

State of Colorado  
Energy & Carbon Management Commission

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Document Number:  
403860613  
Receive Date:  
08/15/2024

Report taken by:  
Nick Cholas

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<br>Phone: <u>(303) 860-5800</u><br>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 #: 34886 Initial Form 27 Document #: 403745811

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>123-30688</u>       | County Name: <u>WELD</u>  |
| Facility Name: <u>GEMINI G FEDERAL 06-33</u>   | Latitude: <u>40.337380</u> | Longitude: <u>-104.716300</u> |   |
| ** correct Lat/Long if needed: Latitude: _____ |                            | Longitude: _____              |   |
| QtrQtr: <u>SESE</u>                            | Sec: <u>1</u>              | Twp: <u>4N</u>                | Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u> |

|  |                            |                               |   |
|--|----------------------------|-------------------------------|---|
| Facility Type: <u>SPILL OR RELEASE</u>         | Facility ID: <u>487070</u> | API #: _____                  | County Name: <u>WELD</u>  |
| Facility Name: <u>Gemini G Federal 06-33</u>   | Latitude: <u>40.337305</u> | Longitude: <u>-104.715633</u> |   |
| ** correct Lat/Long if needed: Latitude: _____ |                            | Longitude: _____              |   |
| QtrQtr: <u>SESE</u>                            | Sec: <u>1</u>              | Twp: <u>4N</u>                | Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u> |

Facility Type: SPILL OR RELEASE Facility ID: 487071 API #: \_\_\_\_\_ County Name: WELD  
Facility Name: Gemini G Federal 06-33 Latitude: 40.337314 Longitude: -104.716021  
\*\* correct Lat/Long if needed: Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
QtrQtr: SESE Sec: 1 Twp: 4N Range: 66W Meridian: 6 Sensitive Area? Yes

**SITE CONDITIONS**

General soil type - USCS Classifications SW Most Sensitive Adjacent Land Use Cropland  
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? No

**Other Potential Receptors within 1/4 mile**

Freshwater Pond 0.23mi S  
Residential 0.1/0.2mi S, 0.22mi E  
Farm Structure 0.07/0.08/0.13mi SW, 0.08/0.09/0.12/0.15mi S, 0.19/0.2mi SE, 0.06mi E, 0.09/0.11/0.14mi NE

# 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                   |
|--------------|----------------|-----------------------------|----------------------------------|
| UNDETERMINED | GROUNDWATER    | Refer to Doc# 403745811     | Lab analysis if encountered      |
| Yes          | SOILS          | Refer to Tables and Figures | Lab analysis and field screening |

## INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Pursuant to ECMC Rule 911 a site investigation was conducted pertaining to the Gemini G Federal 06-33 wellhead cut and cap and flowline removal. Approximately 1169' of flowline was removed. The wellhead was cut and capped per ECMC rules. Additionally, soil samples were field screened at the N-E-S-W sides of the wellhead. Soil samples were taken along the flowline at any points of material change and/or hammer unions, directional changes, as well as at the bell holes on either side of a waterway. The Flowline Pre-Abandonment Notice Document number is included under Related Forms.

## 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 grab soil sample was collected at the base of the excavation or the area showing the highest degree of impact during field screening activities at the wellhead excavation. Additionally, soil samples were field screened at the N-E-S-W sides of the wellhead. Soil samples were taken along the flowline at any points of material change and/or hammer unions, directional changes, as well as at the bell holes on either side of a waterway. Soil samples were analyzed by a certified laboratory for the full extent of Table 915-1, including but not limited to: TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons) organic compounds in soil per ECMC Table 915-1, and EC, SAR, pH, metals, and boron. All samples collected were analyzed by a certified laboratory using approved ECMC laboratory analysis methods.

