

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
401365192
Receive Date:
08/04/2017

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 INFORMATION

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 #: 10314 Initial Form 27 Document #: 401360516

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 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 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

Y Multiple Facilities (in accordance with Rule 909.c.)

Facility Type: <u>LOCATION</u>	Facility ID: <u>307227</u>	API #: _____	County Name: <u>LARIMER</u>
Facility Name: <u>JACKSON-65N68W 1SESE</u>	Latitude: <u>40.424580</u>	Longitude: <u>-104.949190</u>	
** correct Lat/Long if needed: Latitude: <u>40.424472</u>		Longitude: <u>-104.949443</u>	
QtrQtr: <u>SESE</u>	Sec: <u>1</u>	Twp: <u>5N</u>	Range: <u>68W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>
Facility Type: <u>LOCATION</u>	Facility ID: <u>322737</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>MININGER/HOFF-66N65W 15NWNW</u>	Latitude: <u>40.491890</u>	Longitude: <u>-104.656830</u>	
** correct Lat/Long if needed: Latitude: <u>40.491668</u>		Longitude: <u>-104.654692</u>	
QtrQtr: <u>NWNW</u>	Sec: <u>15</u>	Twp: <u>6N</u>	Range: <u>65W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>
Facility Type: <u>LOCATION</u>	Facility ID: <u>323514</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SKURICH-ROTHER-65N63W 6NENE</u>	Latitude: <u>40.433920</u>	Longitude: <u>-104.472530</u>	
** correct Lat/Long if needed: Latitude: <u>40.434186</u>		Longitude: <u>-104.472000</u>	
QtrQtr: <u>NENE</u>	Sec: <u>6</u>	Twp: <u>5N</u>	Range: <u>63W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

Facility Type: LOCATION Facility ID: 330888 API #: County Name: WELD
Facility Name: J & L FARMS-66N63W 29SESE Latitude: 40.452030 Longitude: -104.453030
** correct Lat/Long if needed: Latitude: 40.450352 Longitude: -104.455677
QtrQtr: SESE Sec: 29 Twp: 6N Range: 63W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION Facility ID: 331429 API #: County Name: WELD
Facility Name: STATE 5519-65N63W 8NENE Latitude: 40.419580 Longitude: -104.454170
** correct Lat/Long if needed: Latitude: 40.419993 Longitude: -104.456676
QtrQtr: NENE Sec: 8 Twp: 5N Range: 63W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION Facility ID: 331604 API #: County Name: WELD
Facility Name: WELLS RANCH-66N63W 34SWNW Latitude: 40.444750 Longitude: -104.430310
** correct Lat/Long if needed: Latitude: 40.446362 Longitude: -104.426321
QtrQtr: SWNW Sec: 34 Twp: 6N Range: 63W Meridian: 6 Sensitive Area? Yes

Facility Type: LOCATION Facility ID: 331696 API #: County Name: WELD
Facility Name: UPV-65N63W 5NWNE Latitude: 40.434280 Longitude: -104.458000
** correct Lat/Long if needed: Latitude: 40.434761 Longitude: -104.457936
QtrQtr: NWNE Sec: 5 Twp: 5N Range: 63W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

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

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

Various

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 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
No	SOILS	No impacts encountered.	Excavation 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.

As required by COGCC Rule 905.B, a soil sample will be collected when buried or partially buried produced water vessels are removed from service. One soil sample will be collected below the removed water vessel and submitted for laboratory analysis of identified Table 910-1 chemicals-of-concern (COC's) which include benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, total petroleum hydrocarbons (TPH) – gasoline range organics (GRO), TPH – diesel range organics (DRO), electrical conductivity (EC), and pH. The soil sample will be analyzed for sodium adsorption ratio (SAR) should initial EC concentrations exceed Table 910-1 soil standards. Excavation sidewalls will be field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). Should elevated PID readings be observed on the excavation sidewalls, soil samples will be collected and analyzed for the above referenced organic and inorganic compounds. If shallow groundwater is encountered during the produced water vessel removal, a groundwater sample will be collected and submitted for laboratory analysis of BTEX.

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 7

Number of soil samples exceeding 910-1 2

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

Approximate areal extent (square feet) 100

NA / ND

-- Highest concentration of TPH (mg/kg) 130

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 7

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 910-1

 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

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.

Any soil impacted above COGCC Table 910-1 standards was removed from the excavation area. Impacted soil in exceedance of Table 910-1 standards for only EC, pH, or SAR will not be removed below the root zone (established at 3 feet below ground surface, per COGCC guidance).

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.

Reference Blanket Remediation # 9440.

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
- _____ 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.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other Produced Water Vessel Closure

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

Other Produced Water Vessel Closure Report

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? Yes _____

Do all soils meet Table 910-1 standards? No _____

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? Yes _____

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.

Following excavation activities, the location was backfilled, compacted, and re-contoured to match pre-existing conditions. If the facility was decommissioned, the location was reclaimed in accordance with COGCC Rule 1004.

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). 07/05/2017

Date of commencement of Site Investigation. 07/05/2017

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/21/2017

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

PDC is submitting produced water vessel closure requests for the following sites: J&L Farms 34, 44-29; Jackson 34, 44-IU, 1-DU; Mininger-Hoff 1, 2; Skurich Rothe 31-41-6; State 5519 31, 41, 42-8; Wells Ranch 11, 12, 21-34; and Wells Ranch 31, 41-5.

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: 08/04/2017

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: 08/07/2017

Remediation Project Number: 10314

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.
	Soil sample analytical results indicate that the electrical conductivity of soil beneath the former produced water vessel at the Jackson 34,44-IU,I-DU location is above the Table 910-1 Allowable Level of 4 mmhos/cm. This sample was collected at a depth greater than 3 feet below the ground surface. Therefore, COGCC will not require further action at this time. However, material with elevated pH, SAR, or EC should be buried under a minimum of three (3) feet of backfill cover and soil that satisfies either the Table 910-1 levels for pH, SAR, and EC or the background levels for such contaminants within three (3) feet of the ground surface at the site. In addition, the soil horizons must be replaced in their original relative position and the location must be reclaimed in accordance with 1000 Series Rules, including the establishment of vegetative cover on non-cropland and successful crop growth on cropland.

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**

401365192	FORM 27-SUPPLEMENTAL-SUBMITTED
401365240	SITE INVESTIGATION REPORT
401365242	SITE INVESTIGATION REPORT
401365247	SITE INVESTIGATION REPORT
401365257	SITE INVESTIGATION REPORT
401365290	SITE INVESTIGATION REPORT
401365323	SITE INVESTIGATION REPORT
401365388	SITE INVESTIGATION REPORT

Total Attach: 8 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)