

State of Colorado
Oil and Gas Conservation Commission

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401645463
Receive Date:
06/29/2018

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.

Refer to Rules 340, 905, 906, 907, 908, 909, and 910

OPERATOR INFORMATON

| | | |
|--|------------------------------------|------------------------------|
| Name of Operator: <u>PDC ENERGY INC</u> | Operator No: <u>69175</u> | Phone Numbers |
| Address: <u>1775 SHERMAN STREET - STE 3000</u> | | Phone: <u>(303) 860-5800</u> |
| City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80203</u> | | Mobile: <u>()</u> |
| Contact Person: <u>Karen Olson</u> | Email: <u>karen.olson@pdce.com</u> | |

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 6942 Initial Form 27 Document #: 2223871

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 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 checked="" 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 type="checkbox"/> Other _____ |

SITE INFORMATION N Multiple Facilites (in accordance with Rule 909.c.)

| | | | |
|--|---|-------------------------------|---|
| Facility Type: <u>LOCATION</u> | Facility ID: <u>323620</u> | API #: _____ | County Name: <u>WELD</u> |
| Facility Name: <u>NOFFSINGER-65N64W 5SEW</u> | Latitude: <u>40.430030</u> | Longitude: <u>-104.576470</u> | |
| | ** correct Lat/Long if needed: Latitude: <u>40.428360</u> | Longitude: <u>-104.574290</u> | |
| QtrQtr: <u>SEW</u> | Sec: <u>5</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 CULTIVATED

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? No

Other Potential Receptors within 1/4 mile

SURFACE WATER AREA ~1,100' S, AGRICULTURAL WATER WELL 20' E, BUILDINGS ~900' SE, DEPTH TO GROUNDWATER 43' BGS.

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 type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids | _____ |
| <input checked="" type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input 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 Table 1 | Excavation, drilling, and 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.

THE IMMEDIATE RESPONSE ACTION WAS PROVIDED IN A FORM 19 SUBMITTED ON FEBRUARY 27, 2012. AN AERIAL MAP OF THE SITE IS INCLUDED ON FIGURE 1.

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):

Per the COGCC condition of approval (COA) issued on January 31, 2017, additional investigation will be conducted to determine the vertical extent of petroleum hydrocarbon impacts in borings BH05, BH06, and BH10.

Proposed Groundwater Sampling

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

Per the COGCC COA issued on January 31, 2017, should petroleum hydrocarbon impacts in exceedance of COGCC standards extend into groundwater, groundwater samples will be collected.

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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 6
Number of soil samples exceeding 910-1 3
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 1600

NA / ND

-- Highest concentration of TPH (mg/kg) 2110
NA Highest concentration of SAR
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 43

Groundwater

Number of groundwater samples collected 2
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 44'
Number of groundwater monitoring wells installed 0
Number of groundwater samples exceeding 910-1 2

-- Highest concentration of Benzene (µg/l) 2200
-- Highest concentration of Toluene (µg/l) 2600
-- Highest concentration of Ethylbenzene (µg/l) 190
-- Highest concentration of Xylene (µg/l) 2000
NA 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?

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?

Site investigation activities conducted in accordance with the COGCC COA are summarized in the attached Remediation Annual Progress Assessment Report. Results of the investigation indicate that the lateral extent of soil impacts remains undefined to the east. Soil samples collected above the groundwater table from boring PSB-15 exhibited benzene and TPH concentrations in exceedance of regulatory standards. Two grab groundwater samples were collected from within the hollow stem drill flights and exhibited constituent concentrations in exceedance of regulatory standards. However, the consultant did not properly sample groundwater in accordance with PDC protocols. Thus, PDC does not feel that this data is representative of sub-surface conditions. As a result, three (3) monitoring wells will be installed to assess groundwater conditions. One well will be installed within the source area and two wells will be installed and used to determine the groundwater flow direction. All wells will be properly developed prior to sampling.

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.

THE SOURCE AREA WAS PREVIOUSLY EXCAVATED AND IMPACTED MATERIAL WAS TRANSPORTED AND DISPOSED OF AS DESCRIBED IN THE FORM 19 SUBMITTED ON FEBRUARY 27, 2012.

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.

Between October 2013 and December 2015, a solar powered soil vapor extraction (SVE) fan was operational at BH01 to address remaining petroleum hydrocarbon impacts in soil. In April 2016, a full-scale SVE remediation system was installed. The system has remained operational since April 2016 at six (6) SVE and breather wells (BH05 – BH10).

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

_____ If Yes: Estimated Volume (Cubic Yards) _____ 100

Yes _____ 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

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 April 12, 2018 three groundwater monitoring wells (MW-1 - MW-3) were installed, surveyed and subsequently sampled to verify the groundwater flow direction and evaluate potential impacts to the groundwater. Depth to groundwater in all three wells was measured at 43.5 feet bgs and the flow direction is to the southwest. One well MW-2 was installed in the source area where identified impacted soils are present and actively being remediated. The other two wells were installed to verify flow direction and serve as point of compliance. Analytical results identified that with the exception of Benzene in MW-2 all other constituent concentrations from the three wells were below COGCC table 910-1 standards. Based upon these findings, the wells will be continued to be monitored on a quarterly basis and results reported annually. The groundwater investigation report summarizing the April 2018 activities is attached.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other _____

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other Groundwater Assessment Summary _____

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? _____

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

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

E&P waste (solid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

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

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.

The tank battery was decommissioned and will not be reconstructed. The area will be reclaimed in accordance with COGCC Rule 1004.

Is the described reclamation complete? No _____

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. _____

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). _____

Date of commencement of Site Investigation. 11/23/2011

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 11/23/2011

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

PDC has contacted Olsson and confirmed that the irrigation well was incorrectly mapped on the figures included with the 2017 Annual Report submitted in April 2018. The location of the irrigation well is correctly mapped on the figure included with the recent Groundwater Investigation Report dated May 16, 2018. For your records, attached is Figure 2 from the recent Groundwater Investigation Report with the soil data removed to make it easier to read.

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 EHS Manager _____

Submit Date: 06/29/2018 _____

Email: karen.olson@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: 07/17/2018 _____

Remediation Project Number: 6942 _____

COA Type

Description

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

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

| <u>Att Doc Num</u> | <u>Name</u> |
|--------------------|--------------------------------|
| 401645463 | FORM 27-SUPPLEMENTAL-SUBMITTED |
| 401645580 | SITE INVESTIGATION REPORT |
| 401690422 | MAP |

Total Attach: 3 Files

General Comments

User Group

Comment

Comment Date

| <u>User Group</u> | <u>Comment</u> | <u>Comment Date</u> |
|-------------------|--|---------------------|
| Environmental | Per Operator, "The second quarterly groundwater sampling event is scheduled for mid-July 2018. Following the receipt of the flow direction map and of the analytical results, PDC will discuss a plan to install an addition well to evaluate potential groundwater impacts between MW-2 and the irrigation well." | 07/17/2018 |

Total: 1 comment(s)