

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
402146859  
Receive Date:  
08/19/2019

Report taken by:  
PETER GINTAUTAS

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 #: 4468 Initial Form 27 Document #: 1943616

**PURPOSE INFORMATION**

<input type="checkbox"/> 901.e. Sensitive Area Determination	<input checked="" 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 type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation	<input checked="" 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>323638</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>KIELIAN-64N67W 2NESE</u>	Latitude: <u>40.339060</u>	Longitude: <u>-104.851000</u>	
	** correct Lat/Long if needed: Latitude: <u>40.335285</u>	Longitude: <u>-104.850160</u>	
QtrQtr: <u>NESE</u>	Sec: <u>2</u>	Twp: <u>4N</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 CROP LAND

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**

Surface water approximately 80' southeast of the location.

# 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 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 DATA	GROUNDWATER SAMPLES/LAB ANALYSIS
Yes	SOILS	15' E- W X 22' N-S X 8' BGS	SAMPLES/SCREENING/ANALYSIS

## INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

FORM 19 WAS PRODUCED ON 04/30/08.

## 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 ):

\_\_\_\_\_

### Proposed Groundwater Sampling

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

Quarterly monitoring of MW conducted as approved in initial site investigation plan submitted prior to Eforms

### 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 0  
Number of soil samples exceeding 910-1 \_\_\_\_\_  
Was the areal and vertical extent of soil contamination delineated? \_\_\_\_\_  
Approximate areal extent (square feet) \_\_\_\_\_

### NA / ND

\_\_\_\_\_ Highest concentration of TPH (mg/kg) \_\_\_\_\_  
\_\_\_\_\_ Highest concentration of SAR \_\_\_\_\_  
\_\_\_\_\_ BTEX > 910-1 \_\_\_\_\_  
\_\_\_\_\_ Vertical Extent > 910-1 (in feet) \_\_\_\_\_

### Groundwater

Number of groundwater samples collected 11  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 8'  
Number of groundwater monitoring wells installed 12  
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  
\_\_\_\_\_ 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?

NO. DOWNGRADIENT MONITORING WELL MW08 IS A POC WELL. THEREFORE NO ADDITIONAL WELLS ARE NEEDED TO DEFINE THE EXTENT OF GORUNDWATER IMPACTS. GROUNDWATER MONITORING WELLS WILL CONTINUE TO BE SAMPLED UNTIL FOUR CONSECUTIVE QUARTEDS OF ANALYTICAL LABORATORY RESULTS ARE BELOW THE BASIC STANDARDS FOR GROUNDWATER.

# 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.

DURING A ROUTINE TANK BATTERY UPGRADE ACTIVITIES, A LEAK IN DUMPLINE FROM THE SEPARATOR WAS OBSERVED TO HAVE RELEASED AN UNKNOWN VOLUME OF PRODUCED WATER AND CONDENSATE TO THE SUBSURFACE. APPROXIMATELY 98 CUBIC YARDS OF PETROLEUM HYDROCARBON IMPACTED ABOVE THE COLORADO OIL AND GAS COMMISSION (COGCC ) SENSITIVE AREA ALLOWABLE LEVEL WAS REMOVED FROM THE EXCAVATION ALONG THE DUMP LINES. SOIL SAMPLES WERE COLLECTED FROM THE BASE AND SIDEWALLS OF THE EXCAVATION AND SUBMITTED FOR ANALYSIS BY OF TOTAL PETROLEUM HYDROCARBON BY EPA MODIFIED METHOD 8015. LABORATORY RESULTS INDICATED TPH CONCENTRATIONS (C6-C36) AT THE EXTENT OF EXCAVATION WERE BELOW THE COGCC 1000 MG/KG SENSITIVE AREA ALLOWABLE LEVEL. GROUNDWATER ENTERING THE EXCAVATION WAS ANALYZIED FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES (BTEX) BY EPA METHOD 8260. LABORATORY RESULTS INDICATED BENZENE CONCENTRATIONS EXCEEDED THE COLORADO PUBLIC HEALTH AND ENVIRONMENTAL (CDPHE) WATER QUALITY CONTROL COMMISSION, REGULATION 41- THE BASIC STANDARDS FOR GROUNDWATER OF 5 MICROGRAMS PER LITER (UG/L). A TOPOGRAPHIC MAP OF THE AREA IS SHOWN ON FIGURE 1. SOIL AND GROUNDWATER SAMPLE LOCATIONS ARE SHOWN IN FIGURE 2, SITE MAP PROVIDED . SOIL ANANLYTICAL AND GROUNDWATER ANALYTICAL RESULTS ARE PROVIDED IN TABLES 1 AND 2 RESPECTIVELY.

