

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>		
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80203</u>
Contact Person: <u>Karen Olson</u>	Email: <u>COGCCSpillRemediation@pdce.com</u>	Phone: <u>(303) 860-5800</u>
		Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 16979 Initial Form 27 Document #: 402606405

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 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 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 checked="" type="checkbox"/> Other <u>Tank Battery Closure / Wellhead Closure / Flowline Removal</u>

SITE INFORMATION Y Multiple Facilities (in accordance with Rule 909.c.)

Facility Type: <u>WELL</u>	Facility ID: _____	API #: <u>123-11927</u>	County Name: <u>WELD</u>
Facility Name: <u>MAXEY-HOFF 1</u>	Latitude: <u>40.378889</u>	Longitude: <u>-104.599722</u>	
** correct Lat/Long if needed: Latitude: <u>40.378972</u>		Longitude: <u>-104.599761</u>	
QtrQtr: <u>SWSW</u>	Sec: <u>19</u>	Twp: <u>5N</u>	Range: <u>64W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

Facility Type: <u>LOCATION</u>	Facility ID: <u>322718</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>MAXEY-HOFF-65N64W 19SWSW</u>	Latitude: <u>40.378965</u>	Longitude: <u>-104.599756</u>	
** correct Lat/Long if needed: Latitude: <u>40.378817</u>		Longitude: <u>-104.599361</u>	
QtrQtr: <u>SWSW</u>	Sec: <u>19</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 Cropland

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

Nearest Well: Domestic – 56 feet NE, Surface Water: Latham Ditch – 407 feet SW, Occupied Buildings – 460 feet W, Livestock – 1450 feet NW, FWS Wetlands – Latham Ditch / Riverine – 407 SW

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 checked="" 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
UNDETERMINED	SOILS	Refer to Tables 1-3 and Figure 1	Confirmation 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.

Soil encountered adjacent to and surrounding the wellhead and below the flowline riser was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). In addition, one soil sample (SEP01-FL) was collected beneath the separator end of the flowline during tank battery decommissioning activities. Per the approved soil sampling plan, one soil sample was collected below the flowline riser (FLR01) at approximately 4 feet below ground surface (bgs). Based on field observations and photos collected during cut and cap activities (Attachment B), the wellhead was not uncovered during sampling activities to reduce risk of potential damage to the wellhead. One soil sample was collected adjacent to the former wellhead location (WH01) at approximately 2.5 feet bgs. In addition, one field screening sample (UFL01) was collected beneath an unidentified abandoned flowline discovered adjacent to the former wellhead to confirm the absence of hydrocarbon impacts. Soil sample FLR01 was submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1, 2, 4-trimethylbenzene (TMB), 1, 3, 5-TMB, and TPH (C6-C36) and sample WH01 was submitted for analysis of pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron. Analytical results indicated that organic compounds and soil suitability constituents were in compliance with the applicable COGCC Table 915-1 Protection of Groundwater SSLs in the samples collected at the former wellhead. Analytical results are summarized in Tables 1 and 2, and GPS coordinates and field screened VOC concentrations are summarized in Table 3. Field screening and laboratory sample locations collected at the wellhead and along the flowline are illustrated on Figure 1. The laboratory report is included as Attachment A and the wellhead closure and flowline removal field notes and photo log are included as Attachment B.

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):

Grab soil samples will be collected below and/or adjacent to applicable facility equipment, as defined in the Rule 911.a.(4) guidance document (1/4/21), for field screening purposes. Discrete soil samples will be collected for laboratory analysis either in any area of observed hydrocarbon impacts, or in the sample locations designated by the COGCC. GPS data will be collected for all soil sample locations. Soil samples will be submitted for laboratory for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH C6-C36) by EPA Methods 8260B and 8015. Additionally, soil sample(s) will be collected in the area most likely to be impacted by produced water to confirm soil suitability for reclamation. The sample(s) will be submitted for laboratory analysis of electrical conductivity (EC), pH, sodium adsorption ratio (SAR), and boron by saturated paste and hot water soluble extraction methods. Refer to the Proposed Sample Location Map.

Proposed Groundwater Sampling

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

If groundwater is encountered during decommissioning and/or abandonment activities, a grab sample will be collected as soon as practical. If contaminated soil is in contact with groundwater or if free product/hydrocarbon sheen are observed, the release will be reported in accordance with Rule 912.b. Groundwater samples will be submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260.