### Proposed Groundwater Sampling

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

If groundwater is encountered during the site investigation a grab groundwater will be collected and analyzed for all organic and inorganic compounds per ECMC Table 915-1; this sample analysis includes, but is not limited to 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 ):

Visual inspection of the wellhead and flowline areas occurred during abandonment activities. Field personnel field screened all disturbed areas using visual and olfactory senses to determine if laboratory confirmation sampling is required. A detailed summary of decommissioning activities, including field notes, site photos, figures, and laboratory analytical results, is attached to this Form 27.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

Soil

NA / ND

Number of soil samples collected 8 -- Highest concentration of TPH (mg/kg) 188  
 Number of soil samples exceeding 915-1 8 -- Highest concentration of SAR 0.803  
 Was the areal and vertical extent of soil contamination delineated? No BTEX > 915-1 No  
 Approximate areal extent (square feet) 300 Vertical Extent > 915-1 (in feet) 5

**Groundwater**

Number of groundwater samples collected 0 Highest concentration of Benzene (µg/l) \_\_\_\_\_  
 Was extent of groundwater contaminated delineated? Yes Highest concentration of Toluene (µg/l) \_\_\_\_\_  
 Depth to groundwater (below ground surface, in feet) \_\_\_\_\_ Highest concentration of Ethylbenzene (µg/l) \_\_\_\_\_  
 Number of groundwater monitoring wells installed \_\_\_\_\_ Highest concentration of Xylene (µg/l) \_\_\_\_\_  
 Number of groundwater samples exceeding 915-1 \_\_\_\_\_ 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?  
 Two background soil samples were collected near the wellhead and analyzed for metals in soil per ECMC Table 915-1, pH, SAR, and EC. The two background samples were collected from a depth of 4 and 5 feet below ground surface (ft bgs). Additionally, five background soil samples (BKG01) were collected from native material adjacent to the tank battery and analyzed for metals in soil per ECMC Table 915-1, pH, SAR, and EC. Arsenic, barium, cadmium, and lead and pH were observed in both background soil samples above ECMC Table 915-1 standards. A detailed discussion of the background sampling results is presented in the Remedial Action/Operator Comments sections.

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?  
 A supplemental site investigation (SSI) will be completed to vertically and horizontally delineate the barium, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, pyrene and 1-methylnaphthalene exceedances observed at sample location FL01-07@4' and the benzo(a)anthracene exceedance at FL01-08@4' observed during decommissioning. A proposed SSI map is attached to this Form 27. Based on the benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, pyrene, 1-methylnaphthalene, barium, cadmium, and lead exceedances identified during decommissioning, PDC proposes to limit future soil sampling to ECMC Table 915-1 Organic Compounds in Soil, TPH (C6-C36), barium, and lead. Concurrently with the SSI, additional background samples will be collected to determine if barium, and lead exceedances are attributed to native soil conditions at the site. The SSI will be completed in accordance with the proposed implementation schedule, and the results of the SSI will be submitted on a subsequent Form 27.

**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.  
 Refer to the Remediation Summary section below.

**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.  
 A supplemental site investigation (SSI) will be completed to vertically and horizontally delineate the barium, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, pyrene and 1-methylnaphthalene exceedances observed at sample location FL01-07@4' and the benzo(a)anthracene exceedance at FL01-08@4' observed during decommissioning, in accordance with the attached proposed site investigation map, and proposed sampling plan outlined in the Site Investigation Report and/or Operator Comments sections of this Form 27.

**Soil Remediation Summary**

In Situ

- \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )
- \_\_\_\_\_ Chemical oxidation
- \_\_\_\_\_ Air sparge / Soil vapor extraction
- \_\_\_\_\_ Natural Attenuation
- \_\_\_\_\_ Other \_\_\_\_\_

Ex Situ

- \_\_\_\_\_ Excavate and offsite disposal
- \_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_
- \_\_\_\_\_ Name of Licensed Disposal Facility or ECMC Facility ID # \_\_\_\_\_
- \_\_\_\_\_ Excavate and onsite remediation
- \_\_\_\_\_ 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.

# 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 Decommissioning Sample Summary & Supplemental Site Investigation Proposal

## 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.

- Further soil investigation/delineation is required

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? No

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards

E&P waste (solid) description

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility:

Volume of E&P Waste (liquid) in barrels

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.

Reclamation will be in accordance with ECMC 1000 Series Rules.

