

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
401791076

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		
City: DENVER	State: CO Zip: 80217-3779	
Contact Person: Phillip Hamlin	Email: Phil.Hamlin@anadarko.com	
		Phone: (970) 336-3500
		Mobile: (970) 515-1161

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9925 Initial Form 27 Document #: 200440599

PURPOSE INFORMATION

- 901.e. Sensitive Area Determination
- 909.c.(1), Rule 905: Pit or PW vessel closure
- 909.c.(2), Rule 906: Spill/Release Remediation
- 909.c.(3), Rule 907.e.: Land treatment of oily waste
- 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure
- 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
- Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
- Rule 909.e.(2)B.: Closure of remediation project
- Rule 906.c.: Director request
- Other \_\_\_\_\_

SITE INFORMATION

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

Facility Type: SPILL OR RELEASE Facility ID: 447087 API #: \_\_\_\_\_ County Name: WELD

Facility Name: SPILL/RELEASE POINT Latitude: 40.117509 Longitude: -104.669137

\*\* correct Lat/Long if needed: Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

QtrQtr: SESW Sec: 21 Twp: 2N Range: 65W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Non-crop land

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

Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

An occupied building is located approximately 750 feet southeast of the release location.

# 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 sampling and laboratory analysis
Yes	SOILS	79' (N-S) x 40' (E-W) x 35' bgs	Excavation, soil boring, soil sampling, and 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 July 19, 2016, historical impacts were discovered during abandonment activities at the Ernie F Adamson Gas Unit-62N65W21SWSW production facility. The facility was shut in, associated infrastructure removed, and excavation activities were initiated. Groundwater was encountered during excavation and remediation activities at approximately 32 to 35 feet below ground surface (bgs). The COGCC has issued Spill/Release Point ID 447087 for this release. A partially-buried produced water vessel was removed during excavation and remediation activities.

## 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 ):

Soil samples were collected as described in the Initial Form 27 and previous Form 27-Supplemental Remediation Progress Update. Based on the data presented, impacted soils in the excavation area were remediated to be in full compliance with COGCC standards.

### Proposed Groundwater Sampling

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

Eight groundwater samples (GWN-01 - GWN-04 and GWS-01 - GWS-04) were collected from the open excavation during remediation activities, as described in the previous Form 27-Supplemental Remediation Progress Update. Between September 2, 2016 and August 15, 2018, 18 temporary monitoring wells (BH01 - BH17, BH09R) were installed to further assess the extent of groundwater impacts. Quarterly groundwater sampling was initiated on March 27, 2017, and is ongoing at the 14 monitoring wells remaining at the site. Wells BH01 - BH03 were removed during excavation and remediation activities; well BH09 was destroyed and subsequently replaced with BH09R. Groundwater samples are collected from the monitoring wells on a quarterly basis and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX). Groundwater analytical data is presented in Table 1, and the groundwater sample locations are illustrated on Figure 1. Laboratory analytical reports are provided as Attachment A.

### 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 ):

A partially-buried produced water vessel was removed during excavation and remediation activities.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 64  
Number of soil samples exceeding 910-1 9  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 3160

### NA / ND

-- Highest concentration of TPH (mg/kg) 5380  
NA Highest concentration of SAR           
BTEX > 910-1 Yes  
Vertical Extent > 910-1 (in feet) 35

### Groundwater

Number of groundwater samples collected 72  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 33'  
Number of groundwater monitoring wells installed 18  
Number of groundwater samples exceeding 910-1 51

-- Highest concentration of Benzene (µg/l) 6810  
-- Highest concentration of Toluene (µg/l) 15000  
-- Highest concentration of Ethylbenzene (µg/l) 2680  
-- Highest concentration of Xylene (µg/l) 38500  
NA 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?

Impacted groundwater has been detected in off-site temporary groundwater monitoring wells BH08, BH09, BH09R, BH10, and BH12 - BH17.

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?

Hydrocarbon impacted groundwater remains at the site. The fourteen (14) remaining temporary groundwater monitoring wells (BH04 - BH08, BH09R, BH10 - BH17) will continue to be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain in full compliance with COGCC standards for four consecutive quarters. Additional temporary groundwater monitoring wells will be installed to maintain point-of-compliance (POC).

