

State of Colorado  
Oil and Gas Conservation Commission

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Receive Date:

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

Report taken by:

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>		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 #: 15032 Initial Form 27 Document #: 402300996

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>LOCATION</u>	Facility ID: <u>327873</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SCHWAB-64N66W 26SENW</u>	Latitude: <u>40.284720</u>	Longitude: <u>-104.746070</u>	
	** correct Lat/Long if needed: Latitude: <u>40.283306</u>	Longitude: <u>-104.744610</u>	
QtrQtr: <u>SENW</u> Sec: <u>26</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>471939</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Schwab 26-6F</u>	Latitude: <u>40.283306</u>	Longitude: <u>-104.744610</u>	
	** correct Lat/Long if needed: Latitude: <u>40.283306</u>	Longitude: <u>-104.744610</u>	
QtrQtr: <u>NWSW</u> Sec: <u>26</u> Twp: <u>4N</u> Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>			

## **SITE CONDITIONS**

General soil type - USCS Classifications SM

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? Yes

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

A freshwater emergent wetland is located 210 feet to the northeast. An irrigation well is located 180 feet to the southeast and a domestic irrigation well is located 765 feet to the northwest.

# 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	GROUNDWATER	Refer to Figure 2 and Table 3	Groundwater Sampling
Yes	SOILS	Refer to Figure 2 and Table 1	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.

Historic hydrocarbon impacts were discovered below the produced water vessel during plug and abandonment activities at the Schwab 26-6F tank battery. Approximately 510 cubic yards of impacted material were excavated and transported to the North Weld Waste Management Facility for disposal under PDC waste manifests. A topographic map is included as Figure 1.

## **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 total of 21 soil samples (S01, SS03, and SS11 – SS29) were collected from the sidewalls and base of the excavation area at depths ranging between 6 and 8 feet below ground surface (bgs). Soil samples were submitted to Summit Scientific Laboratory (Summit) for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by EPA Method 8260B, and TPH – diesel range organics (DRO) by EPA Method 8015. In addition, one soil sample (SS02) was submitted for laboratory analysis of pH by EPA Method 9045D and electrical conductivity (EC) by EPA Method 120.1. Analytical result indicated that constituent concentrations were below COGCC Table 910-1 standards in the soil samples collected from the final excavation extent. Soil analytical data is summarized in Tables 1 and 2. The excavation extent and sample locations are illustrated on Figure 2.

### **Proposed Groundwater Sampling**

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

Groundwater was encountered in the excavation area at approximately 7 feet bgs. On February 21, 2020, a groundwater sample (GW01) was collected from the excavation area prior to any vacuum recovery activities. The sample was submitted to Summit for analysis of BTEX by EPA Method 8260B, and analytical results indicated that the benzene concentration was in exceedance of the COGCC Table 910-1 standard. Therefore, groundwater vacuum recovery efforts were initiated and a total of 18 barrels were removed and transported to NGL Energy for disposal. On March 2, 2020, a second groundwater sample (GW02) was collected and submitted for laboratory analysis of BTEX. Analytical results indicated that the benzene concentration remained in exceedance of the applicable standard. Groundwater analytical data is summarized in Table 3. Sample locations are illustrated on Figure 2.

### **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 groundwater assessment will be conducted to determine the extent of remaining dissolved-phase hydrocarbon impacts on site.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 22  
Number of soil samples exceeding 915-1 1  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 2000

### NA / ND

-- Highest concentration of TPH (mg/kg) 1590  
NA Highest concentration of SAR           
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 8

### Groundwater

Number of groundwater samples collected 2  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 7  
Number of groundwater monitoring wells installed 0  
Number of groundwater samples exceeding 915-1 2

-- Highest concentration of Benzene (µg/l) 120  
-- Highest concentration of Toluene (µg/l) 170  
-- Highest concentration of Ethylbenzene (µg/l) 24  
-- Highest concentration of Xylene (µg/l) 430  
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) 510      Volume of liquid waste (barrels) 18

Is further site investigation required?

Eight monitoring wells will be installed within and surrounding the former excavation area to delineate the extent of remaining groundwater impacts on site. Proposed well locations are illustrated on Figure 3.

## 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.

Approximately 510 cubic yards of impacted material were excavated and transported to the North Weld Waste Management Facility 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.

Based on analytical results collected during the third quarter 2020 groundwater monitoring event, three monitoring wells (BH09 – BH11) were installed down-gradient of the existing monitoring well network to delineate dissolved-phase hydrocarbon impacts and establish point of compliance. Monitored natural attenuation (MNA) was selected as remediation strategy during the second quarter 2020 and will remain the selected remediation strategy through the third quarter 2021.

### 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) \_\_\_\_\_ 510  
 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.

Groundwater monitoring will continue on a quarterly basis at the 11 site monitoring wells (BH01 - BH11). Based on the analytical results collected during the second quarter 2021, groundwater samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B. Additionally BH01, BH07 and BH10 will be submitted for chlorides and sulfates by method SM 2450C, and total dissolved solids (TDS) by EPA Method 300.0 in accordance with Table 915-1. Quarterly groundwater monitoring will continue until closure criteria is achieved.

# REMEDATION 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 \_\_\_\_\_ 510

E&P waste (solid) description Hydrocarbon impacted soils

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

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_ 18

E&P waste (liquid) description Hydrocarbon impacted groundwater

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

Non-COGCC Disposal Facility: NGL Energy

# REMEDATION COMPLETION REPORT

## REMEDATION 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.

The facility was decommissioned and will not be replaced. The location will be reclaimed in accordance with COGCC 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. \_\_\_\_\_

Proposed date of completion of Reclamation. \_\_\_\_\_

## 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. 02/26/2020

Actual Spill or Release date, or date of discovery. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 02/03/2020

Proposed site investigation commencement. 02/21/2020

Proposed completion of site investigation. 04/22/2020

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 02/21/2020

Proposed date of completion of Remediation. \_\_\_\_\_

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:

\_\_\_\_\_

