

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: PDC ENERGY INC	Operator No: 69175	Phone Numbers
Address: 1775 SHERMAN STREET - STE 3000		Phone: (303) 860-5800
City: DENVER State: CO Zip: 80203		Mobile: ()
Contact Person: Karen Olson	Email: COGCCSpillRemediation@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 13062 Initial Form 27 Document #: 401993810

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 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 checked="" type="checkbox"/> 909.c.(2), Rule 906: Spill/Release Remediation	<input checked="" 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: LOCATION	Facility ID: 326979	API #:	County Name: WELD
Facility Name: MOSSBERG PMJ-65N66W 30NWSE	Latitude: 40.368534	Longitude: -104.819473	
	** correct Lat/Long if needed: Latitude: 40.367974	Longitude: -104.818169	
QtrQtr: NWSE	Sec: 30	Twp: 5N	Range: 66W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

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

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? Yes

Other Potential Receptors within 1/4 mile

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
Yes	GROUNDWATER	TBD	sampling
Yes	SOILS	25' x 40'	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.

The partially buried produced water vault was removed. Initial pit soil sampling results came back over Table 910-1 limits. A soil and groundwater impact investigation was done, which included removing approximately 400 yards of impacted soil. Groundwater was encountered during excavation at 15' below ground surface, which was also sampled. Those results also came back over Table 910-1 limits. Excavation soil samples confirm all of the impacted soil above the saturated zone has been removed. Approximately 35 bbls of impacted groundwater were removed by a hydrovac truck, followed by the application of 220 lbs of carbon amendment to the exposed excavation bottom. The excavation was then been backfilled.

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):

Another MW will be installed to the south of BH06. A soil sample will be collected from the bore where PID reading is the highest, above the saturated zone. That sample will be taken to Origins Laboratory in Denver to be analyzed for BTEX, DRO, and GRO.

Proposed Groundwater Sampling

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

Another MW will be installed to the south of BH06. Once developed, a groundwater sample will be collected from the MW and taken to Origins Laboratory in Denver to be analyzed for BTEX.

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):

Additional monitoring wells may be installed if groundwater impact extents are not defined after the 11th MW is installed and sampled. Quarterly groundwater monitoring the second quarter of each month until 4 consecutive quarters of table 910-1 compliance has been achieved.

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) 0

NA / ND

ND Highest concentration of TPH (mg/kg) _____
NA Highest concentration of SAR _____
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 0

Groundwater

Number of groundwater samples collected 20
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 15
Number of groundwater monitoring wells installed 10
Number of groundwater samples exceeding 910-1 5

-- Highest concentration of Benzene (µg/l) 870
ND Highest concentration of Toluene (µg/l) _____
-- Highest concentration of Ethylbenzene (µg/l) 81.4
-- Highest concentration of Xylene (µg/l) 41.7
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) 400 Volume of liquid waste (barrels) 35

Is further site investigation required?

Another MW will be installed to the south of BH06. Once developed, a groundwater sample will be collected from the MW and taken to Origins Laboratory in Denver to be analyzed for BTEX. Additional monitoring wells may be installed if groundwater impact extents are not defined after the 11th MW is installed and sampled. Quarterly groundwater monitoring the second quarter of each month until 4 consecutive quarters of table 910-1 compliance has been achieved.

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.

Following the discovery of historic hydrocarbon impacts below the produced water vessel, approximately 400 cubic yards of impacted material were mechanically excavated and transported to the North Weld Waste Management Facility for disposal under SRC Energy waste manifests. Groundwater vacuum recovery activities were conducted concurrent with source mass removal activities and approximately 35 barrels of impacted groundwater were removed and transported to CSI for disposal under SRC Energy manifests. Confirmation soil samples collected from the final excavation extent confirmed that hydrocarbon impacts were successfully removed from within the unsaturated interval during mitigation activities. Following the completion of source mass removal activities, 220 lbs of carbon amendment were spread into the excavation during backfilling activities.

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.

Monitored natural attenuation (MNA) was selected as the remediation strategy for this project between the third quarter 2019 and first quarter 2021.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 400

_____ Air sparge / Soil vapor extraction

_____ Name of Licensed Disposal Facility or COGCC Facility ID # _____

_____ Natural Attenuation

_____ Excavate and onsite remediation

_____ Other _____

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

Bioremediation (or enhanced bioremediation)

No _____ 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.

In August and September 2019, ten monitoring wells (BH01 - BH10) were installed to assess groundwater conditions below the historic release and confirm the absence of dissolved-phase hydrocarbon impacts. Fourth quarter 2019 analytical results indicated that benzene concentrations were in exceedance of the applicable COGCC Table 910-1 groundwater standards in the down-gradient monitoring well BH06. Per the COA issued by the COGCC, one additional monitoring well was installed via hand-auger, down-gradient of the existing monitoring well network. Due to large seasonal fluctuations, shallow groundwater was not encountered during the POC monitoring well installation. Based on field conditions encountered during multiple quarters, monitoring wells BH01 through BH10 were replaced on March 25-26, 2020, to accommodate seasonal groundwater fluctuations. In addition, one monitoring well (BH11) was installed down-gradient of monitoring well BH06 to establish POC. During the first quarter 2021, four consecutive quarters of groundwater concentrations in compliance with COGCC Table 910-1 standards were achieved.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other No Further Action (NFA) Request

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

Other No Further Action (NFA) Request

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 beneficial use.

Volume of E&P Waste (solid) in cubic yards 400

E&P waste (solid) description Hydrocarbon impacted material.

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 35

E&P waste (liquid) description Hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable:

Non-COGCC Disposal Facility: CSI Bennett

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? Yes

Do all soils meet Table 910-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? No

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? Yes

Is additional groundwater monitoring to be conducted? No

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 source mass removal activities, the excavation was backfilled and re-graded to the match pre-existing conditions. The location will be reclaimed in accordance with the COGCC 1000 Series.

Is the described reclamation complete? Yes

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? Yes

If NO, does the seed mix comply with local soil conservation district recommendations? Yes

IMPLEMENTATION SCHEDULE

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 04/02/2019

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/02/2019

Date of commencement of Site Investigation. 06/12/2019

Date of completion of Site Investigation. 05/08/2020

REMEDIAL ACTION DATES

Date of commencement of Remediation. 06/12/2019

Date of completion of Remediation. 02/12/2021

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

During the first quarter 2021, four consecutive quarters of groundwater concentrations in compliance with COGCC Table 910-1 standards were achieved. Consequently, PDC is requesting a No Further Action (NFA) determination for this remediation project.

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: 03/08/2021

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: 03/10/2021

Remediation Project Number: 13062

COA Type**Description**

	<p>Based on the information presented, it appears that no further action is necessary at this time and the COGCC approves the closure request. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards or if groundwater is found to be impacted, then further investigation and/or remediation activities may be required.</p> <p>The surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.</p>
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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**

402620520	FORM 27-SUPPLEMENTAL-SUBMITTED
402620535	ANALYTICAL RESULTS
402620536	GROUND WATER SAMPLE LOCATION
402620539	GROUND WATER ELEVATION MAP

Total Attach: 4 Files

General Comments**User Group****Comment****Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)