FORM 27 Rev 3/16

State of Colorado
Oil and Gas Conservation Commission

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Report taken by: Candice (Nikki) Graber

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: PDC ENERGY INC Operator No: 69175
Address: 1775 SHERMAN STREET - STE 3000
City: DENVER State: CO Zip: 80203
Contact Person: Karen Olson Email: Karen.Olson@pdce.com

Phone Numbers
Phone: (303) 860-5800
Mobile: ( )

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 5398 Initial Form 27 Document #: 1761138

PURPOSE INFORMATION

- [ ] 901.e. Sensitive Area Determination
- [ ] 909.c.(1), Rule 905: Pit or PW vessel closure
- [ ] 909.c.(2), Rule 906: Spill/Release Remediation
- [ ] 909.c.(3), Rule 907.e.: Land treatment of oily waste
- [ ] 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure
- [x] 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
- [ ] Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
- [ ] Rule 909.e.(2)B.: Closure of remediation project
- [ ] Rule 906.c.: Director request
- [ ] Other

SITE INFORMATION

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

Facility Type: LOCATION Facility ID: 323514 API #: County Name: WELD
Facility Name: SKURICH-ROTHE-65N63W 6NENE Latitude: 40.433920 Longitude: -104.472530
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: NENE Sec: 6 Twp: 5N Range: 63W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SM
Most Sensitive Adjacent Land Use PASTURE
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

SURFACE WATER 2110' NW, BUILDING 4280' NW, WATER WELL 2300' S AND DEPTH TO GROUNDWATER 50' BGS.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [x] **E&P Waste**
  - [ ] Produced Water
  - [x] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	75' N-S X 30' E-W X 32' BGS	SOIL SAMPLES

INITIAL ACTION SUMMARY

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

A FORM 19 WAS SUBMITTED ON MAY 28, 2009 (SPILL #1943782).

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):

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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected: 0

Number of soil samples exceeeding 910-1:

Was the areal and vertical extent of soil contamination delineated?:

Approximate areal extent (square feet):

NA / ND

Highest concentration of TPH (mg/kg):

Highest concentration of SAR:

BTEX > 910-1:

Vertical Extent > 910-1 (in feet):

Groundwater

Number of groundwater samples collected: 8

Was extent of groundwater contaminated delineated?: No

Depth to groundwater (below ground surface, in feet): 38`

Number of groundwater monitoring wells installed: 10

Number of groundwater samples exceeding 910-1: 2

-- Highest concentration of Benzene (µg/l): 470

-- Highest concentration of Toluene (µg/l): 580

-- Highest concentration of Ethylbenzene (µg/l): 52

-- Highest concentration of Xylene (µg/l): 1000

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?

PLEASE REFER TO ATTACHED LETTER. THE SVE WELL WILL BE MONITORED FOR THE NEXT 12 MONTHS TO 18 MONTHS AND SAMPLES WILL BE COLLECTED QUARTERLY IN ORDER TO EVALUATE THE CONTINUED EFFECTIVENESS AND NATURAL ATTENUATION. AFTER 12 MONTHS TO 18 MONTHS, PDC RECOMMENDS EVALUATING THE DATA TO DETERMINE WHETHER CONTINUED USE OF PASSIVE SVE TECHNIQUES IS SUFFICIENT FOR MITIGATING THE REMAINING IMPACTS.

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.

PLEASE REFER TO ATTACHED LETTER. PETROLEUM HYDROCARBON IMPACTED SOIL ABOVE COGCC ALLOWABLE LEVELS WAS EXCAVATED TO A DEPTH OF 15 FT BGS. A SOIL SAMPLE COLLECTED FROM THE BASE OF THE EXCAVATION INDICATED THE TPH CONCENTRATION EXCEEDED THE COGCC TABLE 910-1 CONCENTRATION LEVELS. PDC FIELD-SCREENED AND EXCAVATED IMPACTED SOIL TO 32 FEET BGS, WHERE HANBY FIELD TEST KIT RESULTS INDICATED ELEVATED CONCENTRATIONS OF PETROLEUM HYDROCARBONS STILL EXISTED. ON JUNE 12, 2009, A BORING WAS ADVANCED IN THE SOURCE AREA OF THE EXCAVATION IN ORDER TO DEFINE THE VERTICAL EXTENT OF SOIL IMPACT. LTE COLLECTED A CONFIRMATION SOIL SAMPLE FROM THE TERMINUS OF THE BORING AT 47 FEET BGS AND ANALYTICAL RESULTS INDICATED BTEX AND TPH CONCENTRATIONS WERE BELOW COGCC TABLE 910-1 CONCENTRATION LEVELS. AS THE VERTICAL EXTENT OF IMPACTS HAD BEEN DEFINED, A PASSIVE SVE WELL WAS COMPLETED IN THE BORING WITH A SCREENED INTERVAL FROM 25 TO 50 FEET BGS.

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.

Due to persisting BTEX concentrations above the COGCC regulatory standards, EFR/AS activities were reinitiated during the second quarter 2014. EFR/AS activities continued through April 2018, but were discontinued on May 1, 2018. Operation of the SVE system, passive skimmer LNAPL bailer, and manual LNAPL removal will continue through the first quarter 2019. Quarterly groundwater monitoring will continue until four consecutive quarters of monitoring data indicate BTEX concentrations are in compliance with the applicable COGCC Table 910-1 groundwater standards.

Soil Remediation Summary

☐ **In Situ**

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

☐ **Ex Situ**

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

PDC will continue to sample the ten (10) monitoring wells (BH01 - BH04, BH05R, BH07 - BH11) and two remediation wells (BH06 - SVE Well) on a quarterly basis to assess the dissolved phase petroleum hydrocarbon impacts in groundwater using USEPA Method 8260. Groundwater sampling will continue until four consecutive quarters of groundwater monitoring data indicate that BTEX concentrations are in compliance with the COGCC Table 910-1 groundwater standards.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☒ Quarterly ☐ Semi-Annually ☐ Annually ☐ Other _____

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

☐ Other _____

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? No

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 SITE WAS RESTORED TO PRE-RELEASE GRADE. PDC'S PRODUCTION FACILITY REMAINS AT THE SITE.

Is the described reclamation complete? _____

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. 05/20/2009

Date of completion of Site Investigation. 06/12/2010

REMEDIAL ACTION DATES

Date of commencement of Remediation. 05/22/2009

Date of completion of Remediation.

SITE RECLAMATION DATES

Date of commencement of Reclamation.

Date of completion of Reclamation.

OPERATOR COMMENT

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:` 11/30/2018

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: Candice (Nikki) Graber

Date: 12/05/2018

Remediation Project Number: 5398

COA Type	Description

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
401856401	FORM 27-SUPPLEMENTAL-SUBMITTED
401856405	MONITORING REPORT

Total Attach: 2 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)