

State of Colorado  
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
Phone: (303) 894-2100 Fax: (303) 894-2109



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RICK ALLISON

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. Refer to Rules 340, 905, 906, 907, 908, 909, and 910

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 #: 10763 Initial Form 27 Document #: 401440234

**PURPOSE INFORMATION**

<input type="checkbox"/> 901.e. Sensitive Area Determination	<input type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
<input checked="" type="checkbox"/> 909.c.(1), Rule 905: Pit or PW vessel closure	<input type="checkbox"/> Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
<input checked="" type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation	<input type="checkbox"/> Rule 909.e.(2)B.: Closure of remediation project
<input type="checkbox"/> 909.c.(3), Rule 907.e.: Land treatment of oily waste	<input type="checkbox"/> Rule 906.c.: Director request
<input type="checkbox"/> 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure	<input type="checkbox"/> Other _____

**SITE INFORMATION**      N Multiple Facilities ( in accordance with Rule 909.c. )

Facility Type: <u>LOCATION</u>	Facility ID: <u>331521</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>FOE-66N64W 20NWSE</u>	Latitude: <u>40.469140</u>	Longitude: <u>-104.571440</u>	
	** correct Lat/Long if needed: Latitude: <u>40.468490</u>	Longitude: <u>-104.564910</u>	
QtrQtr: <u>NWSE</u>	Sec: <u>20</u>	Twp: <u>6N</u>	Range: <u>64W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

**SITE CONDITIONS**

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Residential

Is domestic water well within 1/4 mile? Yes Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? Yes

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

FWS Wetlands are located approximately 718 feet south of the location. Occupied buildings are located approximately 115 feet south the location. There are no CPW Sensitive Wildlife Habitats identified within a 1/4-mile radius.

# 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 checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             | _____                                  |
| <input 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 2.	Excavation and sampling activities.

## 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 October 13, 2016, approximately 14 barrels of produced water were released within secondary containment at the Foe 33-20 tank battery. Upon discovery, the produced water dump line was shut in and spill response measures were completed. An Initial Form 19 was submitted to the COGCC on November 4, 2017, (Doc# 401142968) and was issued Spill/Release Point ID 448350.

## 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 November 14, 2016 and February 2, 2017, site investigation activities were conducted to determine the extent of potential hydrocarbon impacts related to the release. Six soil borings (SB01 – SB06) were advanced to approximately 6 feet below ground surface (bgs). Grab soil samples were collected from the borings in 1-foot intervals and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Soil samples were collected from the terminus of each soil boring at approximately 6 feet bgs. Samples were submitted to Summit Scientific Laboratories in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260B, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that constituent concentrations were below COGCC Table 910-1 standards in all six soil samples.

### 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 ):

A summary of sub-surface investigation activities and analytical results was provided in a Form 27 submitted to the COGCC on February 28, 2017, under Remediation #10072. Soil boring locations are illustrated in Figure 2 and soil analytical results are summarized in Table 1. The laboratory reports are included in Attachment A.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 6  
Number of soil samples exceeding 910-1 0  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 2668

### NA / ND

ND Highest concentration of TPH (mg/kg) \_\_\_\_\_  
NA Highest concentration of SAR \_\_\_\_\_  
BTEX > 910-1 No  
Vertical Extent > 910-1 (in feet) 6

### Groundwater

Number of groundwater samples collected 1  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 0'  
Number of groundwater monitoring wells installed 0  
Number of groundwater samples exceeding 910-1 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 910-1  
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?

The COGCC issued a condition of approval (COA) requiring that upon the completion of vessel repair activities, additional confirmation sampling below the vessel must be completed.

# 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.

Between August 30 and September 7, 2017, approximately 1,360 cubic yards of impacted material were removed and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Nine (9) soil samples (SS01 - SS09) were collected from the sidewalls of the final extent of the excavation at depths ranging between 12.5 and 13 feet below ground surface (bgs). Samples were submitted to Summit Scientific Laboratories (Summit) in Golden, Colorado for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260B, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that TPH concentrations were in exceedance of applicable COGCC Table 910-1 standards in soil sample SS07. The remaining soil samples exhibited constituent concentrations below applicable regulatory standards. Groundwater was encountered within the excavation at approximately 14.5 feet bgs. Following the completion of excavation activities, approximately 134 barrels of groundwater removed via vacuum trucks and transported to a licensed disposal facility. On September 22, 2017, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX by USEPA Method 8260B. Analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 groundwater standards. The final excavation extent and sample locations are illustrated on Figure 3. Soil and groundwater analytical data is summarized in Table 1 and Table 2, respectively.

## 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 analytical results, petroleum hydrocarbon impacted material remains within the unsaturated interval along the southern extent of the former 2017 excavation area. Impacted material could not be removed during excavation activities due to third-party buried infrastructure. Remaining hydrocarbon impacted material will be excavated and transported to a licensed disposal facility following the removal of the third-party production lines. Confirmation soil samples will be collected from the sidewalls of the final excavation extent and submitted to Summit Scientific for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260B, and TPH - diesel range organics (DRO) by USEPA Method 8015.

## Soil Remediation Summary

In Situ

Ex Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

Yes \_\_\_\_\_ Excavate and offsite disposal

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 1360

\_\_\_\_\_ Air sparge / Soil vapor extraction

\_\_\_\_\_ Name of Licensed Disposal Facility or COGCC 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

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.

Groundwater monitoring will continue on a semi-annual basis at the one site monitoring well (BH01). Groundwater samples will be 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. In addition, site-specific inorganic parameters, including total dissolved solids (TDS), chloride, and sulfate, will be evaluated at the source, up-and down-gradient monitoring wells during the second quarter 2021. Contingent on analytical results, inorganic parameter analysis will be discontinued after one sampling event.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other \_\_\_\_\_  
Report Type:  Groundwater Monitoring  Land Treatment Progress Report  O&M Report  
 Other Groundwater Monitoring Plan Update \_\_\_\_\_

## 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

Do all soils meet Table 910-1 standards? \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? \_\_\_\_\_

Are the only residual soil impacts pH, SAR, or EC at depths greater than 3 feet below ground surface? \_\_\_\_\_

Does Groundwater meet Table 910-1 standards? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

## 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 excavation was backfilled and re-contoured to match pre-existing conditions. The produced water vessel and associated production infrastructure were decommissioned following excavation 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 approve the seed mix? \_\_\_\_\_

If NO, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

## IMPLEMENTATION SCHEDULE

### PRIOR DATES

Date of Surface Owner notification/consultation, if required. 11/04/2016

Actual Spill or Release date, if known. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 10/13/2016

Date of commencement of Site Investigation. 11/14/2016

Date of completion of Site Investigation. \_\_\_\_\_

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 08/30/2017

Date of completion of Remediation. \_\_\_\_\_

### SITE RECLAMATION DATES

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

### OPERATOR COMMENT

Refer to the updated groundwater monitoring plan, in accordance with Table 915-1.

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: 02/26/2021

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: RICK ALLISON

Date: 03/08/2021

Remediation Project Number: 10763

### COA Type

### Description

<u>COA Type</u>	<u>Description</u>

### 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

402611712	FORM 27-SUPPLEMENTAL-SUBMITTED
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Total Attach: 1 Files

### General Comments

#### User Group

#### Comment

#### Comment Date

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)