

State of Colorado  
Energy & Carbon Management Commission

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Document Number:  
403407946  
Receive Date:  
05/26/2023  
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 COGCC 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: (303) 860-5800 Mobile: ( )
Address: 1099 18TH STREET SUITE 1500		
City: DENVER	State: CO	Zip: 80202
Contact Person: Karen Olson	Email: taspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 15233 Initial Form 27 Document #: 402301827

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: LOCATION	Facility ID: 311414	API #: _____	County Name: WELD
Facility Name: SHIVERS-62N66W 29NENE	Latitude: 40.115108	Longitude: -104.793480	
** correct Lat/Long if needed: Latitude: 40.112399		Longitude: -104.797044	
QtrQtr: NENE	Sec: 29	Twp: 2N	Range: 66W Meridian: 6 Sensitive Area? Yes
Facility Type: SPILL OR RELEASE	Facility ID: 471003	API #: _____	County Name: WELD
Facility Name: Shivers 1 & 14-29	Latitude: 40.112399	Longitude: -104.797044	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NENE	Sec: 29	Twp: 2N	Range: 66W Meridian: 6 Sensitive Area? Yes

## SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Cropland

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**

A riverine is located 60 feet north, a pond is located 420 feet southeast, and freshwater wetlands are located 520 feet northeast. Livestock is located 405 feet northeast and a residence is located 1,160 feet northeast. An irrigation well is located 940 feet northwest.

**DENIED**

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> E&P Waste | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input type="checkbox"/> Produced Water       | <input type="checkbox"/> Workover Fluids             |  |
| <input checked="" type="checkbox"/> Oil       | <input type="checkbox"/> Tank Bottoms                |  |
| <input type="checkbox"/> Condensate           | <input type="checkbox"/> Pigging Waste               |  |
| <input type="checkbox"/> Drilling Fluids      | <input type="checkbox"/> Rig Wash                    |  |
| <input type="checkbox"/> Drill Cuttings       | <input type="checkbox"/> Spent Filters               |  |
|   | <input type="checkbox"/> Pit Bottoms                 |  |
|   | <input type="checkbox"/> Other (as described by EPA) |  |

## DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Figure 1 and Table 1	Site investigation

## INITIAL ACTION SUMMARY

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

Historic hydrocarbon impacts were discovered below former tank battery infrastructure following a post-reclamation site investigation.

## PROPOSED SAMPLING PLAN

### Proposed Soil Sampling

Will soil samples be collected as part of this investigation? ( Number, type (grab/composite), analyses, and locations of samples ):

On January 17 and March 3, 2020, 15 soil borings (FSB01 – FSB15) were advanced to depths ranging between 7.5 feet and 11 feet below ground surface (bgs) using a hand auger. Soil encountered in the soil borings was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Soil samples were collected from the vertical intervals which exhibited elevated field-measured VOC concentrations. Twenty-four soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by Environmental Protection Agency (EPA) Method 8260B, TPH– diesel range organics (DRO) by EPA Method 8015. Analytical results indicated that TPH concentrations were in exceedance of COGCC Table 910-1 standards in six soil boring locations.

### Proposed Groundwater Sampling

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

Groundwater was encountered during the investigations at approximately 8 feet bgs. A groundwater sample will be collected from the excavation following the completion of source mass removal activities.

### 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 ):

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

<b>Soil</b>	<b>NA / ND</b>
Number of soil samples collected      24	--      Highest concentration of TPH (mg/kg)      3190
Number of soil samples exceeding 915-1      9	NA      Highest concentration of SAR      _____

Was the areal and vertical extent of soil contamination delineated? No

BTEX > 915-1 No

Approximate areal extent (square feet) 4877

Vertical Extent > 915-1 (in feet) 7

**Groundwater**

Number of groundwater samples collected 7

ND Highest concentration of Benzene (µg/l) \_\_\_\_\_

Was extent of groundwater contaminated delineated? Yes

ND Highest concentration of Toluene (µg/l) \_\_\_\_\_

Depth to groundwater (below ground surface, in feet) 8

ND Highest concentration of Ethylbenzene (µg/l) \_\_\_\_\_

Number of groundwater monitoring wells installed 7

ND Highest concentration of Xylene (µg/l) \_\_\_\_\_

Number of groundwater samples exceeding 915-1 0

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?

