

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:  
CHRIS CANFIELD

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 INFORMATON

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>		Phone: <u>(303) 860-5800</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80203</u>		Mobile: <u>( )</u>
Contact Person: <u>Karen Olson</u>	Email: <u>COGCCSpillRemediation@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**  
Remediation Project #: 11639 Initial Form 27 Document #: 401643628

**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 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 Facilites ( in accordance with Rule 909.c. )

Facility Type: <u>LOCATION</u>	Facility ID: <u>317642</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>WALSH-62N68W 24NWSW</u>	Latitude: <u>40.120527</u>	Longitude: <u>-104.956445</u>	
	** correct Lat/Long if needed: Latitude: <u>40.120710</u>	Longitude: <u>-104.955600</u>	
QtrQtr: <u>NWSW</u>	Sec: <u>24</u>	Twp: <u>2N</u>	Range: <u>68W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

**SITE CONDITIONS**

General soil type - USCS Classifications SC 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? No

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

Residences are located within 75 feet of the tank battery. Groundwater is estimated at 30 feet below ground surface (bgs) based on Colorado Division of Water Resources (DWR) data for nearby permitted wells.

# 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 and Table 1	Site investigation and 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 April 27, 2018, historic petroleum hydrocarbon impacts were discovered during the plug and abandonment of the Walsh 1 tank battery. A topographic map is included as Figure 1. Initial excavation activities were conducted on April 27, 2018. Approximately 220 cubic yards of impacted material were excavated and transported off-site for disposal.

## 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 April 27, 2018, one soil sample (SS01) was collected at 9 feet below ground surface (bgs) from a test pit located west of the tank battery. The sample was submitted to Summit Scientific Laboratories (Summit) 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 constituent concentrations were below COGCC Table 910-1 standards. The sample location is illustrated on Figure 1 and soil analytical data is summarized in Table 1.

### 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 ):

One water well is permitted by the Colorado Division of Water Resources (DWR) on the property south of the former tank battery. The well is permitted for stock use under Permit # 7071. On June 28, 2018, a water sample (ResWell) was collected from the well to confirm water quality. The sample was collected from the existing pump hose and submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX) by USEPA Method 8260B. Analytical results indicated BTEX concentrations were below COGCC Table 910-1 standards (Table 2).

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 55  
Number of soil samples exceeding 910-1 18  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 11970  
0

### NA / ND

--          Highest concentration of TPH (mg/kg) 6380  
NA          Highest concentration of SAR           
         BTEX > 910-1 Yes  
         Vertical Extent > 910-1 (in feet) 17

### 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 910-1         

         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  
         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?

Site investigation activities were conducted between May 7 and July 19, 2018, using mechanical excavation and hollow stem auger drilling methods. Results of the investigation indicated that petroleum hydrocarbon impacts in exceedance of COGCC standards were detected in areas outside of the former PDC tank battery. Test pit and soil boring locations are illustrated on Figure 1. Soil analytical data is summarized in Table 1.

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) 220      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.

On April 27, 2018, approximately 220 cubic yards of impacted material were removed during initial excavation activities and transported to the Front Range Regional Landfill for disposal under PDC waste manifests. Between January 3 and June 27, 2019, approximately 32,578 cubic yards of impacted material were excavated and chemically treated on-site using hydrogen peroxide.

## 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 January 3 and June 27, 2019, excavation and ex-situ chemical oxidation activities were conducted to address remaining petroleum hydrocarbon soil impacts on Site. Approximately 32,578 CY of impacted material were excavated between 1.5 feet and 18 feet below ground surface (bgs) and chemically treated using hydrogen peroxide. A total of 237 soil samples (S01 – S237) were collected from the sidewalls and base of the excavation extent at depth ranging between 9 feet and 18 feet bgs. During the chemical treatment process, 4-point confirmation soil samples were collected from every 100 CY of soil treated to confirm hydrocarbon concentrations were reduced below COGCC Table 910-1 standards and material could be used for backfilling. Groundwater was not encountered in the excavation area during remediation activities. Reference the attached Summary of Remediation and Sampling Activities report for additional information.

## Soil Remediation Summary

In Situ

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

Ex Situ

Yes Excavate and offsite disposal  
\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 220  
\_\_\_\_\_ Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_  
Yes Excavate and onsite remediation  
\_\_\_\_\_ No Land Treatment  
\_\_\_\_\_ No Bioremediation (or enhanced bioremediation)  
Yes Chemical oxidation  
\_\_\_\_\_ No 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.

A limited groundwater assessment will be conducted within the former excavation and treatment area to confirm shallow groundwater is not present. Three temporary monitoring wells will be installed using hollow stem auger drilling methods to a depth of 20 feet bgs. Lithological descriptions and volatile organic compound (VOC) concentrations measured using a photoionization detector (PID) will be recorded in each well. If shallow groundwater is observed, temporary wells will be developed using a surge block to remove sediment emplaced during installation. Groundwater samples will be collected following aquifer recharge and submitted for laboratory analysis of BTEX by EPA Method 8260B. Groundwater elevations and flow direction will be calculated based on the surveyed top of casing elevation collected during groundwater sampling. In addition, two area water wells (#7071 and #65291) permitted through the Colorado Division of Water Resources (DWR) will be sampled in accordance with the COGCC Rule 609 Sampling Analysis Plan (SAP) Version 1, dated May 1, 2013. Reference the attached Summary of Remediation and Sampling Activities report for additional information.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

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

### 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:

Approximately 220 cubic yards of impacted material were removed in April 2018 and transported to the Front Range Regional Landfill for disposal under PDC waste manifests. Between January 3 and June 27, 2019, approximately 32,578 cubic yards of impacted material were excavated and chemically treated on-site using hydrogen peroxide. The material was backfilled following treatment and confirmation sampling.

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_ 32798  
E&P waste (solid) description E&P non-hazardous waste \_\_\_\_\_  
COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_  
Non-COGCC Disposal Facility: Front Range Regional Landfill \_\_\_\_\_  
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? 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 tank battery was decommissioned and will not be reconstructed. Final reclamation on-going and will be completed in accordance with the COGCC 1000 Series and Town of Frederick requirements.

Is the described reclamation complete? No \_\_\_\_\_  
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. 04/27/2018

Actual Spill or Release date, if known. 04/27/2018

## SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/27/2018

Date of commencement of Site Investigation. 04/27/2018

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

## REMEDIAL ACTION DATES

Date of commencement of Remediation. 04/27/2018

Date of completion of Remediation. 06/27/2019

## SITE RECLAMATION DATES

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

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

## OPERATOR COMMENT

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

Signed: Karen Olson

Title: Snr. Program Manager

Submit Date: 07/26/2019

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: CHRIS CANFIELD

Date: 08/08/2019

Remediation Project Number: 11639

## 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

402116383	FORM 27-SUPPLEMENTAL-SUBMITTED
402121856	REMEDATION PROGRESS REPORT

Total Attach: 2 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)