

State of Colorado  
Oil and Gas Conservation Commission

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401390338  
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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 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>Karen.Olson@pdce.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10452 Initial Form 27 Document #: 401390338

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 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

Y Multiple Facilites ( in accordance with Rule 909.c. )

Facility Type: <u>LOCATION</u>	Facility ID: <u>307224</u>	API #: _____	County Name: <u>LARIMER</u>
Facility Name: <u>STEPPEL-65N68W 1NESE</u>	Latitude: <u>40.426670</u>	Longitude: <u>-104.947420</u>	
	** correct Lat/Long if needed: Latitude: <u>40.426416</u>	Longitude: <u>-104.952415</u>	
QtrQtr: <u>NESE</u> Sec: <u>1</u> Twp: <u>5N</u> Range: <u>68W</u> Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>		
Facility Type: <u>LOCATION</u>	Facility ID: <u>323460</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Stella 5N65W22 1-4</u>	Latitude: <u>40.379900</u>	Longitude: <u>-104.641510</u>	
	** correct Lat/Long if needed: Latitude: <u>40.378460</u>	Longitude: <u>-104.644620</u>	
QtrQtr: <u>SESE</u> Sec: <u>22</u> Twp: <u>5N</u> Range: <u>65W</u> Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>		
Facility Type: <u>LOCATION</u>	Facility ID: <u>330610</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SITZMAN-65N64W 4NESW</u>	Latitude: <u>40.426530</u>	Longitude: <u>-104.557110</u>	
	** correct Lat/Long if needed: Latitude: <u>40.421096</u>	Longitude: <u>-104.557909</u>	
QtrQtr: <u>NESW</u> Sec: <u>4</u> Twp: <u>5N</u> Range: <u>64W</u> Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>		

Facility Type: LOCATION Facility ID: 331241 API #: County Name: WELD  
Facility Name: NATIONAL HOG FARM-65N63W 21SWSE Latitude: 40.379530 Longitude: -104.438220  
\*\* correct Lat/Long if needed: Latitude: 40.379526 Longitude: -104.437818  
QtrQtr: SWSE Sec: 21 Twp: 5N Range: 63W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION Facility ID: 331253 API #: County Name: WELD  
Facility Name: STATE 6525-66N63W 32NESE Latitude: 40.440690 Longitude: -104.453640  
\*\* correct Lat/Long if needed: Latitude: 40.490051 Longitude: -104.453854  
QtrQtr: NESE Sec: 32 Twp: 6N Range: 63W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION Facility ID: 331448 API #: County Name: WELD  
Facility Name: STATE 6525-66N63W 32SENE Latitude: 40.444360 Longitude: -104.453890  
\*\* correct Lat/Long if needed: Latitude: 40.444418 Longitude: -104.458354  
QtrQtr: SENE Sec: 32 Twp: 6N Range: 63W Meridian: 6 Sensitive Area? Yes

**SITE CONDITIONS**

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

Various

# 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
No	SOILS	No impacts encountered.	Excavation 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.

As required by COGCC Rule 905.B, a soil sample will be collected when buried or partially buried produced water vessels are removed from service. One soil sample will be collected below the removed water vessel and submitted for laboratory analysis of identified Table 910-1 chemicals-of-concern (COC's) which include benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO), TPH – diesel range organics (DRO), electrical conductivity (EC), and pH. The soil sample will be analyzed for sodium adsorption ratio (SAR) should initial EC concentrations exceed Table 910-1 soil standards. Excavation sidewalls will be field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Should elevated PID readings be observed on the excavation sidewalls, soil samples will be collected and analyzed for the above referenced organic and inorganic compounds. If shallow groundwater is encountered during the produced water vessel removal, a groundwater sample will be collected and submitted for laboratory analysis of BTEX.

## 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 ):

### 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 6

Number of soil samples exceeding 910-1 0

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 100

### NA / ND

ND Highest concentration of TPH (mg/kg) \_\_\_\_\_

NA Highest concentration of SAR \_\_\_\_\_

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 10

### 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

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.

Any soil impacted above COGCC Table 910-1 standards was removed from the excavation area. Impacted soil in exceedance of Table 910-1 standards for only EC, pH, or SAR will not be removed below the root zone (established at 3 feet below ground surface, per COGCC guidance).

## 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.

Reference Blanket Remediation # 9440.

## 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
- \_\_\_\_\_ 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.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other Produced Water Vessel Closure Report

Report Type:  Groundwater Monitoring  Land Treatment Progress Report  O&M Report

Other Produced Water Vessel Closure Report

## WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? \_\_\_\_\_

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: \_\_\_\_\_

## 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.

Following excavation activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. If the facility was decommissioned, the location was reclaimed in accordance with COGCC Rule 1004.

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. \_\_\_\_\_

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

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 08/04/2017

Date of commencement of Site Investigation. 08/04/2017

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

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 08/22/2017

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

### SITE RECLAMATION DATES

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

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

### OPERATOR COMMENT

PDC is submitting produced water vessel closure requests for the following sites: Lofland 44-22; National Hog Farm 34, 43, 44-21; Sitzman 1, 23-4; State 6525 42-32; State 6525 43, 44-32; Steppel 33, 44-1U.

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 EHS Manager \_\_\_\_\_

Submit Date: 08/30/2017 \_\_\_\_\_

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: 09/06/2017 \_\_\_\_\_

Remediation Project Number: 10452 \_\_\_\_\_

### 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

<u>Att Doc Num</u>	<u>Name</u>
401390338	FORM 27-INITIAL-SUBMITTED

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)