 915-1 upper limit for pH of 8.30. Therefore, an additional boring will be installed further south of HA-S. The pH data is summarized in Table 3 and shown on Figure 7. The proposed boring is shown on Figure 8.

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 1/12/24, groundwater samples were collected from each of the five monitoring wells and analyzed for Table 915-1 organic and inorganic parameters by ECMC approved methods. As shown in Tables 5 and 6, a benzene concentration of 8.5 ug/L was present in MW-4 (source well); all other analytes met the standards. The groundwater elevation contours indicate the flow direction is to the southwest. These data are shown on Figures 3 and 4.

On 4/11/24, 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 5 and 6, these constituents were all less than their respective Table 915-1 limits. The groundwater elevation contours for the April 2024 sampling event indicate the flow direction is to the west. These data are shown on Figures 5 and 6.

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

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
- PDC is currently evaluating alternative methods to address the unresolved concentrations of selenium and pH in soil samples collected at the Site.

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 Phelps12-32NHZ 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. 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. 06/28/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 08/19/2023

Proposed date of completion of Remediation. 08/23/2023

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:

OPERATOR COMMENT

At the time of this submittal the previous quarter's Form 27 Supplemental Doc #403668926 is still In Process.

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: 04/26/2024

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: Laurel Anderson

Date: 05/20/2024

Remediation Project Number: 33237

COA Type**Description**

	On the next quarterly Form 27 Supplemental, Operator shall provide a revised Proposed date of Remediation Completion based on soil and groundwater analytical data obtained from ongoing site investigation and remediation activities.
1 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**

403770398	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
403771475	SITE INVESTIGATION REPORT
403797626	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 3 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)