## REMEDATION 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.

Enhanced fluid recovery (EFR) and air sparge (AS) were conducted during the first and second quarters of 2012. Monitoring wells MW01R and MW09 through MW12 were installed during the first quarter 2014 for monitoring and remediation purposes. EFR/AS was re-initiated as the selected remediation strategy at the site during the second quarter 2014, in order to address persisting dissolved phase BTEX concentrations. On April 12, 2016, replacement monitoring well (MW12R) and two additional enhanced fluid recovery (EFR) wells (EFR01 and EFR02) were installed. EFR/AS continued through the third quarter 2017 as the selected remediation strategy. During fourth quarter 2017, a Change in Operator was submitted for the divesture of the lease to Great Western Oil and Gas, Inc. Monitoring and remediation activities were subsequently discontinued. PDC resumed quarterly groundwater monitoring during the second quarter 2019. Based on the analytical results, monitored natural attenuation (MNA) was selected as the remediation strategy for the site.

## 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 # \_\_\_\_\_
- \_\_\_\_\_ Excavate and onsite remediation
- \_\_\_\_\_ Land Treatment
- \_\_\_\_\_ Bioremediation (or enhanced bioremediation)
- \_\_\_\_\_ Chemical oxidation
- \_\_\_\_\_ Other \_\_\_\_\_

## Groundwater Remediation Summary

- Bioremediation ( or enhanced bioremediation )
- Chemical oxidation
- No  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.

Quarterly groundwater monitoring was conducted at the nine site monitoring wells (MW01R-2, MW02, MW04 - MW06, MW07R, MW10, MW11, and MW12R) on August 7, 2019. The groundwater samples were submitted for laboratory analysis of BTEX by USEPA Method 8260B. Based on the analytical results and historic data from 2017, PDC is requesting a No Further Action (NFA) determination for this remediation project.

## REMEDIATION PROGRESS UPDATE

### PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other Quarterly Reporting and NFA Request

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? 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? Yes

Do all soils meet Table 910-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? No

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? Yes

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 facility was divested to Great Western Oil and Gas, Inc.

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 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. \_\_\_\_\_

## **SITE INVESTIGATION DATES**

Date of Initial Actions described in Site Investigation Plan (start date). \_\_\_\_\_

Date of commencement of Site Investigation. 09/04/2008

Date of completion of Site Investigation. 08/07/2019

## **REMEDIAL ACTION DATES**

Date of commencement of Remediation. 09/04/2008

Date of completion of Remediation. 08/07/2019

## **SITE RECLAMATION DATES**

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

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

**OPERATOR COMMENT**

PDC Energy is requesting a No Further Action (NFA) determination for this remediation project.

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: 08/19/2019 \_\_\_\_\_

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: PETER GINTAUTAS \_\_\_\_\_

Date: 08/20/2019 \_\_\_\_\_

Remediation Project Number: 4468 \_\_\_\_\_

**COA Type****Description**

	Based on the information presented, it is concluded 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 ground water is found to be impacted, then further investigation and/or further remediation activities may be required. In addition, the surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules.
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**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**

402146859	FORM 27-SUPPLEMENTAL-SUBMITTED
402146925	GROUND WATER SAMPLE LOCATION
402146926	GROUND WATER ELEVATION MAP
402148429	ANALYTICAL RESULTS

Total Attach: 4 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)