

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.

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

OPERATOR INFORMATION

Name of Operator: PDC ENERGY INC	Operator No: 69175	Phone Numbers
Address: 1099 18TH STREET SUITE 1500		Phone: (303) 860-5800
City: DENVER State: CO Zip: 80202		Mobile: ()
Contact Person: Karen Olson	Email: taspillremediationcontractor@pdce.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 27259 Initial Form 27 Document #: 403303448

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

Yes Multiple Facilities

Facility Type: LOCATION	Facility ID: 437494	API #: _____	County Name: WELD
Facility Name: Thornton 18L-HZ Pad	Latitude: 40.569500	Longitude: -104.714130	
	** correct Lat/Long if needed: Latitude: 40.570139	Longitude: -104.715467	
QtrQtr: SWSW Sec: 18 Twp: 7N Range: 65W Meridian: 6 Sensitive Area? Yes			
Facility Type: WELL	Facility ID: _____	API #: 123-39562	County Name: WELD
Facility Name: Thornton 18L-401	Latitude: 40.569507	Longitude: -104.714141	
	** correct Lat/Long if needed: Latitude: _____	Longitude: _____	
QtrQtr: SWSW Sec: 18 Twp: 7N Range: 65W Meridian: 6 Sensitive Area? Yes			

SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Agricultural

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

Tank Battery: Nearest Well: Irrigation - 679' NNW; Surface Water: Eaton Ditch - 185' SSW; Occupied Building: 201' NE; Livestock: 225' NE; FWS Wetlands: 185' SSW Riverine (R4SBC); HPH Sensitive Wildlife Habitat: Rule 309.e.1: 818' ENE - Bald Eagle Roost Site; 100-Year Floodplain 1,499' W of Tank Battery.

Wellhead (Thornton 18L-401): Nearest Well: Irrigation - 1,032' ESE; Surface Water: Eaton Ditch - 206' SW; Occupied Building: 440' NNW; Livestock: 410' NNW; FWS Wetlands: 206' SSW Riverine (R4SBC); HPH Sensitive Wildlife Habitat: Rule 309.e.1: 637' ENE - Bald Eagle Roost Site.

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	SOILS	Tables 1-3 and Figures 1-3	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.

In accordance with COGCC Rule 911, this form serves as notification for the decommissioning and abandonment of the Thornton 18L-401 production facility, Thornton 18L-401 wellhead, and removal of the associated flowline. The ground and sub-surfaces will be visually inspected for hydrocarbon impacts during equipment decommissioning. In addition, on-site dump lines located between the separator and tank battery will be removed by pulling from either end during decommissioning activities. Field observations and photo documentation will be recorded in a field inspection form for submittal to the COGCC.

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):

Soil samples will be collected from the surface in cardinal directions of the wellhead, as defined in the Rule 911.a.(4) guidance document (9/20/21), for field screening purposes. Grab soil samples will be collected below and/or adjacent to applicable facility equipment, as defined in the Rule 911.a.(4) guidance document (9/20/21), 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 collected at the tank battery will be submitted for laboratory for analysis of BTEX, naphthalene, TPH (C6-C36), 1,2,4-TMB, and 1,3,5-TMB by EPA Methods 8260B and 8015. Soil samples will be collected adjacent to the wellhead from native material and submitted for laboratory analysis of Organic Compounds in Soil, soil suitability, and TPH (C6-C36).

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):

If a produced water vessel is present, discrete soil samples will be collected from the base of the excavation and excavation sidewall in areas most likely to be impacted and exhibiting the highest field screened VOC concentration. The soil samples will be submitted for additional laboratory analysis of EC, pH, SAR, and boron. In addition, tank battery dump lines will be removed by pulling from either end. Assessments will be conducted during the removal of the on-location flowline (estimated to be 199 feet in length) and soil samples will be collected below the flowline risers. The flowline and adjacent sub-surface will be inspected for any visual and olfactory indicators of potential failure and hydrocarbon impacts. Soils will be field screened below the flowline and if suspected impacts are observed, a soil sample will be collected for an initial assessment. Samples will be submitted for laboratory analysis of Organic Compounds in Soil and TPH (C6-C36).

