

Other Potential Receptors within 1/4 mile

Nearest Well: Domestic 105 feet S, Nearest Surface Water: Irrigation Ditch 452 feet SW, Occupied Buildings: 373 feet N, Livestock: 366 feet S, FWS Wetlands - Riverine, Irrigation Ditch 452 feet 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 & 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 September 7, 2021, field screening and confirmation soil sampling was conducted in accordance with the COGCC Rule 911 during the decommissioning and closure of the Buffalo Gardens 41-13 Tank Battery (Figure 1). Based on initial results, it was determined that a historic release was discovered beneath the former separator dump line. Following the discovery, mitigation activities were initiated to delineate and remove remaining hydrocarbon impacts. Between September 7 and 13, 2021, Approximately 129 cubic yards (CY) of impacted material were removed and transported to the Front Range Regional Landfill for disposal under PDC manifests. Upon arrival to the location on Monday, September 13, 2021, stormwater was observed in the excavation. Before continued excavation activities resumed, approximately 3 barrels of stormwater were removed from the excavation and transported to the NGL C6 facility for disposal under a PDC waste manifest. Following stormwater removal, the excavation was monitored to confirm the absence of groundwater. Additionally, a domestic well (Permit No. 32335), located approximately 30 feet northeast of the separator exhibits a static water level of 24 feet bgs. Based on the absence of groundwater recorded during excavation activities, the local static groundwater level, and the precipitation event that was observed on September 12, 2021, water observed within the base of the excavation was confirmed to be stormwater and not indicative of static groundwater levels.

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 September 8, 2021, one soil sample (SS01) was collected from the source area at approximately 2.5 feet below ground surface (bgs) and submitted to Summit Scientific Laboratories for analysis of the full COGCC Table 915-1 analyte list. Preliminary analytical results indicate that contaminants of concern (COCs) include BTEX, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, naphthalene (N), TPH, acenaphthene, benz(a)anthracene, chrysene, fluoranthene, fluorene, pyrene, 1-methylnaphthalene (M), 2-M, and barium. Between September 9 and 13, 2021, eleven (11) soil samples (SS02-SS10 & SS12-SS13) were collected from the sidewalls and base of the excavation at depths ranging from 6 to 15 feet bgs and were submitted for laboratory analysis of the above referenced COCs. In addition, two samples (SS11 & SS14) were collected at 2.5 feet bgs and submitted for Table 915 soil suitability constituents.

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):

During initial closure activities conducted on September 7, 2021, 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), produced water vessel (PWV), and separator flowline (SEP-FL). Samples were submitted for analysis of BTEX, N, 1,2,4-TMB, 1,3,5-TMB, and TPH (C6-C36). In addition, the samples collected below and adjacent to the AST and PWV were submitted for laboratory analysis of pH, EC, SAR, and boron. Analytical results indicated that constituents were in compliance with the applicable COGCC Table 915-1 standards in all laboratory sample locations. Analytical results are summarized in Tables 1-4. GPS coordinates and field screened VOC concentrations are summarized in Table 5.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 22

Number of soil samples exceeding 915-1 7

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 315

NA / ND

-- Highest concentration of TPH (mg/kg) 2460

-- Highest concentration of SAR 0.039

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 15

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 September 10, 2021, three background soil samples (BKG02) was collected at approximately 2.5 feet, 6 feet, and 15 feet bgs, respectively, from native material topographically up-gradient of the tank battery and submitted for analysis of pH, EC, SAR, boron and the COGCC Table 915-1 metals. Analytical results indicated that pH, arsenic, and selenium were in exceedance of the applicable regulatory standards in native soil.

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

Volume of solid waste (cubic yards) 129

Volume of liquid waste (barrels) 3

Is further site investigation required?

Three (3) additional background soil borings will be advanced to approximately 15 feet bgs via hand auger drilling methods. The background soil borings will be advanced adjacent to the former excavation extent to evaluate Table 915-1 metal concentrations in native material. Confirmation sampling will be completed by the end of the first quarter 2022.

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 September 7 and 13, 2021, approximately 129 cubic yards of impacted material were excavated adjacent to the separator dump line and transported to the Front Range Regional Landfill for disposal under PDC waste manifests. Approximately 3 barrels of stormwater were removed from the excavation and transported to the NGL C6 facility for disposal under a PDC waste manifest.

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.

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

Soil Remediation Summary

In Situ

Ex Situ

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

- Yes _____ Excavate and offsite disposal
- _____ If Yes: Estimated Volume (Cubic Yards) _____ 129
- _____ 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
- _____ 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 excavation activities.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other Confirmation Sampling Summary, Analyte Reduction Request, & 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 Confirmation Sampling Summary, Analyte Reduction Request, & 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 129

E&P waste (solid) description Hydrocarbon Impacted Soils

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Front Range Regional Landfill

Volume of E&P Waste (liquid) in barrels 3

E&P waste (liquid) description Stormwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: NGL C6

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.

Reclamation will be conducted in accordance with COGCC 1004 Series Rules.

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. 09/07/2024

Proposed date of completion of Reclamation. 09/07/2026

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. _____

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

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/28/2021

Proposed site investigation commencement. 03/31/2022

Proposed completion of site investigation. 03/31/2022

REMEDIAL ACTION DATES

Proposed start date of Remediation. 09/07/2021

Proposed date of completion of Remediation. 12/02/2026

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 for the waste characterization sample SS01 collected at 2.5 feet bgs, PDC is requesting that the COCs for the historic release discovered at the Buffalo Gardens 41-13 tank battery be reduced to the following: BTEX, 1,2,4-TMB, 1,3,5-TMB, N, TPH, acenaphthene, benz (a)anthracene, chrysene, fluoranthene, fluorene, pyrene, 1-methylnaphthalene (M), 2-M, and barium.

Following the approval of this form, PDC will conduct a supplemental site investigation to evaluate Table 915-1 metal concentrations in native material adjacent to the tank battery. This investigation will be conducted by the end of the first 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: 12/02/2021

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: CHRIS CANFIELD

Date: 12/07/2021

Remediation Project Number: 18608

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

	COGCC has reviewed and approves the Operator's request for a reduction in the list of contaminants of concern.
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**

402878070	FORM 27-SUPPLEMENTAL-SUBMITTED
402885035	ANALYTICAL RESULTS
402885036	PHOTO DOCUMENTATION
402885056	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)