

State of Colorado
Oil and Gas Conservation Commission

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Report taken by:
Kari Brown

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.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

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 #: 18160 Initial Form 27 Document #: 402694343

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: _____

SITE INFORMATION

No Multiple Facilities

Facility Type: <u>WELL</u>	Facility ID: _____	API #: <u>123-10498</u>	County Name: <u>WELD</u>
Facility Name: <u>KERBS 1-20</u>	Latitude: <u>40.301565</u>	Longitude: <u>-104.805232</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>NENW</u>	Sec: <u>20</u>	Twp: <u>4N</u>	Range: <u>66W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Agriculture
 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: Monitoring 1,080 feet SE, Nearest Surface Water: Freshwater Pond 610 feet NE, FWS Wetlands Freshwater Pond 610 feet NE, Occupied Buildings: 1,860 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
Yes	SOILS	Refer to Tables 1-4 and Figures 1&2	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.

On May 13, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during routine maintenance activities of the former Kerbs 1-20 Wellhead (Figure 1). During maintenance activities, historic hydrocarbon impacts were discovered at the wellhead. Following the discovery, emergency plug and abandonment activities were initiated at the wellhead and mitigation activities were initiated to delineate and removed remaining hydrocarbon impacts. Approximately 179 cubic yards (CY) of impacted material were excavated and transported to North Weld Waste Management Facility for disposal under PDC waste manifests.

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):

On May 13, 2021, one soil sample (SS01) was collected from the source mass material and submitted for laboratory analysis of the full COGCC Table 915-1 analytical suite. Analytical results indicated contaminants of concern include: BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH, acenaphthene, anthracene, fluorene, pyrene, 1-M, 2-M, arsenic, barium, lead and selenium. Between June 22 and 23, 2021, nine soil samples (SS02-SS10) were collected from the base and sidewalls of the excavation at depths ranging from 4 feet to 13 feet below ground surface (bgs) and submitted for the above referenced COCs. In addition, one soil sample (SS11) was collected from the excavation at approximately 2.5 feet bgs and submitted for analysis of the Table 915-1 soil suitability constituents. Analytical results indicated organic compound concentrations were below the applicable COGCC Table 915 Protection of Groundwater SSLs in the samples collected from the final excavation extent.

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):

On January 20, 2022, five (5) soil vapor points (SVPs) were installed within and outside the final excavation extent to evaluate soil vapor conditions at the former Kerbs 1-20 wellhead. Following installation, the SVP wells were allowed to equilibrate and stabilize a minimum of 24 hours. On January 21, 2022, SVPs were field screened the following day with a LANDTEC GEM 5000 gas monitoring device for methane (CH₄), carbon dioxide (CO₂), oxygen (O₂), hydrogen sulfide (H₂S) and carbon monoxide (CO) from 5 feet bgs. Screening occurred at 1-minute, 2-minute and 3-minute intervals with pre and post ambient air readings. Field screening results indicate that CH₄, H₂S and CO levels were below detection limits.

During field activities, soil was visually inspected and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). GEM 5000 field screened gas concentrations are summarized in Table 5. Sample locations are illustrated on Figures 1 and 2.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 20
Number of soil samples exceeding 915-1 13
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 306

NA / ND

-- Highest concentration of TPH (mg/kg) 310
-- Highest concentration of SAR 0.739
BTEX > 915-1 Yes
Vertical Extent > 915-1 (in feet) 13

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 915-1

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 915-1
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 June 23, 2021, one background soil sample (BKG01) was collected at approximately 4 feet bgs from native material topographically up-gradient of the wellhead and submitted for analysis of COGCC Table 915-1 metals. Additionally, on January 20, 2022, nine (9) background soil samples (BKG02, BKG03 & BKG04) were collected between 4 feet and 13 feet bgs from native material topographically up-gradient of the wellhead and submitted for analysis of COGCC Table 915-1 metals and pH. Analytical results indicated arsenic and selenium were in exceedance of the applicable regulatory standards for all background samples with the exception of BKG03 from 13 feet bgs. In addition, analytical results indicated pH was in exceedance of the applicable regulatory standards for samples BKG04 from 12 feet and 13 feet bgs. Soil boring logs are included as Attachment C.

