

State of Colorado
Oil and Gas Conservation Commission

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Report taken by:
Candice (Nikki) Graber

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 INFORMATION

Name of Operator: <u>PDC ENERGY INC</u>	Operator No: <u>69175</u>	Phone Numbers
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 #: 7241 Initial Form 27 Document #: 2230206

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 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 Facilities (in accordance with Rule 909.c.)

Facility Type: <u>LOCATION</u>	Facility ID: <u>309889</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>ANDERSON-67N66W 34SESW</u>	Latitude: <u>40.527640</u>	Longitude: <u>-104.769220</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SESW</u>	Sec: <u>34</u>	Twp: <u>7N</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 CULTIVATED

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 ~1,300' N OF TANK BATTERY. WATER WELLS ~1,200' SE OF TANK BATTERY. GROUNDWATER ~8' BGS

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
	GROUNDWATER	REFER TO FIGURE 2 & TABLE 1	GROUNDWATER SAMPLING
	SOILS	REFER TO FIGURE 2 & TABLE 2	EXCAVATION, GEOPROBING, 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.

A FORM 19 WAS SUBMITTED ON APRIL 25, 2012, COGCC ASSIGNED SPILL TRACKING #2224260 TO THE INCIDENT. AN AERIAL MAP OF THE SITE IS INCLUDED ON 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):

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 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 9
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 9'
Number of groundwater monitoring wells installed 10
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 39
ND Highest concentration of Toluene (µg/l)
-- Highest concentration of Ethylbenzene (µg/l) 1.6
-- Highest concentration of Xylene (µg/l) 100
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 FURTHER SITE INVESTIGATION IS REQUIRED AT THIS TIME. THE EXCAVATION EXTENTS, TEST PIT LOCATIONS, SOIL SAMPLE AND GROUNDWATER SAMPLE LOCATIONS, AND THE MONITORING WELL LOCATIONS ARE ILLUSTRATED ON FIGURE 2. GROUNDWATER ANALYTICAL RESULTS ARE SUMMARIZED ON TABLE 1 AND SOIL ANALYTICAL RESULTS ARE SUMMARIZED ON TABLE 2.

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.

THE SOURCE AREA WAS PREVIOUSLY EXCAVATED AND IMPACTED MATERIAL WAS TRANSPORTED AND DISPOSED OF AS DESCRIBED IN THE FORM 19 SUBMITTED ON APRIL 25, 2012.

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.

Enhanced fluid recovery (EFR) and air sparge (AS) were initiated at the site during the second quarter 2013 and continued intermittently through the fourth quarter 2017. Monitored natural attenuation (MNA) was selected as the remediation strategy beginning the first quarter 2018 and continued through the third quarter 2019. During the third quarter 2019, four consecutive quarters of groundwater concentrations were achieved. Therefore, on September 16, 2019, ten soil borings were advanced via direct-push drilling methods to depths ranging between 10.5 and 12 feet below ground surface (bgs). Confirmation soil samples were collected from previously impacted intervals and the terminus of each soil boring to confirm that remaining hydrocarbon impacts naturally attenuated, and organic compound concentrations were below the applicable COGCC Table 910-1 soil standards. Twenty-six 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 EPA Method 8260B, and TPH - diesel range organics (DRO) by EPA Method 8015. Analytical results indicated that benzene and TPH concentrations were above the applicable regulatory standards in three soil borings (SS01R - SS03R). Constituent concentrations were below the applicable regulatory standards in the remaining soil boring locations. Alternative remedial options to address remaining soil impacts are being evaluated. MNA will continue as an interim remediation strategy. Groundwater monitoring will continue on a quarterly basis to confirm that dissolved phase concentrations remain below COGCC standards. Soil sample locations are illustrated on Figure 1 and soil analytical results are summarized in Table 1. The laboratory reports are included in Attachment A.

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 will continue at the four (4) source area monitoring wells (BH01 - BH04) using BTEX by EPA Method 8260B. The remaining six monitoring wells (BH05R2, BH06, BH07R, and BH08 - BH10) will be sampled on an annual basis during the third quarter.

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? 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? No

Do all soils meet Table 910-1 standards? No

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? No

Does Groundwater meet Table 910-1 standards? Yes

Is additional groundwater monitoring to be conducted? Yes

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 2012 remediation activities, the excavation was backfilled and re-graded to match pre-existing conditions. The production facility was rebuilt and remains operational.

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. _____

SITE INVESTIGATION DATES

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

Date of commencement of Site Investigation. 03/12/2012

Date of completion of Site Investigation. 09/16/2019

REMEDIAL ACTION DATES

Date of commencement of Remediation. 03/12/2012

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: Senior Program Manager

Submit Date: 10/07/2019

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: Candice (Nikki) Graber

Date: 10/10/2019

Remediation Project Number: 7241

COA Type

Description

	COGCC agrees to the reduced groundwater monitoring program. If future data indicate the need for additional site characterization or establishing point of compliance, COGCC may require additional monitoring wells be returned to the program.
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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

402190922	FORM 27-SUPPLEMENTAL-SUBMITTED
402196194	SOIL SAMPLE LOCATION MAP
402196218	GROUND WATER SAMPLE LOCATION
402196220	GROUND WATER ELEVATION MAP
402196261	ANALYTICAL RESULTS

Total Attach: 5 Files

General Comments

User Group

Comment

Comment Date

Environmental	Changed Remediation Progress Update to reflect continued groundwater monitoring as detailed in the Remedial Action Plan.	10/04/2019
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Total: 1 comment(s)