

State of Colorado
Energy & Carbon Management Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109



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Receive Date:

Report taken by:

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 ECMC 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>1099 18TH STREET SUITE 1500</u> | | Phone: <u>(303) 860-5800</u> |
| City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80202</u> | | Mobile: <u>()</u> |
| Contact Person: <u>Karen Olson</u> | Email: <u>karen.olson@chevron.com</u> | |

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 21647 Initial Form 27 Document #: 402905269

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: <u>WELL</u> | Facility ID: _____ | API #: <u>123-21776</u> | County Name: <u>WELD</u> |
| Facility Name: <u>ECKHARDT 43-34</u> | Latitude: <u>40.354020</u> | Longitude: <u>-104.528640</u> | |
| ** correct Lat/Long if needed: Latitude: <u>40.354040</u> | | Longitude: <u>-104.528645</u> | |
| QtrQtr: <u>NESE</u> Sec: <u>34</u> Twp: <u>5N</u> Range: <u>64W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u> | | | |
| Facility Type: <u>SPILL OR RELEASE</u> | Facility ID: <u>481771</u> | API #: _____ | County Name: <u>WELD</u> |
| Facility Name: <u>Eckhardt 43-34</u> | Latitude: <u>40.354042</u> | Longitude: <u>-104.528648</u> | |
| ** correct Lat/Long if needed: Latitude: _____ | | Longitude: _____ | |
| QtrQtr: <u>NESE</u> Sec: <u>34</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 Residential / Agricultural

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

Nearest Well: Domestic - 1,320' N; Surface Water: Irrigation Ditch - 575' S; Occupied Building: 655' SE; Livestock: 0' (Within Pasture); FWS Wetlands: 575' S Riverine (R5UBFx).

Flowline conflict - Flowline crosses under irrigation ditch approximately 645' SSE of the wellhead; flowline then runs east towards the tank battery.

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 | GROUNDWATER | Refer to Tables and Figures | Lab analysis and field screening |
| Yes | SOILS | Refer to Tables and Figures | Lab analysis and field screening |

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Between March 11 and 14, 2022, field screening and confirmation soil sampling was conducted in accordance with the ECOM Rule 911 during the decommissioning of the Eckhardt 43-34 wellhead (Figure 1). Based on observed soil staining and olfactory impacts, it was determined that a historic release was discovered adjacent to the former wellhead. Additionally, during the in-situ abandonment of the flowline, soil staining and olfactory impacts were observed, it was determined that a historic release was discovered adjacent to the separator flowline riser. Following the discovery of the releases, mitigation activities were initiated and to date, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. During excavation activities, groundwater was encountered at adjacent to the wellhead at approximately 6.5 feet bgs and approximately 5.5 feet bgs adjacent to the separator flowline riser. Groundwater vacuum recovery was not conducted during excavation activities.

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 March 11, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the wellhead at 6 feet bgs and submitted for laboratory analysis of the full ECOM Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), arsenic and lead, based upon analytical results. Additionally on March 11, 2022, ten (10) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were below the applicable ECOM Table 915-1 standards. One soil sample (SS11) was collected from the sidewall of the final excavation extent at approximately 2.5 feet bgs to evaluate soil suitability for reclamation.

Proposed Groundwater Sampling

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

On March 11, 2022, during excavation activities, groundwater was encountered adjacent to the wellhead at approximately 6.5 feet bgs. Consequently, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that organic compound concentrations were below the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

On March 14, 2022, during excavation activities, groundwater was encountered adjacent to the separator at approximately 5.5 feet bgs. Consequently, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4-TMB, and 1,3,5-TMB. Analytical results indicated that 1,2,4-TMB concentrations were in exceedance of the Protection of Groundwater SSLs in sample GW01. No groundwater was recovered during excavation activities.

