FORM 27 Rev 3/16

State of Colorado
Oil and Gas Conservation Commission

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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: KERR MCGEE OIL & GAS ONSHORE LP Operator No: 47120
Address: P O BOX 173779
City: DENVER State: CO Zip: 80217-3779
Contact Person: Phil Hamlin Email: Phil.Hamlin@anadarko.com

Phone Numbers
Phone: (970) 336-3500
Mobile: ( )

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 7785 Initial Form 27 Document #: 2232961

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.
- [x] Rule 909.e.(2)B.: Closure of remediation project
- [ ] Rule 906.c.: Director request
- [ ] Other

SITE INFORMATION

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

Facility Type: LOCATION Facility ID: 329196 API #: County Name: WELD
Facility Name: HSR-CAMP-63N65W 31NWNW Latitude: 40.187808 Longitude: -104.713822
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: NWNW Sec: 31 Twp: 3N Range: 65W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications CL
Most Sensitive Adjacent Land Use RANGELAND
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? Yes

Other Potential Receptors within 1/4 mile

Water well approximately 950 feet (ft) southeast and groundwater approximately 16 ft below ground surface (bgs).

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [x] **E&P Waste**
  - [x] Produced Water
  - [x] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	SEE ATTACHED DATA	Groundwater Samples/Lab Analysis
Yes	SOILS	35ft N-S x 30ft E-W x 19.5ft bgs	Soil Samples/Lab 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.

The operator discovered a leak in the 1-inch return line at the Camp 4-31X wellhead during a daily site inspection. The 1-inch return line was resting on top of the flowline and the friction between the two lines caused the 1-inch poly return line to rupture. The well was shut in and pressure was bled off of the flowline. The petroleum hydrocarbon impacted soil was excavated to a depth of 19.5 ft bgs. Groundwater was not encountered in the excavation.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

- [x] Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

On January 19, 2012, 5 soil samples were collected from the excavation base and sidewalls and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Analytical results indicated impacts remained in the base of the excavation around sample B01@19.5'. Soil concentrations were compliant with COGCC Table 910-1 allowable levels at the lateral extent of the excavation. On May 2 and October 31, 2012, 7 soil borings (SB01 through SB07) were advanced through and around the backfilled excavation to determine if impacted soil left in-place was present beneath the former excavation and if shallow groundwater had been impacted. Based on the analytical results and the determined groundwater depth, no impacted soil was present above the water table. The excavation soil sample and soil boring 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

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

Groundwater was not encountered in the excavation. On May 2 and October 31, 2012, seven soil borings (SB01 through SB07) were advanced to determine if shallow groundwater had been impacted. Based on depth to groundwater measurements, soil borings SB03 through SB06 were completed as groundwater monitoring wells MW01 through MW04, respectively. Groundwater samples were collected from the monitoring wells and submitted for laboratory analysis of BTEX. Laboratory analytical results indicated that benzene concentrations in MW01 through MW03 exceeded COGCC Table 910-1 allowable levels. Based on these results, additional point of compliance monitoring wells were installed and groundwater monitoring commenced on a quarterly basis. The soil boring locations are depicted on the Excavation Site Map provided as 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: 21

Number of soil samples exceeeding 910-1: 2

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet): 1050

NA / ND

-- Highest concentration of TPH (mg/kg): 550

NA Highest concentration of SAR:

BTEX > 910-1: Yes

Vertical Extent > 910-1 (in feet): 20

Groundwater

Number of groundwater samples collected: 112

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet): 16`

Number of groundwater monitoring wells installed: 17

Number of groundwater samples exceeding 910-1: 12

-- Highest concentration of Benzene (µg/l): 241

-- Highest concentration of Toluene (µg/l): 88

-- Highest concentration of Ethylbenzene (µg/l): 49.2

-- Highest concentration of Xylene (µg/l): 256

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.

Soil samples were collected from the excavation for laboratory analysis. Laboratory analytical results for the confirmation soil samples indicated that TPH and BTEX concentrations were compliant with COGCC Table 910-1 allowable levels at the extent of the excavation. Approximately 760 cubic yards of impacted soil were excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado. The general site layout and excavation footprint are depicted on the Excavation 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.

The excavation was backfilled with clean soil and the site was restored to its pre-release grade. The 1-inch return line has been removed from this location.

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) 760
  - 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

- No Bioremediation (or enhanced bioremediation)
- No Chemical oxidation
- No Air sparge / Soil vapor extraction
- Yes Natural Attenuation
- No Other ____

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 May and October 2012, seven soil borings (SB01 through SB07) were advanced to determine if shallow groundwater had been impacted. Based on depth to groundwater measurements, soil borings SB03 through SB06 were completed as groundwater monitoring wells MW01 through MW04, respectively. Between May 2013 and January 2014, seven additional monitoring wells (MW05 through MW10) and one replacement well (MW02R) were installed. Groundwater monitoring was conducted on a quarterly basis.

On December 3, 2013, monitoring wells MW01 and MW03 through MW07 were surveyed to obtain the relative groundwater and top-of-casing well elevation data. The survey data indicated the groundwater flow direction was to the northwest.

On May 18, 2014, all monitoring wells were properly abandoned to allow a work-over rig access to the well head. In January and June 2015, five replacement monitoring wells (MW01R, MW02R2, MW08R, MW09R, and MW10R) and one additional monitoring well (MW11) were installed at the site. Based on the flow direction, MW03 through MW07 were not reinstalled. The monitoring well locations are depicted on Figure 2. Soil boring logs with well completion diagrams are attached.

On September 19, 2017, replacement monitoring wells MW01R, MW02R2, MW08R, MW09R, and MW10R were surveyed. The survey data indicated the groundwater flow direction was to the northeast and northwest. Groundwater Elevation Contour Maps for the fourth quarter 2016 through third quarter 2017 monitoring events are provided as Figures 3A through 3D, respectively. Relative groundwater elevations are provided in Table 2.

As of the June 2017 quarterly monitoring event, BTEX concentrations in wells MW01R, MW02R2, MW08R, MW09R, MW10R, and MW11 have been compliant 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 760 cubic yards of impacted soil were excavated and transported to the Kerr-McGee Land Treatment Facility in Weld County, Colorado.

Volume of E&P Waste (solid) in cubic yards 760

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 1-inch return line has been removed from this location. The Kerr-McGee tank battery 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. 01/13/2012

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/13/2012

Date of commencement of Site Investigation. 01/13/2012

Date of completion of Site Investigation. 07/08/2015

REMEDIAL ACTION DATES

Date of commencement of Remediation. 01/13/2012

Date of completion of Remediation. 07/05/2017

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:` 12/13/2017 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: 12/13/2017

Remediation Project Number: 7785

COA Type	Description

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
401386154	FORM 27-SUPPLEMENTAL-SUBMITTED
401386273	LOGS
401413769	GROUND WATER ELEVATION MAP
401413896	SITE MAP
401428592	ANALYTICAL RESULTS
401483156	SOIL SAMPLE LOCATION MAP

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
Agency	The COGCC has reviewed the NFA request for Project/Remediation #7785. 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.	12/13/2017

Total: 1 comment(s)