# 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.

Between July 29 and August 4, 2016, approximately 540 cubic yards of impacted material were excavated and transported to the Buffalo Ridge Landfill in Keenesburg, Colorado for disposal. Additional excavation and remediation activities, as described in the previous Form 27-Supplemental Remediation Progress Update, were implemented at the site between December 13, 2016 and February 20, 2017, to address remaining soil impacts left in place below 20 feet bgs and to mitigate groundwater impacts. During these remediation activities, approximately 300 cubic yards of additional impacted material were excavated and transported to the Buffalo Ridge Landfill in Keenesburg, Colorado, and approximately 620 barrels of impacted groundwater were removed from the excavation area via vacuum truck and transported to a licensed disposal facility.

## 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.

Laboratory data indicate that impacted soils in the excavation area have been remediated to be in full compliance with COGCC standards. Details regarding the soil and groundwater remediation activities conducted at the site between December 13, 2016 and February 20, 2017, were provided in the previous Form 27-Supplemental Remediation Progress Update. Prior to backfilling, approximately 385 pounds of granular activated carbon were added to the groundwater within the soil mixing excavation area to mitigate remaining groundwater impacts. Quarterly groundwater monitoring is ongoing and will be continued until concentrations remain in full compliance with COGCC standards for four consecutive quarters. Additional remediation measures, including in-situ chemical oxidation and air sparging, are currently under evaluation to address remaining groundwater impacts. Estimated time to attain NFA is TBD based on the groundwater concentrations, the extent of impacted groundwater, and the efficacy of selected remedial technologies.

## Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation ( or enhanced bioremediation )	Yes	Excavate and offsite disposal
_____ Chemical oxidation	_____	If Yes: Estimated Volume (Cubic Yards) _____ 840
_____ Air sparge / Soil vapor extraction	_____	Name of Licensed Disposal Facility or COGCC Facility ID # _____
_____ Natural Attenuation	Yes	Excavate and onsite remediation
_____ Other _____	No	Land Treatment
	No	Bioremediation (or enhanced bioremediation)
	Yes	Chemical oxidation
	No	Other _____

## Groundwater Remediation Summary

No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

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

No \_\_\_\_\_ Air sparge / Soil vapor extraction

Yes \_\_\_\_\_ Natural Attenuation

Yes \_\_\_\_\_ Other \_\_\_\_\_ Groundwater removal, activated carbon adsorption

## 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.

Between September 2, 2016 and August 15, 2018, a total of eighteen (18) temporary groundwater monitoring wells (BH01 - BH17, BH09R) were installed at the site to further assess the extent of groundwater impacts. Temporary monitoring wells BH01 - BH03 were removed during excavation and remediation activities; well BH09 was reported destroyed on December 5, 2017 and was subsequently replaced with well BH09R on August 14, 2018. The 14 temporary monitoring wells remaining at the site (BH04 - BH08, BH09R, BH10 - BH17) will continue to be sampled on a quarterly basis and submitted for laboratory analysis of BTEX until concentrations remain in full compliance with COGCC standards for four consecutive quarters. Additional temporary groundwater monitoring wells will be installed to maintain POC. Groundwater sample locations are illustrated on Figure 1, and a potentiometric surface contour map for the Third Quarter 2018 is presented as Figure 2. Well completion logs for the temporary monitoring wells are included as Attachment B.

# 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:

NA

Volume of E&P Waste (solid) in cubic yards 840

E&P waste (solid) description Hydrocarbon impacted soil

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

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

Volume of E&P Waste (liquid) in barrels 620

E&P waste (liquid) description Hydrocarbon impacted groundwater

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

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

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? \_\_\_\_\_

Does Groundwater meet Table 910-1 standards? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

## 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 has been restored to its pre-release grade. Kerr-McGee will consult with the surface owner to determine reclamation specifics to properly conduct reclamation activities in accordance with COGCC 1000 Series Rules.

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. 07/30/2016

Actual Spill or Release date, if known. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/19/2016

Date of commencement of Site Investigation. 07/19/2016

Date of completion of Site Investigation. \_\_\_\_\_

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/29/2016

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: Phillip 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: 9925

### COA Type

### Description

<u>COA Type</u>	<u>Description</u>

### 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>
401791180	LOGS
401791183	ANALYTICAL RESULTS
401791211	ANALYTICAL RESULTS
401805156	GROUND WATER SAMPLE LOCATION
401805158	GROUND WATER ELEVATION MAP

Total Attach: 5 Files

### General Comments

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

Total: 0 comment(s)