

State of Colorado
Oil and Gas Conservation Commission

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Document Number:
401529152
Receive Date:
06/25/2018

Report taken by:
BOB CHESSON

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 INFORMATON

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>(970) 336-3500</u>
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80217-3779</u>
Contact Person: <u>Phil Hamlin</u>	Email: <u>Phil.Hamlin@anadarko.com</u>	Mobile: <u>()</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION
Remediation Project #: 3613 Initial Form 27 Document #: 1394588

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 Facilites (in accordance with Rule 909.c.)

Facility Type: <u>LOCATION</u>	Facility ID: <u>329995</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>ANDERSON-64N65W 27NENE</u>	Latitude: <u>40.289280</u>	Longitude: <u>-104.642510</u>	
	** correct Lat/Long if needed: Latitude: <u>40.288701</u>	Longitude: <u>-104.646639</u>	
QtrQtr: <u>NENE</u>	Sec: <u>27</u>	Twp: <u>4N</u>	Range: <u>65W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications SM Most Sensitive Adjacent Land Use Agriculture

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

A water well is located approximately 470 feet (ft) northwest, surface water (irrigation ditch) is located approximately 320 ft northwest, wetlands are approximately 740 ft southeast, an occupied building is located approximately 400 ft northwest, and groundwater is present approximately 8 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 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	35' N-S X 25' E-W X 14' bgs	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.

In November 2005, historical petroleum hydrocarbon impacts were encountered at the Anderson 41-27, Bohlender 2-27 tank battery facility in the vicinity of the concrete produced water sump during facility upgrade activities. The volume of the release is unknown.

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):

On November 11, 2005, five soil samples were collected from the excavation sidewalls and submitted for laboratory analysis of total petroleum hydrocarbons (TPH). Laboratory analytical results indicated that TPH concentrations were in full compliance with the 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. 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 3, 2005, one groundwater sample (ABGW02) was collected from the open excavation for laboratory analysis of BTEX. Laboratory analytical results for groundwater sample ABGW02 indicated that the benzene and total xylenes concentrations exceeded the COGCC Table 910-1 allowable levels at concentrations of 6,200 micrograms per liter (µg/L) and 8,600 µg/L, respectively. The excavation groundwater sample location is 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 5
Number of soil samples exceeding 910-1 1
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet) 875

NA / ND

-- Highest concentration of TPH (mg/kg) 2800
NA Highest concentration of SAR
BTEX > 910-1 No
Vertical Extent > 910-1 (in feet) 14

Groundwater

Number of groundwater samples collected 253
Was extent of groundwater contaminated delineated? Yes
Depth to groundwater (below ground surface, in feet) 8'
Number of groundwater monitoring wells installed 11
Number of groundwater samples exceeding 910-1 52

-- Highest concentration of Benzene (µg/l) 8300
-- Highest concentration of Toluene (µg/l) 130
-- Highest concentration of Ethylbenzene (µg/l) 630
-- Highest concentration of Xylene (µg/l) 8600
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 agricultural field northeast of the former excavation.

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 800 cubic yards of petroleum hydrocarbon impacted soil were excavated 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. The general site layout and excavation footprint 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.

Please refer to the attached Remediation Summary.

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) _____ 800
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)
Yes _____ Chemical oxidation
Yes _____ Air sparge / Soil vapor extraction
Yes _____ Natural Attenuation
Yes _____ Other MicroBlaze® Application and BOS 200® Injections _____

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 MW06 were installed at the site between December 2005 and December 2010. Monitoring wells MW01, MW02, MW03, and MW04, were destroyed between September 2008 and March 2015. Replacement monitoring wells MW02R, MW03R, MW04R, and MW04R2 were installed between June 2009 and December 2010. Groundwater monitoring continued on a quarterly basis. The monitoring well locations are depicted on Figure 2.

On November 1, 2013, monitoring wells MW01, MW02R, MW03R, MW04R2, MW05, and MW06 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 east-northeast. On March 11, 2016, monitoring well MW01R was tied into the survey data. The survey data confirmed the groundwater flow direction at the site is to the east-northeast. However, in June 2017, the groundwater elevation data indicated a groundwater flow direction to the southeast. It is believed this data is anomalous based on the quarterly elevation measurements one year prior to and after this monitoring event, which consistently show flow to the east-northeast. Relative groundwater elevations are provided in Table 2. Groundwater Elevation Contour Maps for the second quarter 2016 through first quarter 2018 monitoring events are provided as Figures 3A through 3H, respectively.

As of the March 2018 quarterly monitoring event, BTEX concentrations in monitoring wells MW01R, MW02R, MW03R, MW04R2, MW05, and MW06 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 800 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 800

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? 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 Noble Energy 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. 11/02/2005

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 11/03/2005

Date of commencement of Site Investigation. 11/03/2005

Date of completion of Site Investigation. 12/08/2010

REMEDIAL ACTION DATES

Date of commencement of Remediation. 11/03/2005

Date of completion of Remediation. 03/01/2018

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

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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: 06/25/2018 _____

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: BOB CHESSON _____

Date: 06/25/2018 _____

Remediation Project Number: 3613 _____

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**

401529152	FORM 27-SUPPLEMENTAL-SUBMITTED
401570665	CORRESPONDENCE
401571237	LOGS
401615837	ANALYTICAL RESULTS
401619177	SOIL SAMPLE LOCATION MAP
401619178	SITE MAP
401641298	GROUND WATER ELEVATION MAP
401676626	REMEDIATION PROGRESS REPORT

Total Attach: 8 Files

General Comments**User Group****Comment****Comment Date**

Environmental	The COGCC has reviewed the NFA request for Project/Remediation #3613. Based on the information presented, no further action is necessary at this time. However, should future conditions at the site indicate contaminant concentrations in soils or groundwater exceeding COGCC standards then further investigation and/or remediation activities may be required at the site. For locations with active ongoing oil and gas operations, comply with Rule 1003 interim reclamation requirements and for locations that will no longer have active oil and gas operations, comply with Rule 1004 Final Reclamation requirements.	06/25/2018
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Total: 1 comment(s)