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. 05/13/2024

Proposed date of completion of Reclamation. 08/15/2025

## 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. 02/07/2024

Actual Spill or Release date, or date of discovery. 06/13/2024

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/13/2024

Proposed site investigation commencement. 08/15/2024

Proposed completion of site investigation. 02/15/2025

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 02/15/2025

Proposed date of completion of Remediation. 02/15/2026

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:

The implementation schedule has been changed due to the decommissioning of the Gemini G Federal 06-33 wellhead and flowline and necessity for supplemental site investigation activities adjacent to the wellhead and flowline. The proposed site investigation will be completed following the approval of this form, landowner negotiations, and crew availability.

## OPERATOR COMMENT

This Form 27 is being submitted to include the decommissioning results and historic reportable release discovered at the former Gemini G Federal 06-33 Wellhead and Flowline location. A proposal to delineate the barium, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, pyrene and 1-methylnaphthalene exceedances observed at sample location FL01-07@4' and the benzo(a)anthracene exceedance at FL01-08@4' observed during decommissioning is presented in the Site Investigation Report section of this Form 27.

Two background soil samples (BKG01) were collected from adjacent to the wellhead location and the lithology between the site and background locations were observed to be well graded sands. The maximum background concentration of arsenic was 4.14 mg/kg, and 1.25 times the maximum background concentration was calculated to be 5.18 mg/kg. All site arsenic concentrations were below this concentration. Furthermore, the mean background soil sample concentration x1.25 was calculated to be 4.30 mg/kg. Since the maximum and mean background concentration for arsenic was observed to be greater than the site concentrations, PDC requests arsenic to not be considered a contaminant of concern. Additionally, the maximum and mean background concentrations of pH was calculated to be 9.08 and 8.88; respectively. Since the maximum and mean background concentration for pH was observed to be greater than the site concentrations, PDC requests pH to not be considered a contaminant of concern. The reporting limit x1.25 for selenium is greater than the observed concentration on-site, therefore PDC requests that selenium not be considered a contaminant of concern. Additionally, five background soil samples (BKG01) were collected from native material adjacent to the nearby Gemini K 1-9, 10 Tank Battery and the lithology between the site and background locations were observed to be well graded sands. The maximum background concentration at the nearby tank battery indicated that cadmium was 0.382 mg/kg, and 1.25 times the maximum background concentration was calculated to be 0.478 mg/kg. All site arsenic concentrations were below this concentration. Since the maximum background concentration for cadmium was observed to be greater than the site concentrations, PDC requests cadmium to not be considered a contaminant of concern.

Based on the contaminants of concern identified during decommissioning, PDC proposes to limit future soil sampling to ECMC Table 915-1 Organic Compounds in Soil, TPH (C6-C36), barium, and lead. Concurrent with delineation activities, additional background samples will be collected to determine if barium, cadmium, and lead exceedances observed at this location are indicative of native material conditions.

Quarterly reporting will be conducted until closure criteria are achieved for the remediation project. The results of the supplemental site investigation will be submitted on a subsequent Form 27.

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: 08/15/2024

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: Nick Cholas

Date: 11/26/2024

Remediation Project Number: 34886

## COA Type

## Description

|        |   |
|--------|---|
|        | Operator will continue quarterly reporting until the site investigation is complete and Table 915-1 standards are met within the remediation area.                              |
|        | ECMC does not approve a reduced analyte suite at this time. Operator shall submit sufficient background soil sample analytical before ECMC can approve a reduced analyte suite. |
| 2 COAs |   |

## 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

|           |                                |
|-----------|--------------------------------|
| 403860613 | FORM 27-SUPPLEMENTAL-SUBMITTED |
| 403891237 | SOIL SAMPLE LOCATION MAP       |
| 403891240 | SITE INVESTIGATION PLAN        |
| 403891243 | SOIL SAMPLE LOCATION MAP       |
| 403891245 | PHOTO DOCUMENTATION            |
| 403891247 | ANALYTICAL RESULTS             |
| 403891248 | SOIL SAMPLE LOCATION MAP       |

Total Attach: 7 Files

## General Comments

**User Group**

**Comment**

**Comment Date**

| <b><u>User Group</u></b> | <b><u>Comment</u></b> | <b><u>Comment Date</u></b> |
|--------------------------|-----------------------|----------------------------|
|                          |                       | Stamp Upon Approval        |

Total: 0 comment(s)