

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 #: 9920 Initial Form 27 Document #: 200440580

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>SPILL OR RELEASE</u>	Facility ID: <u>445086</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Loustalet 41-15</u>		Latitude: <u>40.403550</u>	Longitude: <u>-104.527490</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>NENE</u>	Sec: <u>15</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 SW

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

An occupied building is located 715 ft. west and surface water is located 90 ft. south of the site. The nearest water well is located 485 ft. north. Depth to shallow groundwater is approximately 18 feet 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	GROUNDWATER	Refer to the attached Figure 3	Drilling and groundwater sampling
Yes	SOILS	Refer to the attached Figure 2	Excavation, drilling, 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 March 7, 2016, a produced water dump line release was discovered at the Loustalet 41-15 production facility as summarized in the Initial Form 19 (Doc# 401002236) submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on March 9, 2016, and in the Supplemental Form 19 (Doc# 401010057) submitted on March 17, 2016. 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 9

Number of soil samples exceeding 910-1 0

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

Approximate areal extent (square feet) 2400

NA / ND

ND Highest concentration of TPH (mg/kg)

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 18

Groundwater

Number of groundwater samples collected 2

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 18'

Number of groundwater monitoring wells installed 7

Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 15

-- Highest concentration of Toluene (µg/l) 140

-- Highest concentration of Ethylbenzene (µg/l) 110

-- Highest concentration of Xylene (µg/l) 1700

NA 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?

No. The extent of hydrocarbon impacts was successfully delineated and removed. Point of compliance was previously established in the temporary monitoring well network.

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.

On September 23, 2016, approximately 140 cubic yards of impacted material were excavated and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC water manifests. Soil samples were collected from the sidewalls and base of the excavation area and submitted to Summit Scientific Laboratories (Summit) in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that TPH concentrations were above applicable COGCC Table 910-1 standards in the soil samples collected from the base and north sidewall (SS04 and SS01) of the excavation. Remaining soil samples exhibited constituent concentrations below applicable regulatory standards. Initial excavation activities were temporarily discontinued due to unstable and sloughing soils, site constraints, and the Weld County Right-of-Way. Consequently, a sub-surface site assessment was completed to determine the lateral and vertical extent of hydrocarbon impacts related to the release. On October 18 - 19, 2016, eight soil borings (BH01 - BH08) were advanced to approximately 20 feet and 25 feet below ground surface (bgs). The varying depths were a result of significant change in ground elevation between the containment and the surrounding native surface. Grab soil samples were collected from the borings in 1-foot intervals and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). One soil sample was collected above the groundwater table in each of the eight borings at depths ranging between 10 feet and 17 feet bgs. Samples were submitted to Summit in Golden, Colorado for analysis of BTEX, naphthalene, and TPH - GRO by USEPA Method 8260, and TPH - DRO by USEPA Method 8015. Analytical results indicated constituent concentrations were below COGCC Table 910-1 standards in all eight soil sample locations. Groundwater was encountered in the soil borings between 11 feet and 18 feet bgs and as a result, temporary monitoring wells were installed. Temporary monitoring wells were developed and subsequently sampled. Eight groundwater samples (BH01 - BH08) were submitted for laboratory analysis of BTEX by USEPA Method 8260B. Analytical results indicated that the benzene concentration detected in monitoring well BH07 was above the applicable COGCC Table 910-1 groundwater standard. BTEX concentrations were below regulatory standards in the remaining seven monitoring wells. The excavation extent and soil boring/temporary monitoring well locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. Laboratory analytical reports are included as Attachment A.

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.

Refer to attached Form 27 Addendum: Summary of Excavation Activities and Proposed Path Forward.

Soil Remediation Summary

☐ In Situ

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

☒ Ex Situ

Yes _____ Excavate and offsite disposal
If Yes: Estimated Volume (Cubic Yards) _____ 792
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
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.

Refer to attached Form 27 Addendum: Summary of Excavation Activities and Proposed Path Forward.

REMEDATION PROGRESS UPDATE

PERIODIC REPORTING

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

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

☒ Other Form 27 Addendum _____

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? Yes _____

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

No waste was used for beneficial use.

Volume of E&P Waste (solid) in cubic yards 792

E&P waste (solid) description E&P exempt waste

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Waste Management Facility - North
Weld Landfill

Volume of E&P Waste (liquid) in barrels 80

E&P waste (liquid) description Groundwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Licensed 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 excavation will be backfilled, compacted, and re-contoured to match pre-existing conditions

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. 09/23/2016

Date of completion of Site Investigation. 10/19/2016

REMEDIAL ACTION DATES

Date of commencement of Remediation. _____

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: Snr. EHS Manager

Submit Date: 02/02/2017

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: 02/13/2017

Remediation Project Number: 9920

COA Type

Description

	The Operator shall update the Remedial Action Plan with the quarterly monitoring program in the next Supplemental Form 27 submitted.
	Quarterly groundwater monitoring for BTEX must continue until monitoring data demonstrate compliance with the Table 910-1 Concentration Levels in groundwater for four consecutive quarters following the excavation.

Attachment Check List

Att Doc Num

Name

401200883	FORM 27-SUPPLEMENTAL-SUBMITTED
401201080	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)