

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
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Receive Date:  
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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 #: 4188 Initial Form 27 Document #: 1981629

**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 checked="" type="checkbox"/> Other Monitoring Well Reduction Request

**SITE INFORMATION**        N   Multiple Facilities ( in accordance with Rule 909.c. )

Facility Type: LOCATION	Facility ID: 327104	API #: _____	County Name: WELD
Facility Name: HSR-AVERY-63N66W 27NWSE	Latitude: 40.194340	Longitude: -104.761080	
** correct Lat/Long if needed: Latitude: 40.192395		Longitude: -104.758612	
QtrQtr: NWSE	Sec: 27	Twp: 3N	Range: 66W Meridian: 6 Sensitive Area? Yes

**SITE CONDITIONS**

General soil type - USCS Classifications SW Most Sensitive Adjacent Land Use Pasture

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

Is groundwater less than 20 feet below ground surface? Yes

**Other Potential Receptors within 1/4 mile**

Groundwater approximately 3 feet 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 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 data	Groundwater Sampling/Laboratory Analysis
Yes	SOILS	44' N-S X 58' E-W X 7' bgs	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.

On December 12, 2007, a truck driver left an oil tank valve open at the HSR-Avery 10-27A, HSR-Savul 15-27, HSR-Tuteur 9-27A facility, resulting in the release of approximately 98 barrels of oil onto the ground surface. The petroleum hydrocarbon impacted soil was excavated. The 2007 release was assigned Remediation Number 4188.

On September 19, 2008, oil staining around a riser to a production tank was discovered. The source of the release was determined to be from a corrosion hole in a dump line. The petroleum hydrocarbon impacted soil was excavated, and the dumpline was replaced. The 2008 release was assigned Remediation Number 4893, and subsequently closed and combined with Remediation 4188 on December 1, 2010.

## 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 ):

In December 2007 and January 2008, seven soil samples were collected from the base and sidewalls of the excavation and submitted for laboratory analysis of total petroleum hydrocarbons (TPH). Laboratory analytical results indicated that the TPH concentrations were in full compliance with the Colorado Oil and Gas Conservation Commission (COGCC) sensitive area allowable level of 1,000 milligrams per kilogram (mg/kg) at the lateral extent of the excavation. The soil samples were not analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) as the samples were collected prior to the April 1, 2009, COGCC rule changes.

In October 2008, nine soil samples were collected from the sidewalls of the excavation. Laboratory analytical results indicated that soil was in full compliance with COGCC sensitive area allowable level for TPH at the lateral extent of the excavation.

### Proposed Groundwater Sampling

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

On January 7, 2008, one groundwater sample (GW01) was collected from the December 2007 excavation for laboratory analysis of BTEX. Laboratory analytical results for groundwater sample GW01 indicated that the benzene, toluene, and total xylenes concentrations exceeded the COGCC Table 910-1 allowable levels at 140 micrograms per liter (µg/L), 1,300 µg/L, and 1,700 µg/L, respectively.

On September 26, 2008, one groundwater sample (GW01) was collected from the September 2008 excavation for laboratory analysis of BTEX. Laboratory analytical results for groundwater sample GW01 indicated that the benzene, toluene, and total xylenes concentrations exceeded the COGCC Table 910-1 allowable levels at 2,400 µg/L, 4,600 µg/L, and 2,100 µg/L, respectively. The excavation groundwater sample locations are depicted on Figure 1. The groundwater sample analytical results are summarized in Table 1.

Quarterly groundwater monitoring has been conducted at the site since February 2008.

### 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) 2552

### NA / ND

-- Highest concentration of TPH (mg/kg) 15000  
NA Highest concentration of SAR           
BTEX > 910-1 Yes  
Vertical Extent > 910-1 (in feet) 7

### Groundwater

Number of groundwater samples collected 773  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 3'  
Number of groundwater monitoring wells installed 39  
Number of groundwater samples exceeding 910-1 221

-- Highest concentration of Benzene (µg/l) 4300  
-- Highest concentration of Toluene (µg/l) 4600  
-- Highest concentration of Ethylbenzene (µg/l) 430  
-- Highest concentration of Xylene (µg/l) 5700  
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 pasture northwest 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.

Approximately 650 cubic yards of petroleum hydrocarbon impacted soil were excavated from the January 2008 excavation (December 2007 release) and approximately 600 cubic yards were excavated from the September 2008 excavation. The petroleum hydrocarbon impacted soil from the January 2008 and September 2008 excavations were transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado, for recycling. The general site layout and the excavation dimensions 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.

Prior to backfilling the January 2008 excavation, five gallons of MicroBlaze®, a concentrated solution of facultative microbes, nutrients, and surfactants designed to bioremediate petroleum hydrocarbons, were applied to the groundwater in the excavation.

While backfilling the September 2008 excavation, 250 pounds of BOS 200®, an activated carbon bioremediation product, was applied to the groundwater and clean backfill through a series of lifts to ensure distribution through the phreatic and smear zones.

Additional remedial options are under evaluation.

## Soil Remediation Summary

In Situ

Ex Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

Yes \_\_\_\_\_ Excavate and offsite disposal

\_\_\_\_\_ Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_ 1250

\_\_\_\_\_ 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 MicroBlaze® Application  
(January 2008) and BOS 200®  
(September 2008)

## 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.

Groundwater monitoring wells MW01R, MW03R, MW04R, MW06R2, MW07R, MW08R, MW10R, MW11R, MW13R, MW14R, MW15R, MW16, MW17, MW18, MW20R, MW21R, MW22, and MW25 are sampled on a quarterly basis and submitted for laboratory analysis of 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 November 2018 survey data is provided as Figure 2. The groundwater analytical results are summarized in Table 1, and the laboratory analytical reports for the groundwater monitoring events are attached.

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

Based on the groundwater analytical data to date, Kerr-McGee requests the removal of monitoring wells MW03R, MW15R, MW16, and MW20R from the groundwater monitoring program. BTEX concentrations have been compliant with COGCC Table 910-1 allowable levels for 23 or more consecutive quarterly groundwater monitoring events in the monitoring wells. Additionally, these wells do not currently serve or are needed as points of compliance.

# 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 from the 2008 and 2009 excavations was transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado, for recycling.

Volume of E&P Waste (solid) in cubic yards \_\_\_\_\_ 1250

E&P waste (solid) description Petroleum hydrocarbon impacted soil (2008 and 2009 excavations)

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 facility 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. \_\_\_\_\_

Actual Spill or Release date, if known. 12/12/2007

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 12/12/2007

Date of commencement of Site Investigation. 12/12/2007

Date of completion of Site Investigation. 02/03/2015

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 12/12/2007

Date of completion of Remediation. \_\_\_\_\_

### SITE RECLAMATION DATES

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

### OPERATOR COMMENT

Based on the groundwater analytical data to date, Kerr-McGee requests the removal of monitoring wells MW03R, MW15R, MW16, and MW20R from the groundwater monitoring program.

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: 4188

### 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>
401864669	ANALYTICAL RESULTS
401889202	GROUND WATER ELEVATION MAP
401889206	SITE MAP

Total Attach: 3 Files

### General Comments

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

Total: 0 comment(s)