\_\_\_\_\_

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?

Between March 20, and March 22, 2023, thirteen soil borings (SB01 - SB13) and three temporary monitoring wells (BH02, BH05, BH06) were advanced via direct push drilling to assess sub-surface conditions and delineate hydrocarbon soil impacts on site. Lithologic descriptions and volatile organic compound (VOC) concentrations were measured using a photoionization detector (PID) and recorded for each soil boring and monitoring well. Thirty-two (32) soil samples were collected from intervals exhibiting the highest VOC concentrations and from the terminus of each soil boring and monitoring well. All soil samples were submitted to Summit Scientific Laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, and total petroleum hydrocarbons (TPH)[C6-C36].  
  
Soil analytical results indicated that organic compound concentrations were in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater SSLs in eight soil sample locations (BH06 @ 11', SB01 @ 9', SB02 @ 8', SB04 @ 9', SB05 @ 10', SB09 @ 6', SB10 @ 10', and SB12 @ 5'). Organic compound concentrations were in compliance with the applicable regulatory standards in the remaining 24 sample locations. Soil sample locations are illustrated on Figure 1. Soil analytical results are summarized in Table 1. GPS coordinates and field observed VOC concentrations are summarized in Table 2. The laboratory analytical reports are included in Attachment A. The soil boring and well completion logs are included as Attachment B.

**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.

No source mass was removed during previous supplemental site investigation activities.

**REMEDICATION 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 the soil analytical results received for samples collected during March 2023 supplemental site investigation activities, hydrocarbon impacted material remains in-situ on location. A remediation strategy will be implemented following land owner negotiations.  
  
Monitored natural attenuation (MNA) was the selected remediation strategy for groundwater at this location between the first quarter 2020 and the first quarter 2023.

**Soil Remediation Summary**

In Situ

Ex Situ

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

- \_\_\_\_\_ Excavate and offsite disposal
- \_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_
- \_\_\_\_\_ Name of Licensed Disposal Facility or COGCC 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
- 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 March 31, 2020, quarterly groundwater monitoring was initiated at the seven site temporary monitoring wells (BH01 - BH07). Due to the location of the former tank battery and active farming activities, the temporary monitoring wells were installed via hand auger on a quarterly basis and subsequently abandoned following sampling activities. A GPS point was collected from each temporary monitoring well location to ensure the groundwater sample locations remain consistent between quarters. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B in accordance with Table 915-1. Per the approved Supplemental Form 27s (Document Nos. 402858935 and 403185313), TDS and chloride and sulfate anions were removed from the quarterly sampling and analysis plan.

During the first quarter 2023, four consecutive quarters of organic compound concentrations in compliance with the applicable COGCC Table 915-1 regulatory standards were achieved.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

### Approved Reporting Schedule:

Quarterly    Semi-Annually    Annually    Other   Supplemental Site Investigation Summary

### 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   Supplemental Site Investigation Summary

## 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.

Financial assurance information was included on the second quarter 2022 Supplemental Form 27 (Document No. 403126835). This section and estimate will be updated on an annual basis until closure criteria are met.

Operator anticipates the remaining cost for this project to be: \$ 10000

## 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 \_\_\_\_\_

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

Non-COGCC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_

E&P waste (liquid) description \_\_\_\_\_

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

Non-COGCC 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 COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

## RECLAMATION PLAN

### RECLAMATION PLANNING

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

Following the completion of facility decommissioning activities, this location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 Series.

