

State of Colorado Oil and Gas Conservation Commission

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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 Phone: <u>(720) 929-4306</u> Mobile: <u>()</u>
Address: <u>P O BOX 173779</u>		
City: <u>DENVER</u>	State: <u>CO</u> Zip: <u>80217-3779</u>	
Contact Person: <u>Erik Mickelson</u>	Email: <u>erik.mickelson@anadarko.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 5445 Initial Form 27 Document #: 2523454

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 type="checkbox"/> Other _____ |

SITE INFORMATION

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

Facility Type: <u>LOCATION</u>	Facility ID: <u>319310</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>DRY CREEK 31-27</u>		Latitude: <u>40.026260</u>	Longitude: <u>-104.881890</u>
		** correct Lat/Long if needed: Latitude: <u>40.026537</u>	Longitude: <u>-104.882387</u>
QtrQtr: <u>NWNW</u>	Sec: <u>27</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 CL Most Sensitive Adjacent Land Use Agriculture and Irrigation Canal

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

Water well approximately 850 feet (ft) northwest, surface water (canal) and wetlands approximately 120 ft northwest, building approximately 850 ft west, and groundwater approximately 18 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 Analysis
Yes	SOILS	35ft N-S X 56ft E-W X 15.5ft 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.

In July 2010, a limited subsurface site assessment was conducted at the UPRR 42 Pan Am "AM" True #1 facility prior to upgrading the tank battery to accommodate additional wells. Five assessment boreholes (SB01 through SB05) were completed into the shallow groundwater table using a direct-push rig. Groundwater was encountered in the assessment boreholes at depths of 14 ft to 18 ft bgs. Two groundwater samples (GW01 and GW02) were collected from boreholes SB02 and SB04, respectively. Petroleum hydrocarbon impacts to subsurface soil and groundwater were confirmed by the laboratory analytical results. Based on the assessment findings, the impacted soil was excavated.

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 July 7, 2010, five soil samples were collected from assessment soil borings around the tank battery for laboratory analysis of total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX). Laboratory analytical results indicated that SB02@17' exceeded the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 allowable level for benzene at 0.2 milligrams per kilogram (mg/kg).

On July 27 and 28, 2010, following excavation of the impacted soil, soil samples were collected from the excavation sidewalls for laboratory analysis of TPH and BTEX. Laboratory analytical results indicated that TPH and BTEX were in full compliance with COGCC Table 910-1 allowable levels 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):

Groundwater was encountered in soil borings SB02 and SB04 at depths of 18 ft bgs and 14 ft bgs, respectively. On July 7, 2010, groundwater sample GW01 was collected from SB02 and groundwater sample GW02 was collected from SB04 and submitted for laboratory analysis of BTEX. Laboratory analytical results indicated sample GW01 exceeded the COGCC Table 910-1 allowable levels for benzene, ethylbenzene, and total xylenes at concentrations of 2,900 micrograms per liter (µg/L), 1,300 µg/L, and 8,400 µg/L, respectively. Sample GW02 was in full compliance with COGCC Table 910-1 allowable levels. On July 28, 2010, groundwater sample GW03 was collected from the excavation for BTEX analysis. Laboratory analytical results indicated BTEX exceedances in sample GW03 at concentrations of 430 µg/L, 1,300 µg/L, 900 µg/L, and 8,400 µg/L, respectively. The groundwater sample analytical results are summarized in Table 1.

Groundwater monitoring has been conducted on a quarterly basis since October 2010.

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 12

Number of soil samples exceeding 910-1 0

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

Approximate areal extent (square feet) 1960

NA / ND

-- Highest concentration of TPH (mg/kg) 130

NA Highest concentration of SAR

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 0

Groundwater

Number of groundwater samples collected 255

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 18'

Number of groundwater monitoring wells installed 17

Number of groundwater samples exceeding 910-1 60

-- Highest concentration of Benzene (µg/l) 2900

-- Highest concentration of Toluene (µg/l) 1300

-- Highest concentration of Ethylbenzene (µg/l) 2000

-- Highest concentration of Xylene (µg/l) 25000

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?

Based on the surveyed groundwater flow direction, additional monitoring wells will be installed northeast of MW12 and MW13 to establish points 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.

Approximately 580 cubic yards of petroleum hydrocarbon impacted soil were removed from the excavation and transported to the Denver Regional Landfill in Erie, Colorado, for disposal. 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 attached 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, five gallons of MicroBlaze®, a concentrated solution of facultative microbes, nutrients, and surfactants designed to bioremediate petroleum hydrocarbons, were applied to the groundwater and exposed smear zone soils in the open excavation.

Due to persistent elevated benzene concentrations in MW02R, MW08 through MW10, and MW12 through MW13, additional remedial options are under evaluation.

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) 580
Name of Licensed Disposal Facility or COGCC Facility ID # _____
No Excavate and onsite remediation
No Land Treatment
No Bioremediation (or enhanced bioremediation)
No Chemical oxidation
No Other _____

Groundwater Remediation Summary

Yes Bioremediation (or enhanced bioremediation)
No Chemical oxidation
No Air sparge / Soil vapor extraction
Yes Natural Attenuation
Yes Other MicroBlaze® Application _____

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, MW02R, MW03R, and MW04 through MW14 are sampled on a quarterly basis and submitted for laboratory analysis of BTEX by United States Environmental Protection Agency Method 8260C. Groundwater monitoring will continue on a quarterly basis. The monitoring well locations are depicted on Figure 1. A Groundwater Elevation Contour Map generated using the July 2019 survey data is provided as Figure 2. The groundwater analytical results are summarized in Table 1, and the laboratory analytical reports for the October 2018, January 2019, April 2019, and July 2019 groundwater monitoring events are attached.

Additional monitoring wells will be installed at the site to establish POC. Groundwater monitoring will continue on a quarterly basis until a No Further Action status request is warranted.

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 580

E&P waste (solid) description Petroleum hydrocarbon impacted soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Denver Regional Landfill in Erie,
Colorado

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 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. 07/08/2010

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/07/2010

Date of commencement of Site Investigation. 07/07/2010

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 07/26/2010

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: Erik Mickelson

Title: Staff Environmental Rep.

Submit Date: 08/08/2019

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: 08/28/2019

Remediation Project Number: 5445

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

402116096	FORM 27-SUPPLEMENTAL-SUBMITTED
402116573	ANALYTICAL RESULTS
402137847	SITE MAP
402137848	GROUND WATER ELEVATION MAP

Total Attach: 4 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)