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):

On March 25, 2021, an unidentified abandoned flowline was discovered adjacent to the former separator. Based on field observations, approximately four cubic yards of material was removed from beneath the flowline and transported to the Buffalo Ridge Landfill for disposal under PDC waste manifests. Following excavation activities, five samples were collected from the base and sidewalls of the excavation at depths of 5 feet and 6 feet bgs. The sample (SS01) exhibiting the highest field screened VOC concentration was submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). Analytical results indicated that organic compound concentrations were in compliance with the applicable COGCC Table 915-1 Protection of Groundwater SSLs. Analytical results are summarized in Table 1, and GPS coordinates and field screened VOC concentrations are summarized in Table 3. Field screening and laboratory sample locations are illustrated on Figure 1.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 9

Number of soil samples exceeding 910-1 2

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

Approximate areal extent (square feet) 940

NA / ND

-- Highest concentration of TPH (mg/kg) 0.66

-- Highest concentration of SAR 8.23

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 6

Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet)

Number of groundwater monitoring wells installed

Number of groundwater samples exceeding 910-1

____ Highest concentration of Benzene (µg/l)

____ Highest concentration of Toluene (µg/l)

____ Highest concentration of Ethylbenzene (µg/l)

____ Highest concentration of Xylene (µg/l)

____ 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?

On March 26, 2021, one background sample (BKG01) was collected from native material topographically up-gradient of the wellhead location and submitted for analysis of pH, electrical conductivity (EC), sodium adsorption ration (SAR) and boron. Analytical results indicated that EC and SAR were in exceedance of the applicable COGCC Table 915-1 standards. The remaining soil suitability constituents were in compliance with the applicable standards.

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) 8

Volume of liquid waste (barrels) 0

Is further site investigation required?

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 March 25, 2021, approximately 8 cubic yards of impacted material were excavated and transported to the Buffalo Ridge Landfill for disposal under PDC waste manifests.

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.

Soil encountered on site and below production equipment was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Per the approved proposed soil sampling plan, samples were collected below and/or adjacent to the above ground storage tank (AST), separator flowline, and dump lines (SEP-FL and SEP-DL) and produced water vessel (PWV). Based on field observations, approximately four cubic yards of material was removed from beneath the separator dump line and transported to the Buffalo Ridge Landfill for disposal under PDC waste manifests. Following excavation activities, five samples were collected from the base and all sidewalls of the excavation at depths of 4 feet and 5 feet bgs. The sample (SEP01-DL) exhibiting the highest field screened VOC concentration was submitted for laboratory analysis. The tank battery samples were submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). In addition, the excavation sidewall sample which exhibited the highest PID reading collected adjacent to the produced water vessel was submitted for laboratory analysis of pH, electrical conductivity (EC), sodium adsorption ration (SAR) and boron. Analytical results indicated that pH was in exceedance of the applicable COGCC Table 915-1 standard in the sample (PWV01-N) collected adjacent to the former produced water vessel location. Analytical results are summarized in Tables 1 and 2, and GPS coordinates and field screened VOC concentrations are summarized in Table 3. Field screening and laboratory sample locations are illustrated on Figure 1. The laboratory reports are included as Attachment A and the tank battery decommissioning field notes and photo log are included in Attachment B.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 8

_____ 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)

_____ 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.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other Timeline Update

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

Other Timeline Update

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 8

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

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Buffalo Ridge Landfill

Volume of E&P Waste (liquid) in barrels 0

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.

Following tank battery and wellhead decommissioning activities, the location was backfilled, compacted, and re-contoured to 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? _____

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. 01/15/2021

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/01/2021

Date of commencement of Site Investigation. 03/25/2021

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 03/25/2021

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

Based on the analytical results collected during tank battery decommissioning activities, additional site investigation is required below and adjacent to the location of the former produced water vessel to confirm the pH level is in compliance with the COGCC Table 915-1 standards. Supplemental site investigation activities will be conducted by June 30, 2021.

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: ` 05/11/2021 _____

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: 05/19/2021 _____

Remediation Project Number: 16979 _____

Condition of Approval**COA Type****Description**

	Operator shall collect samples from below the former produced water vault in native material and submit them for laboratory analysis in accordance with Rule 911.a.(4) Guidance Document. Sample shall be analyzed for TPH (C6-C36), BTEX, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and soil suitability parameters EC, SAR and boron.
1 COA	

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**

402681162	FORM 27-SUPPLEMENTAL-SUBMITTED
402681164	PHOTO DOCUMENTATION
402681166	ANALYTICAL RESULTS
402681167	SOIL SAMPLE LOCATION MAP

Total Attach: 4 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)