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

Volume of solid waste (cubic yards) 179 Volume of liquid waste (barrels) 0

Is further site investigation required?

Up to three (3) soil borings will be advanced to approximately 4 feet bgs to horizontally delineate remaining table 915-1 metal exceedances observed in soils samples collected from the excavation extent, as well as to delineate pH exceedances observed in source material characterization sample SS01.

Up to two (2) additional soil borings will be advanced at the center and to the south of the former excavation extent to approximately 13.5 feet and 4 feet bgs, respectively, to delineate pH exceedances observed in source material characterization sample SS01.

Additionally, up to two (2) soil borings will be advanced in native material adjacent to the excavation extent to further evaluate Table 915-1 metals and pH in native material.

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.

Between May 13 and June 23, 2021, approximately 179.5 CY of impacted material were removed from the excavation and transported to the North Weld Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests.

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.

Per the first Condition of Approval (COA) issued by the COGCC on August 2, 2021, PDC conducted a soil gas survey at the wellhead. Five (5) soil vapor point (SVP) locations were installed at the wellhead to a depth of 5 feet bgs. Two SVPs were installed within the excavation extent clean backfill material. Three (3) SVPs were installed in a triangular position surrounding the wellhead located 15 feet, 20 feet, and 25 feet away from the wellhead, respectively, in native material. Utilizing a GEM 5000 Plus, H2S, CO, CH4, CO2, and O2 readings were measured in order to evaluate soil vapor impacts within the clean backfill material and native material surrounding the wellhead. Results indicate no soil vapor impact present with CH4, H2S and CO levels being below detection limits.

A remediation strategy will be selected following the evaluation of confirmatory soil sampling analytical results.

Analytical results are summarized in Tables 1-5 and GPS coordinates and field screened VOC concentrations are summarized in Table 6. Field screening and laboratory sample locations collected at the wellhead are illustrated on Figures 1 and 2. The proposed soil boring locations are illustrated on Figure 3. Laboratory reports are included in Attachment A and the wellhead decommissioning and remediation field notes and photo logs are included as Attachment B. Soil boring logs are included as Attachment C.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 179

_____ 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.

Groundwater was not encountered during supplemental site investigation activities.

REMEDATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other Supplemental Site Investigation Proposal

Request Alternative Reporting Schedule:

Semi-Annually Annually Other _____

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

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

Other Supplemental Site Investigation Proposal

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 _____ 179

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

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: North Weld Waste Management

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

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

If YES:

Compliant with Rule 913.h.(1).

Compliant with Rule 913.h.(2).

Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? _____

Does the previous reply indicate consideration of background concentrations? _____

Does Groundwater meet Table 915-1 standards? _____

Is additional groundwater monitoring to be conducted? _____

Operator shall comply with the COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

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 wellhead and flowline abandonment 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 provide the seed mix? _____

If YES, does the seed mix comply with local soil conservation district recommendations? _____

Did the local soil conservation district provide the seed mix? _____

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 05/13/2021

Proposed date of completion of Reclamation. 05/13/2024

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 05/13/2021

Actual Spill or Release date, or date of discovery. 05/13/2021

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/24/2021

Proposed site investigation commencement. 03/31/2022

Proposed completion of site investigation. 04/15/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 05/13/2021

Proposed date of completion of Remediation. 06/30/2022

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

OPERATOR COMMENT

Based on the results described herein for the Kerbs 1-20 wellhead, PDC will conduct a supplemental site investigation to define the horizontal extents of the remaining Table 915-1 metal impacts as well as vertical and horizontal extent of pH impacts discovered during the June 2021 site investigation. Supplemental site investigation activities will be completed by the end of the second quarter 2022.

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: 04/21/2022

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: Kari Brown

Date: 05/09/2022

Remediation Project Number: 18160

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

0 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**

402990206	FORM 27-SUPPLEMENTAL-SUBMITTED
402990294	SOIL SAMPLE LOCATION MAP
402990296	MAP
403022398	SITE INVESTIGATION PLAN
403022421	PHOTO DOCUMENTATION
403022423	LOGS
403023007	ANALYTICAL RESULTS

Total Attach: 7 Files

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

		Stamp Upon Approval
--	--	---------------------

Total: 0 comment(s)