

State of Colorado  
Oil and Gas Conservation Commission

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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 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: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	<b>Phone Numbers</b>
Address: <u>1775 SHERMAN STREET - STE 3000</u>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80203</u>
Contact Person: <u>Karen Olson</u>	Email: <u>COGCCSpillRemediation@pdce.com</u>	
		Phone: <u>(303) 860-5800</u>
		Mobile: <u>( )</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 18148 Initial Form 27 Document #: 402683219

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: <u>LOCATION</u>	Facility ID: <u>472456</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Village 31, 32, 41, 42-</u>	Latitude: <u>40.399472</u>	Longitude: <u>-104.889207</u>	
	** correct Lat/Long if needed: Latitude: <u>40.399546</u>	Longitude: <u>-104.888888</u>	
QtrQtr: <u>NESE</u>	Sec: <u>16</u>	Twp: <u>5N</u>	Range: <u>67W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Agriculture  
 Is domestic water well within 1/4 mile? No Is surface water within 1/4 mile? No  
 Is groundwater less than 20 feet below ground surface? No

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

None Observed

**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
- Other (as described by EPA)

**DESCRIPTION OF IMPACT**

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Tables 1-4 and Figures 1-2	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 July 14, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the L-H 1, Edwards 33,43-16U Tank Battery (Figure 1). Based on initial results, it was determined that a historic release was discovered below the former produced water vessel. Following the discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. Approximately 578 cubic yards (CY) of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC manifests.

**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 ):

Between November 5, and November 15, 2021, approximately 2,941 cubic yards of hydrocarbon impacted material were removed from site and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Forty-six soil samples (SS04 - SS49) were collected from the base and sidewalls of the final excavation extent at depths ranging from 8 feet to 35 feet below ground surface (bgs). Samples were submitted for laboratory analysis of the COGCC approved contaminants of concern (COCs). Additionally, one sample (SS50) was collected at approximately 2.5 feet bgs and submitted for analysis of pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron.

**Proposed Groundwater Sampling**

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

**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 ):

During initial closure activities conducted on July 14, 2021, soil encountered on-site and below production equipment was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Per the approved proposed soil sampling plan, samples were collected below and/or adjacent to the above ground storage tank (AST), and the separator flowline and dumpline (SEP-FL & SEP-DL). Samples were submitted for analysis of BTEX, N, 1,2,4-TMB, 1,3,5-TMB and TPH. Analytical results indicated that constituents were in compliance with the applicable COGCC Table 915-1 standards in all laboratory sample locations. Additionally, field screened soil samples were collected adjacent to/below the flare, third party meter house, and on sidewalls of the initial PWV excavation extent sidewalls between ground surface and six feet bgs. Sample locations collected during the initial decommissioning activities are illustrated on Figure 1.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 47

Number of soil samples exceeding 915-1 0

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 5026

### NA / ND

ND Highest concentration of TPH (mg/kg) \_\_\_\_\_

-- Highest concentration of SAR 0.275

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 35

### Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) \_\_\_\_\_

Number of groundwater monitoring wells installed \_\_\_\_\_

Number of groundwater samples exceeding 915-1 \_\_\_\_\_

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

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

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

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

\_\_\_\_\_ 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 July 14, 2021, one background soil sample (BKG01) was collected at approximately 2.5 feet bgs from the native material topographically up-gradient of the tank battery and submitted for analysis of the COGCC Table 915-1 metals. Analytical results indicated that arsenic, barium, and selenium were in exceedance of the applicable regulatory standards in native soil. The location of the background sample is detailed on Figure 1.

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

Volume of solid waste (cubic yards) 3519

Volume of liquid waste (barrels) 0

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.

Following the discovery of a historic hydrocarbon release, mitigation efforts were initiated and approximately 578 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility for disposal under PDC manifests. Based on the depth of impacts, source mass removal activities were suspended and an Engineered Excavation Work Plan was drafted. Following the approval of the Engineered Excavation Work Plan, source mass removal activities were re-initiated and between November 5, and November 15, 2021, approximately 2,941 cubic yards of impacted material were removed from the excavation and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests.

### 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.

Between November 5, and November 15, 2021, forty-seven confirmation soil samples were collected from the base and sidewalls of the final excavation extent and submitted for laboratory analysis of the COGCC approved COC analyte suite (Doc # 402756144). Analytical results received during source mass removal activities indicated that all constituent concentrations were in compliance with the applicable COGCC Table 915-1 regulatory standards in all soil samples collected from the final excavation extent. The final excavation extent and sample locations are illustrated on are illustrated on Figures 2. Soil analytical results and field screened VOC readings are summarized in Tables 1 through 5. The laboratory reports are included in Attachment A. The field notes and photo documentation are included as Attachment B.

**Soil Remediation Summary**

In Situ

Ex Situ

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

- Yes \_\_\_\_\_ Excavate and offsite disposal
- \_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 3519
- \_\_\_\_\_ 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
- \_\_\_\_\_ 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.

Groundwater was not encountered during source mass removal activities.

# 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   

## 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:

Volume of E&P Waste (solid) in cubic yards    3519

E&P waste (solid) description    Hydrocarbon impacted soils

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

Non-COGCC Disposal Facility:    North Weld Waste Management

Volume of E&P Waste (liquid) in barrels    0

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?    Yes

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?    No

Does Groundwater meet Table 915-1 standards?    Yes

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 decommissioning and excavation activities, the 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. 07/15/2021

Proposed date of completion of Reclamation. 11/18/2022

## 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. 01/18/2021

Actual Spill or Release date, or date of discovery. 07/14/2021

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/31/2021

Proposed site investigation commencement. 07/14/2021

Proposed completion of site investigation. 03/31/2022

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 11/01/2021

Proposed date of completion of Remediation. 11/18/2021

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**

Based on the analytical results collected from the final excavation extent, PDC is requesting a no further action (NFA) designation for the L-H #1, Edwards 16U tank battery location.

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: 02/03/2022

Email: COGCCSpillRemediation@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: Candice (Nikki) Graber

Date: 02/16/2022

Remediation Project Number: 18148

**Condition of Approval****COA Type****Description**

	<p>Based on the information presented, it appears that no further action is necessary at this time and the COGCC approves the closure request. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards or if groundwater is found to be impacted, then further investigation and/or remediation activities may be required.</p> <p>The surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.</p>
1 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**

402931981	FORM 27-SUPPLEMENTAL-SUBMITTED
402932253	REMEDIAL ACTION PLAN
402932263	PHOTO DOCUMENTATION
402932271	SOIL SAMPLE LOCATION MAP
402945119	ANALYTICAL RESULTS
402945122	SOIL SAMPLE LOCATION MAP

Total Attach: 6 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)