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 14, 2022, one soil sample (SS01) was collected from the impacted source material adjacent to the separator flowline riser at 4 feet bgs and submitted for laboratory analysis of the full ECMC Table 915-1 analytical suite. Analytical results indicate that the COCs include BTEX, 1,2,4-TMB, 1,3,5-TMB, naphthalene, TPH (C6-C36), chrysene, fluorene, pyrene, 1-M and 2-M, based upon analytical results. Additionally on March 14, 2022, seven (7) soil samples were collected from the sidewalls and base of the excavation and submitted for laboratory analysis of the above mentioned COCs. Analytical results indicate that organic constituents were in exceedance of the applicable ECMC Table 915-1 standards in multiple base and sidewall samples. Excavation activities were temporarily discontinued due to the active status of the tank battery.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 0
 Number of soil samples exceeding 915-1 0
 Was the areal and vertical extent of soil contamination delineated? No
 Approximate areal extent (square feet) 0

NA / ND

-- Highest concentration of TPH (mg/kg) 0
 -- Highest concentration of SAR 0
 BTEX > 915-1 No
 Vertical Extent > 915-1 (in feet) 0

Groundwater

Number of groundwater samples collected 4
 Was extent of groundwater contaminated delineated? No
 Depth to groundwater (below ground surface, in feet) 11
 Number of groundwater monitoring wells installed 5
 Number of groundwater samples exceeding 915-1 0

ND Highest concentration of Benzene (µg/l) _____
 ND Highest concentration of Toluene (µg/l) _____
 ND Highest concentration of Ethylbenzene (µg/l) _____
 ND Highest concentration of Xylene (µg/l) _____
 NA 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?

Twenty-nine background soil samples were collected near the flowline and analyzed for metals in soil per ECMC Table 915-1, and SAR. Background soil samples were collected from depths ranging between 2.5 to 13 feet below ground surface (ft bgs). The maximum background concentrations for SAR was observed to be 14.3. The maximum background concentrations with a 1.25x multiplier applied for arsenic and lead were calculated to be 17.5 mg/kg, and 18.9 mg/kg, respectively. All SAR concentrations observed during decommissioning were below background levels.

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

Volume of solid waste (cubic yards) 18 Volume of liquid waste (barrels) 0

Is further site investigation required?

Based on the final analytical results for soil samples collected during the supplemental site investigations arsenic and lead constituents remain in exceedance of the Table 915-1 Protection of Groundwater Site Soil Screening Levels (SSLs) in multiple locations. However, all soils are within background concentrations or below EPA Residential Screening Levels (RSLs) for lead.

Soil analytical results indicated that arsenic concentrations remain in exceedance of the applicable ECMC Table 915-1 standards. Based on the data, further data interpretation and evaluation of arsenic and lead concentrations in soil is necessary. PDC is currently in the process of evaluating site arsenic and lead concentrations in relation to background concentrations. A path forward will be prepared and included on the next quarterly Supplemental Form 27.

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 March 11 and 14, 2022, approximately 8 cubic yards of impacted material was removed at the wellhead and 10 cubic yards of impacted material was removed adjacent to the separator flowline riser. All material removed was transported to the North Weld Waste Management Facility in Ault, CO for disposal under PDC waste manifests. No groundwater was recovered during excavation 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.

Twenty-two (22) soil borings (SB01-SB22) have been advanced adjacent to the former wellhead location to vertically and horizontally delineate arsenic and lead exceedances recorded during excavation activities. Eighty-seven (87) soil samples were collected from the soil borings at depths ranging from 2 feet to 13 feet bgs and were submitted to Summit Scientific Laboratory for analysis of arsenic and lead. Soil analytical results indicated that elevated arsenic and/or lead concentrations were observed across the site and in aforementioned native material soil borings samples.

Consequently, on May 9, 2024, five groundwater samples were collected from the five (5) existing groundwater monitoring wells onsite, BH01-BH05. Groundwater samples were submitted for laboratory analysis of dissolved arsenic and dissolved lead.

Arsenic and lead concentrations in soil will be re-evaluated following the receipt of analytical results from further groundwater monitoring.

