

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 9261 Initial Form 27 Document #: 2315510

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>SPILL OR RELEASE</u>	Facility ID: <u>440445</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Dewalt 1-12</u>	Latitude: <u>40.504925</u>	Longitude: <u>-104.609378</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SWNE</u>	Sec: <u>12</u>	Twp: <u>6N</u>	Range: <u>65W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

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

Res -765'NW. Surf wtr 200'W, wtr well 860'NW. 3 wtr wells w/in .25mi rad. Dpth to shallow grndwtr ab

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
	GROUNDWATER	Refer to the attached Fig 3 & Tab 2	Drilling & groundwater sampling
	SOILS	Refer to the attached Fig 2 & Tab 1	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.

On December 11, 2014, a historic release was discovered while repairing the water drain line from the production tank to the produced water vessel. Excavation activities were summarized in an Initial Form 19 submitted on December 13, 2014 (Document # 400751596) and in a Supplemental Form 19 submitted on December 18, 2014 (Oocumenl# 400754466). A topographic map of the site is included as 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 12
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 3'
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?

Based on soil analytical results, PDC feels that the remaining soil impacts were successfully removed. However, based on groundwater analytical results and the general groundwater flow direction, the extent of remaining dissolved phase hydrocarbon impacts has not been delineated. Consequently, additional drilling and site investigation activities are required. The excavation extent and soil and groundwater sample locations are illustrated on Figure 2. Temporary monitoring well locations are illustrated on Figure 3. A groundwater elevation contour map is included as Figure 4. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized on Table 2. The laboratory analytical reports are included as Attachment A.

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.

Excavation activities were completed between December 11 and December 15, 2014. Approximately 246 cubic yards of impacted material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. The lateral and vertical extent of the excavation was guided by field screening of volatile organic compound (VOC) concentrations in soil using a photoionization detector (PID). Soil samples collected from the sidewalls of the final excavation exhibited constituent concentrations below COGCC Table 910-1 soil standards. Groundwater was encountered in the excavation area at approximately 6.5 feet below ground surface (bgs). Approximately 120 barrels of groundwater were removed from the excavation using a vacuum truck and transported to a licensed water disposal facility. The groundwater sample (GW01) collected from the excavation area exhibited benzene concentrations in excess of COGCC Table 910-1 groundwater standards. The excavation extent and soil and groundwater sample locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. The laboratory analytical reports are included as Attachment A.

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.

EFR/AS events will be discontinued following the end of the second quarter 2017. Monitored natural attenuation (MNA) will be the selected remediation strategy for the site beginning the third quarter 2017 and will remain the selected remediation strategy through the second quarter 2018. Quarterly groundwater monitoring will be completed until four consecutive quarters of BTEX concentrations in compliance with regulatory standards are achieved.

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.

Groundwater was encountered during excavation and drilling activities at approximately 4-6 feet below ground surface (bgs). Quarterly groundwater sampling at the five temporary monitoring locations was initiated in April 2015. PDC will continue quarterly groundwater sampling at the 12 temporary monitoring wells to monitor petroleum hydrocarbon impacts in groundwater using USEPA Method 8260. Groundwater monitoring will continue until four consecutive quarters of BTEX concentrations in compliance with COGCC Table 910-1 groundwater standards are achieved.

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? _____

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 excavation was backfilled and compacted with clean material and the ground surface was re-contoured to match pre-existing conditions. Subsequent to attainment of closure, the temporary monitoring wells will be plugged and abandoned.

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). _____

Date of commencement of Site Investigation. 12/11/2014

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 03/31/2015

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

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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: 04/30/2018 _____

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: 05/08/2018 _____

Remediation Project Number: 9261 _____

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

401624742	FORM 27-SUPPLEMENTAL-SUBMITTED
401624744	MONITORING REPORT

Total Attach: 2 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)