

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
401671031

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	Phone Numbers Phone: (970) 336-3500 Mobile: ( )
Address: P O BOX 173779		
City: DENVER	State: CO Zip: 80217-3779	
Contact Person: Phil Hamlin	Email: Phil.Hamlin@anadarko.com	

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**  
Remediation Project #: 9500 Initial Form 27 Document #: 200439032

**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 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 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 Facilities ( in accordance with Rule 909.c. )

Facility Type: SPILL OR RELEASE	Facility ID: 444185	API #: _____	County Name: WELD
Facility Name: SPILL/RELEASE POINT	Latitude: 40.191804	Longitude: -104.824718	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWSW	Sec: 30	Twp: 3N	Range: 66W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications   SC   Most Sensitive Adjacent Land Use   Rangeland and Livestock  

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 260 feet (ft) southwest, a water well approximately 800 ft southeast, livestock approximately 20 ft west, an occupied building approximately 750 ft east, and groundwater approximately 1 ft below ground surface (bgs).

# 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 checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" 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 data	Groundwater Samples/Lab Results
Yes	SOILS	14ft x 44ft x 4ft bgs (max)	Soil Samples/Lab Results

## INITIAL ACTION SUMMARY

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

During deconstruction activities at the Lorenz-63N66W/30SWSW tank battery, historical petroleum hydrocarbon impacted groundwater was encountered beneath the partially-buried produced water sump. There were no indications that the dumlines or produced water sump were leaking. 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 ):

Between November 25 and December 2, 2015, seven soil samples were collected from the excavation sidewalls and submitted for laboratory analysis of total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), pH, and specific conductivity (EC). Laboratory analytical results indicated that TPH, BTEX, pH, and EC concentrations and levels were in full compliance with Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable levels at the extent of the excavation. The general site layout, excavation footprint, and soil sample locations are depicted on the Excavation Site Map provided as Figure 1. The soil sample analytical results are summarized in Table 1.

### Proposed Groundwater Sampling

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

On November 25, 2015, one groundwater sample (GW01) was collected from the open excavation for laboratory analysis of BTEX. Laboratory analytical results for groundwater sample GW01 indicated that the benzene concentration exceeded the COGCC Table 910-1 allowable level at 96.8 micrograms per liter (µg/L). December 2, 2015, following the removal of impacted groundwater from the excavation, groundwater sample GW02 was collected from excavation. Laboratory analytical results indicated groundwater sample GW02 was in full compliance with COGCC Table 910-1 allowable levels for BTEX. The excavation groundwater sample locations are depicted on Figure 1. The groundwater sample analytical results are summarized in Table 2.

### 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 1  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 540

### NA / ND

-- Highest concentration of TPH (mg/kg) 2250  
NA Highest concentration of SAR           
BTEX > 910-1 No  
Vertical Extent > 910-1 (in feet) 2

### Groundwater

Number of groundwater samples collected 38  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 1'  
Number of groundwater monitoring wells installed 9  
Number of groundwater samples exceeding 910-1 1

-- Highest concentration of Benzene (µg/l) 96.8  
-- Highest concentration of Toluene (µg/l) 282  
-- Highest concentration of Ethylbenzene (µg/l) 22.2  
-- Highest concentration of Xylene (µg/l) 244  
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?

# 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.

Approximately 220 cubic yards of petroleum hydrocarbon impacted soil were removed from the excavation and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The impacted soil was excavated into the capillary and phreatic zones to address potential hydrocarbon impacts that may have been present below the groundwater table due to past seasonal fluctuations. Approximately 340 barrels of petroleum hydrocarbon impacted groundwater were removed from the excavation and transported to a licensed injection facility for disposal. The general site layout and excavation footprint are depicted on the Site Map provided as Figure 2.

## 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 excavation, 80 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

Ex Situ

_____ Bioremediation ( or enhanced bioremediation )	Yes	Excavate and offsite disposal
_____ Chemical oxidation		If Yes: Estimated Volume (Cubic Yards) _____ 220
_____ Air sparge / Soil vapor extraction		Name of Licensed Disposal Facility or COGCC Facility ID # _____ 149007
_____ Natural Attenuation	No	Excavate and onsite remediation
_____ Other _____		_____ 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.

Monitoring wells MW01 through MW09 were installed at the site in July 2017. Groundwater monitoring continued on a quarterly basis. The monitoring well locations are depicted on Figure 2. Boring logs with monitoring well completion diagrams are attached.

On August 3, 2017, monitoring wells MW01 through MW09 were surveyed to obtain the relative groundwater and top-of-casing well elevation data. The survey data indicated the groundwater flow direction at the site is to the north-northwest. Relative groundwater elevations are provided in Table 2. Groundwater Elevation Contour Maps for the third quarter 2017 through second quarter 2018 monitoring events are provided as Figures 3A through 3D, respectively.

As of the May 2018 quarterly monitoring event, BTEX concentrations in monitoring wells MW01 through MW09 were in full compliance with COGCC Table 910-1 allowable levels for four consecutive quarterly monitoring events. The groundwater analytical results are summarized in Table 2. The analytical reports for the four compliant groundwater monitoring events are attached.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

**Frequency:**  Quarterly  Semi-Annually  Annually  Other Final Report  
**Report Type:**  Groundwater Monitoring  Land Treatment Progress Report  O&M Report  
 Other NFA Status 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:

Approximately 220 cubic yards of petroleum hydrocarbon impacted soil were removed from the excavation and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado, for recycling.

Volume of E&P Waste (solid) in cubic yards 220

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 340

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

COGCC Disposal Facility ID #, if applicable: 159443

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? 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.

The site was restored to its pre-release grade. The northern oil tank and produced water sump were permanently removed. The southern oil tank and produced water sump remain 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. 11/30/2015

Actual Spill or Release date, if known. 11/30/2015

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 11/25/2015

Date of commencement of Site Investigation. 11/25/2015

Date of completion of Site Investigation. 08/03/2017

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 11/30/2015

Date of completion of Remediation. 05/16/2018

### 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: 9500

### 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.

<u>Att Doc Num</u>	<u>Name</u>
401671411	LOGS
401687776	SOIL SAMPLE LOCATION MAP
401687777	SITE MAP
401687778	GROUND WATER ELEVATION MAP
401693731	ANALYTICAL RESULTS

Total Attach: 5 Files

### General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)