Is the described reclamation complete? Yes \_\_\_\_\_

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim  Final

Did the Surface Owner provide the seed mix? \_\_\_\_\_

If YES, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

Did the local soil conservation district provide the seed mix? \_\_\_\_\_

### SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 08/09/2018

Proposed date of completion of Reclamation. 01/17/2025

## 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. 01/24/2020

Actual Spill or Release date, or date of discovery. 01/24/2020

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/17/2020

Proposed site investigation commencement. 03/20/2023

Proposed completion of site investigation. 03/22/2023

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 01/17/2020

Proposed date of completion of Remediation. 01/17/2025

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:

A limited sub-surface supplemental site investigation was conducted between March 20, and March 22, 2023 to assess hydrocarbon impacted material on location. Based on the analytical results, a remediation strategy will be developed to address the hydrocarbon impacts following landowner negotiations.

## OPERATOR COMMENT

This Supplemental Form 27 was submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the first quarter 2023 at the former Shivers 1 & 41-29 tank battery location.

Soil analytical results received for samples collected during March 2023 supplemental site investigation activities indicated that organic compound concentrations were in exceedance of the applicable COGCC Table 915-1 Protection of Groundwater SSLs in eight soil sample locations (BH06 @ 11', SB01 @ 9', SB02 @ 8', SB04 @ 9', SB05 @ 10', SB09 @ 6', SB10 @ 10', and SB12 @ 5'). Organic compound concentrations were in compliance with the applicable regulatory standards in the remaining 24 sample locations.

During the first quarter 2023, four consecutive quarters of organic compound concentrations in compliance with the applicable COGCC Table 915-1 regulatory standards were achieved. Based on these results, PDC is requesting to remove groundwater monitoring from this remediation project.

In addition, a remediation strategy will be developed to address the hydrocarbon impacts encountered during March 2023 supplemental site investigation activities. The remediation strategy will be included in a subsequent Supplemental Form 27 following landowner negotiations.

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

Signed: Karen Olson \_\_\_\_\_

Title: Senior Program Manager \_\_\_\_\_

Submit Date: 05/26/2023 \_\_\_\_\_

Email: [taspillremediationcontractor@pdce.com](mailto:taspillremediationcontractor@pdce.com) \_\_\_\_\_

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 15233 \_\_\_\_\_

### COA Type

### Description

COA Type	Description
0 COA	

## Attachment Check 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

403407946	FORM 27 DENIED
403407996	GROUND WATER ELEVATION MAP
403407997	GROUND WATER SAMPLE LOCATION
403408004	GROUND WATER SAMPLE LOCATION
403414489	ANALYTICAL RESULTS
403478917	FORM 27-SUPPLEMENTAL-SUBMITTED
403478918	DENIED FORM 27 DENIED

Total Attach: 7 Files

## General Comments

### User Group

### Comment

### Comment Date

Environmental	This Form 27 cannot be approved based on the information submitted. Therefore Document ID #403407946 has been denied. The Operator is directed to submit a replacement form.	07/27/2023
Environmental	Operator lists the release date of discovery as 01/24/2020; however, no source removal or remediation has taken place to date. ECMC does not approve this workplan as monitored natural attenuation in soil is not an acceptable remediation strategy.  Operator shall propose a remediation plan with timeline within 45 days of approval of this form 27.	07/27/2023
Environmental	ECMC does not approve of Operator's request to remove groundwater monitoring from this remediation project.	07/27/2023

Environmental	Operator shall provide documentation of their negotiations with the landowner on the subsequent Supplemental Form 27.	07/27/2023
Environmental	Operator shall analyze soil samples for complete Table 915-1 Contaminants of Concern until Operator has submitted sufficient characterization data to request and receive Director Approval of reduced list of contaminants of concern.	07/27/2023
Environmental	Location is adjacent to a jurisdictional Wetlands as mapped on the National Wetland Inventory Maps. In the event that operations encroach upon the wetlands, Operator shall consult with the US Army Corps of Engineers regarding compliance with Sections 401 and 404 of the Clean Water Act. Operator shall submit all communications/permits obtained to the ECMC via Form 4 Sundry. Note: Approval of this Form 27 does not supersede any Federal, State or Local regulations.	07/27/2023

Total: 6 comment(s)