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 16
Number of soil samples exceeding 915-1 5
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 100

NA / ND

-- Highest concentration of TPH (mg/kg) 0.55
-- Highest concentration of SAR 4.76
BTEX > 915-1 No
Vertical Extent > 915-1 (in feet) 7

Groundwater

Number of groundwater samples collected 0
Was extent of groundwater contaminated delineated? Yes
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 April 11, 2023, five (5) background samples (BKG01 @ 0-6", BKG01 @ 2', BKG01 @ 4', BKG01 @ 5', BKG01 @ 6' and BKG01 @ 7') were collected from native material topographically upgradient of the wellhead and tank battery location and submitted for analysis of EC and metals. Analytical results indicated that EC concentrations were in compliance with the applicable Table 915-1 standard in native material. Additionally, arsenic and barium concentrations were above the applicable COGCC regulatory Table 915-1 standards in all background soil samples.

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 the analytical results collected during initial decommissioning activities, supplemental site investigation activities will be conducted to delineate the EC exceedance observed in soil sample PWV01-N. Up to two soil borings will be advanced to approximately 5 ft bgs. Samples will be collected from depths of approximately 2 ft, 3 ft, 4 ft, and 5 ft bgs. The samples collected at approximately 3 ft will be submitted to obtain vertical delineation. The samples collected from approximately 2 ft bgs will be submitted for laboratory analysis of EC to obtain horizontal delineation. The remaining soil samples will be submitted to the laboratory on hold.

Additionally, supplemental site investigation activities will be conducted to delineate arsenic exceedances observed in soil samples SEP01-DL-B and SEP01-DL-E as well as arsenic and barium exceedances observed in soil samples SEP01-FL-B and SEP01-FL-N.

Two soil samples will be collected from the center of the SEP01-FL and SEP01-DL excavations to delineate Table 915-1 metal exceedances observed in SEP01-FL-B @ 6' and SEP01-DLB @ 7', respectively. Soil samples will be collected from the soil borings adjacent to the former locations at depths of approximately 7 ft, 8 ft, 9 ft, and 10 ft bgs. The soil samples will be submitted for laboratory analysis of arsenic and/or barium as necessary.

In addition, up to seven cardinal direction soil borings will be advanced to approximately 10 ft bgs. Soil samples will be collected at depths of approximately 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, and 10 ft bgs. The soil samples will be submitted for laboratory analysis of arsenic and/or barium as necessary.

Additionally, up to four soil borings will be advanced in native material adjacent to the former tank battery to a depth of approximately 10 ft bgs to evaluate EC, arsenic, and barium concentrations in native material. The proposed soil boring locations are illustrated on Figure 4.

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 April 11, 2023, during tank battery and wellhead closure activities and the removal of the associated flowline, approximately 9 cubic yards of impacted material was removed from the SEP01-DL excavation and approximately 2 cubic yards of impacted material was removed from the SEP01-FL excavation and transported to the North Weld Waste Management Facility 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 adjacent to and surrounding tank battery/wellhead infrastructure was visually inspected and field screened for VOC concentrations using a PID. Inspections were conducted below the injection flowline riser (IFLR01) and at the midpoint (FL01-01) and were submitted for analysis of BTEXN, TMBs, and TPH (C6-C36). Per the proposed soil sampling plan, two wellhead soil samples were collected at the wellhead from depths of approximately 4 ft and 6 ft bgs from undisturbed areas most likely to be impacted by oil and gas operations located adjacent to and below production infrastructure. Soil samples WH01, FLR01 were submitted for laboratory analysis of the COGCC Table 915-1 Organic Compounds in Soil, TPH (C6-C36), pH, EC, SAR, and boron.

