

State of Colorado
Oil and Gas Conservation Commission

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Report taken by:
CHRIS CANFIELD

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>(720) 929-6000</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80217-3779</u>		Mobile: <u>(720) 929-4306</u>
Contact Person: <u>Erik Mickelson</u>	Email: <u>Erik.Mickelson@anadarko.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 9106 Initial Form 27 Document #: 2143456

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 Notification of replacement well installation, removal of select wells from quarterly monitoring

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

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>439681</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SPILL/RELEASE POINT</u>	Latitude: <u>40.040113</u>	Longitude: <u>-104.872339</u>	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: <u>SWNE</u>	Sec: <u>22</u>	Twp: <u>1N</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 Crop Land

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

An occupied building is located approximately 1,075 feet east-northeast of the release location. Livestock holding pens are located approximately 900 feet southeast and 1,020 feet northeast 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 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	58' (E-W) x 40' (N-S) x 10' bgs	Excavation, 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 October 30, 2014, historical impacts were discovered during tank battery reconstruction activities at the Albert Sack Unit 1 production facility. The facility was shut in, associated infrastructure removed, and excavation activities were initiated. Groundwater was encountered in the excavation area at approximately 10 feet below ground surface (bgs). The COGCC has issued Spill/Release Point ID 439681 for this 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):

Soil samples were collected as described in the Initial Form 27 (Document No. 2143456), and previous eForm 27-Supplemental Annual Update (Document No. 401563094). 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):

Between April 2 and October 12, 2015, fourteen (14) temporary monitoring wells (BH01 - BH12, BH05R, BH11R) were installed to further assess the extent of groundwater impacts. Quarterly groundwater sampling was initiated on April 14, 2015, and was continued through January 26, 2018. Groundwater monitoring was temporarily placed on hold and the temporary monitoring wells were abandoned following the 1Q18 sampling event, pending the construction of a new well pad and production facility at this location. Tank battery reconstruction activities were completed in February 2019; replacement temporary monitoring wells will be installed, and groundwater sample collection and analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX) will be reinitiated. The proposed replacement monitoring well locations are illustrated on Figure 1. Historical groundwater analytical data is presented in Table 1.

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):

All remaining temporary groundwater monitoring wells at the site (BH01 - BH12, BH05R, BH11R) were abandoned on February 1, 2018. Replacement and step-out temporary monitoring wells will be installed at the locations illustrated on Figure 1.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 15
Number of soil samples exceeding 910-1 5
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 1020

NA / ND

-- Highest concentration of TPH (mg/kg) 1908
NA Highest concentration of SAR
BTEX > 910-1 Yes
Vertical Extent > 910-1 (in feet) 10

Groundwater

Number of groundwater samples collected 132
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 10'
Number of groundwater monitoring wells installed 14
Number of groundwater samples exceeding 910-1 44

-- Highest concentration of Benzene (µg/l) 3140
-- Highest concentration of Toluene (µg/l) 1400
-- Highest concentration of Ethylbenzene (µg/l) 618
-- Highest concentration of Xylene (µg/l) 8040
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 historically been detected in off-site temporary groundwater monitoring wells BH09 and BH11R.

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. Groundwater monitoring activities were placed on hold following the 1Q18 sampling event, pending the construction of a new well pad and production facility at this location. Tank battery reconstruction activities were completed in February 2019; replacement temporary groundwater monitoring wells will be installed, and groundwater monitoring activities will resume. Additional temporary groundwater monitoring wells will be installed to maintain point-of-compliance (POC). The temporary groundwater monitoring wells will 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. The proposed replacement and step-out monitoring well locations are illustrated on Figure 1.