In the fourth quarter of 2022, monitored natural attenuation (MNA) was selected as the remediation strategy for this site and will remain the selected remediation strategy through the first quarter 2025.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 18

_____ Air sparge / Soil vapor extraction

_____ Name of Licensed Disposal Facility or ECMC 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

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.

On October 21, 2022, groundwater monitoring was initiated at the five site monitoring wells (BH01 - BH05) at the former Eckhardt 43-34 wellhead location. PDC will conduct quarterly groundwater monitoring at the five site monitoring wells (BH01 - BH05) until closure criteria are met. Groundwater samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, by EPA Method 8260B, chloride and sulfate anions by EPA Method 300.0, total dissolved solids (TDS) by Method SM 2540C, dissolved arsenic and dissolved lead in accordance with Table 915-1 standards.

Fourth quarter 2024 analytical results indicated that organic compound concentrations were in compliance with the applicable regulatory standards in all four sampled monitoring well locations. Additionally, inorganic parameters and dissolved metals concentrations were in compliance with the applicable regulatory standards or within 1.25x the background concentrations of the up/cross-gradient monitoring well (BH04) in all sampled monitoring well locations.

A groundwater sample was not collected from monitoring well BH03 due to the well being dry at the time of the fourth quarter monitoring event.

Arsenic and lead concentrations in soil will be re-evaluated following the receipt of analytical results from further groundwater monitoring.

Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? No _____

Does the previous reply indicate consideration of background concentrations? _____

Does Groundwater meet Table 915-1 standards? No _____

Is additional groundwater monitoring to be conducted? Yes _____

Operator shall comply with the ECMC 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 source mass removal activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. The location will be reclaimed in accordance with the ECMC 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. 01/10/2022

Proposed date of completion of Reclamation. 04/01/2029

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. 11/18/2021

Actual Spill or Release date, or date of discovery. 03/11/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/10/2022

Proposed site investigation commencement. 05/09/2024

Proposed completion of site investigation. 05/09/2024

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/11/2022

Proposed date of completion of Remediation. 12/31/2027

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:

Based on the need for additional groundwater monitoring and data evaluation of arsenic and lead concentrations in soils, the proposed date of site investigation commencement and the proposed date of the completion of site investigation was adjusted to reflect the recent May 9, 2024 groundwater sampling event.

OPERATOR COMMENT

This Supplemental Form 27 has been submitted to summarize quarterly groundwater monitoring activities and analytical results collected during the fourth quarter 2024 at the former Eckhardt 43-34 Wellhead location.

Fourth quarter 2024 analytical results indicated that organic compound concentrations were in compliance with the applicable regulatory standards in all four sampled monitoring well locations. Additionally, inorganic parameters and dissolved metals concentrations were in compliance with the applicable regulatory standards or within 1.25x the background concentrations of the up/cross-gradient monitoring well (BH04) in all sampled monitoring well locations.

A groundwater sample was not collected from monitoring well BH03 due to the well being dry at the time of the fourth quarter monitoring event.

Arsenic and lead concentrations in soil will be evaluated following the receipt of analytical results from further groundwater monitoring.

Supplemental Form 27s will be prepared and submitted on a quarterly schedule to provide updates and progress of the remediation until closure criteria has been achieved.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Jake Whritenour

Title: Environmental Consultant

Submit Date: _____

Email: tas-chevron-1@tasman-geo.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: _____

Date: _____

Remediation Project Number: 21647

COA Type

Description

| <u>COA Type</u> | <u>Description</u> |
|-----------------|--------------------|
| 0 COA | |

ATTACHMENT 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

| | |
|-----------|--------------------|
| 404093584 | MONITORING REPORT |
| 404093586 | ANALYTICAL RESULTS |

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

| <u>User Group</u> | <u>Comment</u> | <u>Comment Date</u> |
|-------------------|----------------|---------------------|
| | | Stamp Upon Approval |

Total: 0 comment(s)