

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
401533937
Receive Date:
02/05/2018

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 #: 10179 Initial Form 27 Document #: 401277415

PURPOSE INFORMATION

<input type="checkbox"/> 901.e. Sensitive Area Determination	<input checked="" type="checkbox"/> 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
<input checked="" 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 checked="" 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>323125</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Wacker 5N64W10G</u>	Latitude: <u>40.415468</u>	Longitude: <u>-104.544237</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SWNW</u>	Sec: <u>10</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 Cropland

Is domestic water well within 1/4 mile? Yes Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

Depth to shallow groundwater is approximately 31 feet below ground surface. An occupied building is approximately 495 feet from the site.

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	GROUNDWATER	See attached Figure 2 and Table 2	Drilling and Groundwater Sampling
Yes	SOILS	See attached Figure 2 and Table 1	Excavation, Drilling, and 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.

Excavation activities were initiated on March 20, 2017, following the discovery of a historic release during facility decommissioning activities. Approximately 510 cubic yards of impacted material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Soil encountered in the excavation area and adjacent test pit locations was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Three soil samples (SS01, SS02, and TP02) were collected from the excavation area and northern test pit at depths ranging between 16 and 26 feet below ground surface (bgs). Soil samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260, and TPH – diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated constituent concentrations were in exceedance of COGCC Table 910-1 standards in the two soil samples (SS01 and SS02) collected from the excavation area. The excavation extent and soil sample locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and the laboratory analytical reports are included as Attachment A.

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 April 10, 2017, a site investigation was conducted to determine the lateral and vertical extent of remaining petroleum hydrocarbon impacts. Seven soil borings (SB01 – SB07) were advanced within and adjacent to the excavation area using direct push drilling methods. Soil encountered in the soil borings was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Soil samples were collected from the two soil borings (SB01 and SB03) which exhibited elevated PID readings. Soil samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260, and TPH – diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated TPH concentrations were in exceedance of COGCC Table 910-1 standards in both soil sample locations.

Proposed Groundwater Sampling

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

Groundwater was encountered in the first source soil boring at approximately 31 feet below ground surface (bgs). As such, the remaining soil borings were advanced to groundwater and temporary monitoring wells were installed. On April 13, 2017, groundwater samples were collected from the seven temporary well locations (BH01 – BH07) and submitted for laboratory analysis of BTEX by USEPA Method 8260. Analytical results indicated benzene concentrations were in exceedance of COGCC Table 910-1 at temporary monitoring well BH01. BTEX concentrations were below regulatory standards at the remaining well locations.

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 5
Number of soil samples exceeding 910-1 4
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 4200

NA / ND

-- Highest concentration of TPH (mg/kg) 1940
NA Highest concentration of SAR
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 31

Groundwater

Number of groundwater samples collected 7
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 31`
Number of groundwater monitoring wells installed 7
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 9.7
-- Highest concentration of Toluene (µg/l) 1.2
-- Highest concentration of Ethylbenzene (µg/l) 1.8
-- Highest concentration of Xylene (µg/l) 5.6
NA Highest concentration of Methane (mg/l)

Surface Water

0 Number of surface water samples collected
0 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?

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 January 8 and January 26, 2018, approximately 4,592 cubic yards of impacted material were excavated and transported to the North Weld Waste Management Facility in Ault, Colorado 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.

Between January 8 and January 26, 2018, source removal activities were conducted to mitigate remaining petroleum hydrocarbon impacts. Soil from the excavation was field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Twenty (20) soil samples were collected from the sidewalls of the final excavation extent at depths of 18 feet and 28 feet below ground surface (bgs). Soil samples were submitted to Summit Scientific Laboratories in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that organic compound concentrations were below applicable COGCC Table 910-1 standards in all sample locations. Groundwater was encountered in the excavation at approximately 34 feet bgs. Groundwater recovery was conducted in conjunction with excavation activities to allow for the removal of saturated source material to a depth of 39 feet bgs. Approximately 1,310 barrels of groundwater were removed via vacuum recovery and transported to a licensed disposal facility. On January 29, 2018, one groundwater sample (GW01) was collected from the excavation and submitted for laboratory analysis of BTEX by USEPA Method 8260. Analytical results indicated that BTEX concentrations were below the applicable COGCC Table 910-1 groundwater standards. Sample locations and the final excavation extent is illustrated in Figure 1. Soil and groundwater analytical results are summarized in Table 1 and Table 2, respectively. The laboratory reports are included in Attachment A.

Soil Remediation Summary

In Situ

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

Ex Situ

Yes Excavate and offsite disposal
_____ If Yes: Estimated Volume (Cubic Yards) 4592
Name of Licensed Disposal Facility or COGCC Facility ID # _____
No Excavate and onsite remediation
No Land Treatment
No Bioremediation (or enhanced bioremediation)
Yes Chemical oxidation
No 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.

The seven (7) existing monitoring well locations (BH01 - BH07) were destroyed during excavation activities. Consequently, one temporary monitoring well (BH08) was installed down-gradient of the release area on January 31, 2018, to confirm dissolved-phase impacts did not migrate down-gradient during excavation activities. A groundwater sample was collected from the well on February 1, 2018 and submitted for laboratory analysis of BTEX by USEPA Method 8260. Analytical results indicated that BTEX concentrations were below the applicable regulatory standards in monitoring well BH08. Temporary monitoring well locations and groundwater analytical results are illustrated on Figure 2. Groundwater analytical results are summarized in Table 2 and the laboratory report is included in Attachment A.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other No Further Action (NFA) Request

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other No Further Action (NFA) Request

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 4592

E&P waste (solid) description Petroleum hydrocarbon impacted soils

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: North Weld Waste Management Facility

Volume of E&P Waste (liquid) in barrels 1310

E&P waste (liquid) description Groundwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Licensed disposal facility.

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? Yes

Do all soils meet Table 910-1 standards? Yes

Does the previous reply indicate consideration of background concentrations? No

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? Yes

Is additional groundwater monitoring to be conducted? No

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.

Per land owners request, the excavation area was left open and incorporated into the existing augmentation pond. Sidewalls were sloped to match the pre-existing pond grade.

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 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. 03/17/2017

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/20/2017

Date of commencement of Site Investigation. 04/10/2017

Date of completion of Site Investigation. 04/13/2017

REMEDIAL ACTION DATES

Date of commencement of Remediation. 01/08/2018

Date of completion of Remediation. 02/01/2018

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

Based on the analytical results described herein, PDC is requesting a No Further Action (NFA) determination for this release.

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: 02/05/2018 _____

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: 02/21/2018 _____

Remediation Project Number: 10179 _____

COA Type**Description**

	Based on the information presented, it appears that no further action is necessary at this time and the COGCC approves the closure request. However, should future conditions at the site indicate contaminant concentrations in soils exceeding COGCC standards or if ground water is found to be impacted, then further investigation and/or remediation activities may be required. In addition, the surface area disturbed by the remediation activity shall be reclaimed in accordance with the 1000 Series Reclamation Rules.
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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**

401533937	FORM 27-SUPPLEMENTAL-SUBMITTED
401534533	SOIL SAMPLE LOCATION MAP
401534535	SITE MAP
401534548	ANALYTICAL RESULTS

Total Attach: 4 Files

General Comments**User Group****Comment****Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)