

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 INFORMATION

Name of Operator: <u>KERR MCGEE OIL & GAS ONSHORE LP</u>	Operator No: <u>47120</u>	Phone Numbers
Address: <u>P O BOX 173779</u>		Phone: <u>(970) 336-3500</u>
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80217-3779</u>
Contact Person: <u>Phil Hamlin</u>	Email: <u>Phil.Hamlin@anadarko.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10503 Initial Form 27 Document #: 401395702

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 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 Facilities (in accordance with Rule 909.c.)

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>451306</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Thompson 13-33</u>		Latitude: <u>40.349113</u>	Longitude: <u>-104.905567</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>SWSW</u>	Sec: <u>33</u>	Twp: <u>5N</u>	Range: <u>67W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Agriculture and Residential

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 and wetlands approximately 800 feet (ft) west, occupied building approximately 330 ft west-southwest, livestock approximately 400 ft southwest, and groundwater approximately 2 ft below ground surface (bgs).

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	See attached data	Groundwater Samples/Lab Analysis
Yes	SOILS	43ft E-W x 16ft N-S x 4ft bgs	Soil Samples/Lab Analysis

INITIAL ACTION SUMMARY

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

In June 2017, a dump line with a corrosion hole was encountered while excavating a surface stain at the Thompson 13-33 tank battery facility. The volume of the release is unknown. The petroleum hydrocarbon impacted soil was excavated.

In August 2017, groundwater with petroleum hydrocarbon impacts were encountered while removing the partially-buried produced water sump. The groundwater sample exceedance was associated with the June 2017 dump line corrosion hole release.

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):

Between June 26 and 29, 2017, 9 soil samples were collected from the excavation for laboratory analysis of total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), pH, and specific conductivity (EC). Analytical results indicated that BTEX, TPH, pH, and EC levels were in full compliance with Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels at the lateral extent of the excavation.

In August 2017, soil sampling was conducted to determine if petroleum hydrocarbon impacts to subsurface soil resulted from operating a partially-buried produced water sump at the site. Soil samples were collected for BTEX, TPH, pH, and EC analysis. Laboratory analytical results indicated that BTEX, TPH, pH, and EC levels were in full compliance with COGCC Table 910-1 allowable levels at the lateral extent of the excavation. For additional details, please refer to the Sump Closure Report submitted to the COGCC on January 22, 2018.

Proposed Groundwater Sampling

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

On June 26, 2017, groundwater sample GW01 was collected from the excavation and submitted for laboratory analysis of BTEX. Laboratory analytical results indicated that benzene exceeded the COGCC Table 910-1 allowable level at a concentration of 1,320 micrograms per liter (µg/L). On June 30, 2017, following removal of impacted groundwater from the excavation, sample GW02 was collected for BTEX analysis. Laboratory analytical results for GW02 indicated that benzene exceeded the COGCC allowable level at a concentration of 16.4 µg/L. The groundwater analytical results are summarized on Table 1.

In August 2017, a groundwater sample was collected from the sump excavation which exceeded the COGCC Table 910-1 allowable level for benzene. The exceedance was determined to be associated with the June 2017 dump line corrosion hole release. For additional details of the sump excavation and analytical results, please refer to the Sump Closure Report submitted to the COGCC on January 22, 2018.

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 13

Number of soil samples exceeding 910-1 3

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

Approximate areal extent (square feet) 690

NA / ND

-- Highest concentration of TPH (mg/kg) 3795

NA Highest concentration of SAR

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 4

Groundwater

Number of groundwater samples collected 24

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 2'

Number of groundwater monitoring wells installed 7

Number of groundwater samples exceeding 910-1 6

-- Highest concentration of Benzene (µg/l) 1790

-- Highest concentration of Toluene (µg/l) 273

-- Highest concentration of Ethylbenzene (µg/l) 92.5

-- Highest concentration of Xylene (µg/l) 800

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?

A background soil sample was submitted to the laboratory and placed on hold for analysis. Laboratory analytical results for excavation soil samples indicated that pH and EC levels were compliant at the extent of the excavation; therefore, the background soil sample was not run for laboratory analysis.

☐ 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.

In June 2017, approximately 110 cubic yards of petroleum hydrocarbon impacted soil were excavated and transported to Buffalo Ridge Landfill in Keenesburg, Colorado, for disposal. The impacted soil was excavated into the capillary and phreatic zones to address potential hydrocarbon impacts that may have been present below the current groundwater table due to seasonal fluctuations. Based on excavation groundwater samples exceeding COGCC Table 910-1 allowable levels, approximately 150 barrels of impacted groundwater were removed from the excavation using a vacuum truck and transported to the Aggregate Recycle Facility in Weld County, Colorado.

In August 2017, petroleum hydrocarbon impacted soil was not encountered in the partially-buried produced water sump excavation. The general site layout and excavation footprint are depicted on the Site Map provided as Figure 1.

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.

While backfilling the June 2017 excavation, 100 pounds of COGAC®, a carbon-based bioremediation product designed to capture and degrade petroleum hydrocarbons via chemical oxidation and passive bio-stimulation, were applied to the clean backfill in a series of lifts in the capillary and phreatic horizons.

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) 110

_____ Name of Licensed Disposal Facility or COGCC Facility ID # _____

No Excavate and onsite remediation

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

Yes Bioremediation (or enhanced bioremediation)

Yes Chemical oxidation

No Air sparge / Soil vapor extraction

Yes Natural Attenuation

Yes Other Groundwater Removal and
COGAC® Application

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.

In May 2019, one replacement monitoring well (MW06R) was installed at the site. The boring log with a monitoring well completion diagram is attached.

Groundwater monitoring wells MW01 through MW06R are sampled on a quarterly basis for BTEX by United States Environmental Protection Agency Method 8260C. The monitoring well locations are depicted on Figure 1. The Groundwater Elevation Contour Map generated using the June 2019 survey data is provided as Figure 2. The groundwater analytical results are summarized in Table 1, and the laboratory analytical report for the June 2019 groundwater monitoring event is attached.

Groundwater monitoring will continue on a quarterly basis until a No Further Action status request is warranted.

REMEDATION 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? Yes _____

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

The petroleum hydrocarbon impacted groundwater was transported to the Aggregate Recycle Facility in Weld County, Colorado, to be recycled.

Volume of E&P Waste (solid) in cubic yards _____ 110

E&P waste (solid) description _____ Petroleum hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Buffalo Ridge Landfill in Keenesburg, Colorado

Volume of E&P Waste (liquid) in barrels _____ 150

E&P waste (liquid) description _____ Petroleum hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable: _____ 434766

Non-COGCC Disposal Facility: _____

REMEDATION COMPLETION REPORT

REMEDATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No _____

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? Yes _____

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 excavation has been backfilled and restored to its pre-release grade. The Kerr-McGee tank battery was reconstructed.

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. 06/27/2017

Actual Spill or Release date, if known. 06/27/2017

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/26/2017

Date of commencement of Site Investigation. 06/26/2017

Date of completion of Site Investigation. 09/06/2018

REMEDIAL ACTION DATES

Date of commencement of Remediation. 06/27/2017

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: Phil Hamlin

Title: Senior Environmental Rep.

Submit Date: 08/07/2019

Email: Phil.Hamlin@anadarko.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: 08/19/2019

Remediation Project Number: 10503

COA Type

Description

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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

402072211	FORM 27-SUPPLEMENTAL-SUBMITTED
402072266	LOGS
402089478	GROUND WATER ELEVATION MAP
402089479	SITE MAP
402132902	ANALYTICAL RESULTS

Total Attach: 5 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)