Tank battery samples were collected below and/or adjacent to the AST and PWV and submitted for laboratory analysis of BTEXN, TMBs, and TPH (C6-C36). Additionally, the PWV base sample and sidewall sample which exhibited the highest PID readings were submitted for analysis of pH, EC, SAR, and boron. Analytical results indicated that organic compounds and soil suitability constituents were in compliance with the applicable COGCC Table 915-1, except for EC in sample PWV01-N. In addition, SEP01-FL and SEP01-DL base and sidewall samples that exhibited the highest PID readings were submitted for the full Table 915-1 analytical suite. Analytical results indicated that organic compounds and soil suitability constituents were in compliance with the applicable COGCC Table 915-1, however, arsenic exceedances were observed in all SEP-FL and SEP-DL base and sidewall samples and barium exceedances were observed in SEP01-FL base and sidewall samples. Consequently, five soil samples (BKG01) were collected up-gradient of the tank battery and submitted for analysis of EC and metals. Analytical results indicated EC was in compliance with applicable regulatory standards, arsenic and barium were in exceedance of the standard in native material.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

_____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____

_____ 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 initial decommissioning activities at the tank battery or wellhead.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other

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

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Operator does not have site-specific financial assurance for this project; however, Operator has inactive well, blanket, and surface bonding including Surety IDs 106077122, 106473808, and 106473820, as well as commercial general liability and/or umbrella/excess insurance meeting the requirements of Rule 705.b. Operator does not anticipate making an insurance claim for this project.

- Investigation of the organics in soils at the tank battery and wellhead has been completed.
- Facility and infrastructure were decommissioned and the location will be reclaimed in accordance with the COGCC 1000 Series.
- Further soil investigation activities are required at the former PWV-N sample location to delineate elevated EC concentrations.
- Further soil investigation activities are required at the former SEP01-FL and SEP01-DL sample locations to delineate elevated arsenic and barium concentrations.

Costs included herein are estimates only and may change over time based on numerous factors. Accordingly, Operator makes no guarantees as to the accuracy of such cost estimates, thus providing an estimate for the next year below.

Operator anticipates the remaining cost for this project to be: \$ 10000

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:

Volume of E&P Waste (solid) in cubic yards 11

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 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

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 tank battery, 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. 04/11/2023

Proposed date of completion of Reclamation. 05/22/2024

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. 01/16/2023

Actual Spill or Release date, or date of discovery. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 02/16/2023

Proposed site investigation commencement. 06/01/2023

Proposed completion of site investigation. 09/30/2023

REMEDIAL ACTION DATES

Proposed start date of Remediation. 04/11/2023

Proposed date of completion of Remediation. 05/22/2024

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:

The proposed commencement and completion dates of the proposed supplemental site investigation has been updated to span through the end of the third quarter 2023.

OPERATOR COMMENT

Based on the analytical results collected during initial decommissioning activities, supplemental site investigation activities will be conducted at the Thornton 18L-401 tank battery to delineate the EC concentrations recorded in soil sample PWV01-N. Additionally, supplemental site investigation activities will be conducted to delineate the arsenic exceedances observed in SEP01-FL and SEP01-DL excavations and the arsenic and barium exceedances observed in SEP01-FL-B and SEP01-FL-N soil sample locations. PDC will conduct the supplemental site investigation following form approval and landowner negotiations.

Additionally, based on the analytical results and field observations recorded during the decommissioning of the Thornton 18L-401 Wellhead, PDC is submitting a closure request for this location.

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: 06/05/2023

Email: taspillremediationcontractor@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: 06/15/2023

Remediation Project Number: 27259

COA Type

Description

0 COA	
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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
403400921	INVESTIGATION/REMEDATION WORKPLAN (SUPPLEMENTAL)
403423088	ANALYTICAL RESULTS
403423089	PHOTO DOCUMENTATION
403423092	SOIL SAMPLE LOCATION MAP
403423097	SOIL SAMPLE LOCATION MAP
403423099	SOIL SAMPLE LOCATION MAP
403423100	SITE INVESTIGATION PLAN
403435233	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 8 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)