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 October 30 and November 14, 2014, approximately 500 cubic yards of impacted soil were excavated and transported to the Front Range Landfill in Erie, Colorado for disposal. Approximately 80 barrels of impacted groundwater were removed from the excavation 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. Prior to backfilling, approximately 264 pounds of activated carbon were added to the groundwater within the excavation area to mitigate remaining hydrocarbon impacts in groundwater. Bi-weekly mobile air sparge / enhanced fluid recovery (AS/EFR) events were conducted at the site between October 19, 2016 and January 26, 2018. During this period, a total of approximately 233 barrels of impacted groundwater were removed during mobile AS/EFR events. Quarterly groundwater monitoring and AS/EFR events were placed on temporary hold, pending the construction of a new well pad and production facility at this location. Tank battery reconstruction activities were completed in February 2019; replacement temporary monitoring wells will be installed, and groundwater monitoring activities will resume. The temporary groundwater monitoring wells will 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. Potential remediation measures, including restarting mobile AS/EFR events, will be evaluated as necessary, to address potential remaining groundwater impacts. Estimated time to attain NFA is TBD based on the groundwater concentrations, the extent of impacted groundwater, and the efficacy of the 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) _____ 500

_____ Air sparge / Soil vapor extraction

Name of Licensed Disposal Facility or COGCC Facility ID # _____

_____ Natural Attenuation

No _____ Excavate and onsite remediation

_____ Other _____

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

No _____ Bioremediation (or enhanced bioremediation)

No _____ Chemical oxidation

Yes _____ Air sparge / Soil vapor extraction

Yes _____ Natural Attenuation

Yes _____ Other _____
Groundwater removal, activated
carbon adsorption, enhanced
fluid recovery

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 April 2 and October 12, 2015, a total of 14 temporary groundwater monitoring wells were installed at the site to assess the extent of groundwater impacts (BH01 - BH12, BH05R, BH11R). The remaining 12 groundwater monitoring wells were abandoned on February 1, 2018, in preparation for the construction of a new well pad and production facility at this location. Tank battery reconstruction activities were completed in February 2019; replacement temporary monitoring wells will be installed, and groundwater monitoring activities will resume. Based on historical groundwater analytical results, Kerr-McGee is requesting approval of the following modifications to the temporary groundwater monitoring well network: 1) based on a minimum of four consecutive quarters of compliant groundwater results, Kerr-McGee is requesting that temporary monitoring wells BH03, BH04, BH06, and BH07 not be replaced, and that these wells be removed from future quarterly groundwater sampling events, and; 2) additional step-out temporary groundwater monitoring wells will be installed to maintain POC as illustrated on Figure 1. The replacement and step-out monitoring wells will 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. The proposed replacement and step-out temporary groundwater monitoring well locations are illustrated on Figure 1. Historical groundwater analytical data is presented in Table 1.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: Quarterly Semi-Annually Annually Other Notification of replacement well installation, removal of select wells from quarterly monitoring

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report

Other Notification of replacement well installation, removal of select wells from quarterly monitoring

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 500

E&P waste (solid) description Hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Front Range Landfill - Erie, Colorado

Volume of E&P Waste (liquid) in barrels 313

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. A new Kerr-McGee production facility has been constructed at the site. 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. _____
 Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 10/30/2014
 Date of commencement of Site Investigation. 10/30/2014
 Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 10/30/2014
 Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____
 Date of completion of Reclamation. _____

OPERATOR COMMENT

This Supplemental Form 27 is being prepared for the purpose of notifying the COGCC of replacement and step-out temporary monitoring well installation. As such, no additional groundwater monitoring results or analytical data are included herein. Based on historical groundwater analytical results, temporary monitoring wells BH03, BH04, BH06, and BH07 have been in full compliance with COGCC standards for a minimum of four consecutive quarters. As such, Kerr-McGee is requesting these wells not be replaced, and therefore be removed from future quarterly groundwater sampling events. The replacement and step-out monitoring wells will 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. The proposed replacement and step-out temporary monitoring well locations are illustrated on Figure 1. Historical groundwater analytical data is presented in Table 1.

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Erik Mickelson Title: Senior HSE Representative
 Submit Date: 03/11/2019 Email: Erik.Mickelson@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: CHRIS CANFIELD Date: 03/18/2019
 Remediation Project Number: 9106

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

401952951	FORM 27-SUPPLEMENTAL-SUBMITTED
401953058	GROUND WATER SAMPLE LOCATION
401953087	ANALYTICAL RESULTS

Total Attach: 3 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)