

# State of Colorado Oil and Gas Conservation Commission

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Document Number:

401557748

Receive Date:

Report taken by:

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

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 5140

Initial Form 27 Document #: 2608077

#### 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: LOCATION	Facility ID: 328928	API #:	County Name: WELD
Facility Name: HSR-MOORHEAD-63N66W 5SWSW		Latitude: 40.247878	Longitude: -104.808553
		** correct Lat/Long if needed: Latitude: 40.246836	Longitude: -104.806753
QtrQtr: SWSW	Sec: 5	Twp: 3N	Range: 66W
		Meridian: 6	Sensitive Area? Yes

#### SITE CONDITIONS

General soil type - USCS Classifications SM

Most Sensitive Adjacent Land Use Commercial – Sod Farm

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

Water well and occupied building approximately 420 feet (ft) west, surface water approximately 650 ft east, 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 Sampling/Laboratory Analysis
Yes	SOILS	50' N-S X 60' E-W X 5' bgs (max)	Soil Sampling/Laboratory 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 January 2010, soil with historical petroleum hydrocarbon impacts was encountered near the HSR-Chaknova 14-5, HSR-Moorhead 13-5, HSR-Bell 12-5, HSR-Creaseon 11-5 production tank while digging a trench for the emission control device (ECD) lines. The volume of the release is unknown. The petroleum hydrocarbon impacted soil was excavated.

## 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 ):

Please refer to the Form 27 submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on July 27, 2010.

### Proposed Groundwater Sampling

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

Groundwater monitoring has been performed on a quarterly basis since June 2010.

### 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 12

Number of soil samples exceeding 910-1 2

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

Approximate areal extent (square feet) 3000

### NA / ND

-- Highest concentration of TPH (mg/kg) 4240

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 4

### Groundwater

Number of groundwater samples collected 418

Was extent of groundwater contaminated delineated? Yes

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

Number of groundwater monitoring wells installed 18

Number of groundwater samples exceeding 910-1 103

-- Highest concentration of Benzene (µg/l) 4500

-- Highest concentration of Toluene (µg/l) 32

-- Highest concentration of Ethylbenzene (µg/l) 1200

-- Highest concentration of Xylene (µg/l) 7900

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?

Groundwater impacts were detected in the adjoining field north of the tank battery.

☐ 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.

Please refer to the Form 27 submitted to the COGCC on July 27, 2010.

## REMEDICATION 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.

Please refer to the Form 27 submitted to the COGCC on July 27, 2010.

Due to persistent, elevated BTEX concentrations in multiple site monitoring wells, an air sparging (AS) and soil vapor extraction (SVE) system was installed at the site to remediate the dissolved-phase petroleum hydrocarbon plume. The AS/SVE system was designed to introduce ambient air into the subsurface water column to promote volatilization and aerobic microbial decomposition of dissolved-phase petroleum hydrocarbons. Installation and operation of the full-scale AS/SVE system occurred in February 2016. Kerr-McGee submitted a UIC Permit Application to Region 8 of the USEPA which was subsequently approved on March 17, 2015. A copy of the February 2015 UIC Permit Application and the March 2015 Rule Authorization: Aquifer Remediation Well approval letter from Region 8 are attached.

The AS/SVE system started up in February 2016. The system is comprised of eight wells connected by a combination of surface and subsurface high-density polyethylene piping to a remediation trailer powered by electricity. Two AS wells were added in March 2018 to increase system influence around the separators. The remediation system included valves at all the AS wellheads to allow for uninterrupted flow control, measurement, and adjustment. AS was accomplished using a 10-horsepower-driven Rietschle Thomas DLR 150 rotary-claw compressor, and SVE was accomplished using a Roots 47 U-RAI DSL rotary-lobe blower housed within the remediation trailer. A diesel-powered tow-behind air compressor was used periodically to increase AS system influence and will be utilized if future remediation operation is necessary. The as-built layout of the full-scale AS/SVE system is depicted on the Site Map attached as Figure 1. Boring logs for the AS wells are attached.

## 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) 500

Name of Licensed Disposal Facility or COGCC Facility ID # 149007

No Excavate and onsite remediation

Land Treatment

Bioremediation (or enhanced bioremediation)

Chemical oxidation

Other

## Groundwater Remediation Summary

Yes Bioremediation ( or enhanced bioremediation )

No Chemical oxidation

Yes Air sparge / Soil vapor extraction

Yes Natural Attenuation

Yes Other MicroBlaze® 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.

Since the submittal of the Form 27 on July 27, 2010, thirteen additional monitoring wells (MW05 through MW17) and one replacement monitoring well (MW12R) were installed at the site. Field boring logs with well completion diagrams are attached. The monitoring well locations are depicted on Figure 1.

Groundwater monitoring wells MW01 through MW17 are sampled on a quarterly basis for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (USEPA) Method 8260C. The Groundwater Elevation Contour Map generated using the March 2018 survey data is provided as Figure 2. The groundwater analytical results are summarized in Table 1, and the laboratory analytical report for the March 2018 groundwater monitoring event is attached.

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

## 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? Yes \_\_\_\_\_

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

The petroleum hydrocarbon impacted soil was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado, for recycling.

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_ 500

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

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_ 149007

Non-COGCC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_ 0

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? 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? No \_\_\_\_\_

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 site was restored to its pre-release grade. The Kerr-McGee production facility remains at the site.

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. 01/22/2010

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/22/2010

Date of commencement of Site Investigation. 02/04/2010

Date of completion of Site Investigation. 12/02/2014

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 02/04/2010

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 HSE Representative

Submit Date: \_\_\_\_\_

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: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 5140

### 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

401574353	LOGS
401629766	SITE MAP
401629767	GROUND WATER ELEVATION MAP
401629836	ANALYTICAL RESULTS
401695030	CORRESPONDENCE
401695031	CORRESPONDENCE

Total Attach: 6 Files

### General Comments

#### User Group

#### Comment

#### Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)