

State of Colorado Oil and Gas Conservation Commission

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Report taken by:

RICK ALLISON

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>
Contact Person: <u>Karen Olson</u>	Email: <u>karen.olson@pdce.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 6942 Initial Form 27 Document #: 2223871

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 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 checked="" 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>323620</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>NOFFSINGER-65N64W 5SEW</u>		Latitude: <u>40.430030</u>	Longitude: <u>-104.576470</u>
		** correct Lat/Long if needed: Latitude: <u>40.428360</u>	Longitude: <u>-104.574290</u>
QtrQtr: <u>SEW</u>	Sec: <u>5</u>	Twp: <u>5N</u>	Range: <u>64W</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? No Is surface water within 1/4 mile? Yes

Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

SURFACE WATER AREA ~1,100' S, AGRICULTURAL WATER WELL 20' E, BUILDINGS ~900' SE, DEPTH TO GROUNDWATER 43' BGS.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

☒ E&P Waste

☐ Other E&P Waste

☐ Non-E&P Waste

☐ Produced Water

☐ Workover Fluids

☒ Oil

☐ Tank Bottoms

☐ Condensate

☐ Pigging Waste

☐ Drilling Fluids

☐ Rig Wash

☐ Drill Cuttings

☐ Spent Filters

☐ Pit Bottoms

☐ Other (as described by EPA)

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	Refer to Table 1	Excavation, drilling, and sampling

INITIAL ACTION SUMMARY

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

THE IMMEDIATE RESPONSE ACTION WAS PROVIDED IN A FORM 19 SUBMITTED ON FEBRUARY 27, 2012. 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):

Per the COGCC condition of approval (COA) issued on January 31, 2017, additional investigation will be conducted to determine the vertical extent of petroleum hydrocarbon impacts in borings BH05, BH06, and BH10.

Proposed Groundwater Sampling

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

Per the COGCC COA issued on January 31, 2017, should petroleum hydrocarbon impacts in exceedance of COGCC standards extend into groundwater, groundwater samples will be collected.

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 3

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 1600

NA / ND

-- Highest concentration of TPH (mg/kg) 2110

NA Highest concentration of SAR

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 43

Groundwater

Number of groundwater samples collected 2

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 44'

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 910-1 2

-- Highest concentration of Benzene (µg/l) 2200

-- Highest concentration of Toluene (µg/l) 2600

-- Highest concentration of Ethylbenzene (µg/l) 190

-- Highest concentration of Xylene (µg/l) 2000

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?

Site investigation activities conducted in accordance with the COGCC COA are summarized in the attached Remediation Annual Progress Assessment Report. Results of the investigation indicate that the lateral extent of soil impacts remains undefined to the east. Soil samples collected above the groundwater table from boring PSB-15 exhibited benzene and TPH concentrations in exceedance of regulatory standards. Two grab groundwater samples were collected from within the hollow stem drill flights and exhibited constituent concentrations in exceedance of regulatory standards. However, the consultant did not properly sample groundwater in accordance with PDC protocols. Thus, PDC does not feel that this data is representative of sub-surface conditions. As a result, three (3) monitoring wells will be installed to assess groundwater conditions. One well will be installed within the source area and two wells will be installed and used to determine the groundwater flow direction. All wells will be properly developed prior to sampling.

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 FEBRUARY 27, 2012.

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.

Between October 2013 and December 2015, a solar powered soil vapor extraction (SVE) fan was operational at BH01 to address remaining petroleum hydrocarbon impacts in soil. In April 2016, a full-scale SVE remediation system was installed. The system has remained operational since April 2016 at six (6) SVE and breather wells (BH05 – BH10).

Soil Remediation Summary

☒ In Situ

_____ Bioremediation (or enhanced bioremediation)
_____ Chemical oxidation
Yes _____ Air sparge / Soil vapor extraction
_____ Natural Attenuation
_____ Other _____

☒ Ex Situ

Yes _____ Excavate and offsite disposal
_____ If Yes: Estimated Volume (Cubic Yards) _____ 100
_____ 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.

Groundwater was encountered at approximately 43.5 feet below ground surface (bgs). A groundwater monitoring and remediation plan will be developed following further assessment, which will include installation and sampling of three (3) proposed monitoring wells.

REMEDATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☐ Quarterly ☐ Semi-Annually ☒ Annually ☐ Other _____

Report Type: ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report
☒ Other Remediation and Assessment 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: _____

REMEDATION COMPLETION REPORT

REMEDATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No _____

Do all soils meet Table 910-1 standards? _____

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? _____

Does Groundwater meet Table 910-1 standards? _____

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 tank battery was decommissioned and will not be reconstructed. The area will be reclaimed in accordance with COGCC Rule 1004.

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. 11/23/2011

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 11/23/2011

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 EHS Manager

Submit Date: 04/05/2018

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: 04/11/2018

Remediation Project Number: 6942

COA Type

Description

	Report results of the monitoring well installation upon completion and receipt of groundwater monitoring results. Monitoring reports may be submitted annually thereafter.
	Operator shall establish point of compliance in groundwater between the source area and irrigation wells located adjacent on the northeast portion of the site and to the south across County Road 60.5.

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

401589281	FORM 27-SUPPLEMENTAL-SUBMITTED
401598765	REMEDATION PROGRESS REPORT

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)