

State of Colorado  
Oil and Gas Conservation Commission

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



Document Number:  
401277415  
Receive Date:  
05/11/2017

Report taken by:  
RICK ALLISON

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10179 Initial Form 27 Document #: 401277415

PURPOSE INFORMATION

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

SITE INFORMATION

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

Facility Type: LOCATION	Facility ID: 323125	API #: _____	County Name: WELD
Facility Name: Wacker 5N64W10G	Latitude: 40.415468	Longitude: -104.544237	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWNW	Sec: 10	Twp: 5N	Range: 64W 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? 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

Depth to shallow groundwater is approximately 31 feet below ground surface. An occupied building is approximately 495 feet from the site.

# 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	GROUNDWATER	See attached Figure 2 and Table 2	Drilling and Groundwater Sampling
Yes	SOILS	See attached Figure 2 and Table 1	Excavation, Drilling, 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.

Excavation activities were initiated on March 20, 2017, following the discovery of a historic release during facility decommissioning activities. Approximately 510 cubic yards of impacted material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Soil encountered in the excavation area and adjacent test pit locations was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Three soil samples (SS01, SS02, and TP02) were collected from the excavation area and northern test pit at depths ranging between 16 and 26 feet below ground surface (bgs). Soil samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260, and TPH – diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated constituent concentrations were in exceedance of COGCC Table 910-1 standards in the two soil samples (SS01 and SS02) collected from the excavation area. The excavation extent and soil sample locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and the laboratory analytical reports are included as Attachment A.

## **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 10, 2017, a site investigation was conducted to determine the lateral and vertical extent of remaining petroleum hydrocarbon impacts. Seven soil borings (SB01 – SB07) were advanced within and adjacent to the excavation area using direct push drilling methods. 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 two soil borings (SB01 and SB03) which exhibited elevated PID readings. Soil samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260, and TPH – diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated TPH concentrations were in exceedance of COGCC Table 910-1 standards in both soil sample locations.

### **Proposed Groundwater Sampling**

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

Groundwater was encountered in the first source soil boring at approximately 31 feet below ground surface (bgs). As such, the remaining soil borings were advanced to groundwater and temporary monitoring wells were installed. On April 13, 2017, groundwater samples were collected from the seven temporary well locations (BH01 – BH07) and submitted for laboratory analysis of BTEX by USEPA Method 8260. Analytical results indicated benzene concentrations were in exceedance of COGCC Table 910-1 at temporary monitoring well BH01. BTEX concentrations were below regulatory standards at the remaining well locations.

### **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

### Soil

Number of soil samples collected 5  
Number of soil samples exceeding 910-1 4  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 4200

### NA / ND

-- Highest concentration of TPH (mg/kg) 1940  
NA Highest concentration of SAR           
BTEX > 910-1 Yes  
Vertical Extent > 910-1 (in feet) 31

### Groundwater

Number of groundwater samples collected 7  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 31`  
Number of groundwater monitoring wells installed 7  
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 9.7  
-- Highest concentration of Toluene (µg/l) 1.2  
-- Highest concentration of Ethylbenzene (µg/l) 1.8  
-- Highest concentration of Xylene (µg/l) 5.6  
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?

# REMEDIAL ACTION PLAN

## SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Impacted material will be treated on-site using ex-situ chemical oxidation.

## 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.

Excavation and ex-situ chemical oxidation will be conducted to address remaining petroleum hydrocarbon impacts in soil and groundwater. Confirmation soil samples will be collected for every 100 cubic yards of soil treated with hydrogen peroxide to confirm hydrocarbon concentrations were reduced below COGCC Table 910-1 soil standards and material could be used for backfilling. Soil and groundwater samples will be collected from the final excavation extent prior to backfilling. A summary of remediation and sampling activities will be provided in a supplemental report.

## Soil Remediation Summary

In Situ

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

Ex Situ

- \_\_\_\_\_ Excavate and offsite disposal
- \_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_
- \_\_\_\_\_ 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 monitoring plan will be selected following the evaluation of post-remediation groundwater data.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other \_\_\_\_\_

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:

No beneficial use.

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_ 510

E&P waste (solid) description Petroleum hydrocarbon impacted soils

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

Non-COGCC Disposal Facility: North Weld - Waste Management 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: \_\_\_\_\_

## 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 area will be backfilled and re-graded to match pre-existing conditions. The tank battery will not be reconstructed.

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. \_\_\_\_\_

Actual Spill or Release date, if known. 03/17/2017

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/20/2017

Date of commencement of Site Investigation. 04/10/2017

Date of completion of Site Investigation. 04/13/2017

### REMEDIAL ACTION DATES

Date of commencement of Remediation. \_\_\_\_\_

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

### 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. EHS Manager

Submit Date: 05/11/2017

Email: karen.olson@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: 05/15/2017

Remediation Project Number: 10179

### COA Type

### Description

	Submit a Form 19 Supplemental Report with a Request for Closure - Work proceeding under an approved Form 27.
	Implement the proposed remediation within 90 days of approval of this Form 27 (by August 13, 2017). Submit a post excavation Form 27 Supplemental Report with a proposed groundwater monitoring plan.

### 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

401277415	FORM 27-INITIAL-SUBMITTED
401279552	SITE INVESTIGATION REPORT

Total Attach: 2 Files

### General Comments

#### User Group

#### Comment

#### Comment Date

		Stamp Upon Approval
--	--	---------------------

Total: 0 comment(s)