FORM 27 Rev 5/22

State of Colorado
Oil and Gas Conservation Commission

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Report taken by: Kari Brown

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.
Closure request is not available for an Initial Site Investigation and Remediation Workplan.

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: Gregory Hamilton

Phone Numbers
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PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 23466 Initial Form 27 Document #: 403056997

PURPOSE INFORMATION

- [ ] Rule 913.c.(1): Pit or Cuttings Trench closure.
- [ ] Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- [X] Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- [ ] Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- [ ] Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- [X] Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- [ ] Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- [ ] Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- [ ] Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- [ ] Rule 913.g: Changes of Operator.
- [ ] Rule 915.b: Request to leave elevated inorganics in situ.
- [ ] Other:

SITE INFORMATION

Yes Multiple Facilities

Facility Type: TANK BATTERY Facility ID: 446417 API #: County Name: WELD
Facility Name: HOWARD 4N-29HZ Latitude: 40.007922 Longitude: -104.922433
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: SWNW Sec: 32 Twp: 1N Range: 67W Meridian: 6 Sensitive Area? Yes

Facility Type: SPILL OR RELEASE Facility ID: 481695 API #: County Name: WELD
Facility Name: Howard 28N-29HZ Produced Water Latitude: 40.007831 Longitude: -104.922047
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: SWNW Sec: 32 Twp: 1N Range: 67W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications GW

Most Sensitive Adjacent Land Use Crop Land

Is domestic water well within 1/4 mile? No

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

Surface water is located approximately 650 feet northwest of the facility location.
A wetland is located approximately 700 feet northwest of the facility location.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

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

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	See attached data	Groundwater sampling / laboratory analyis
Yes	SOILS	23' (E-W) x 23' (N-S) x 11' bgs	Excavation / soil sampling / 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 March 3, 2022, a release of an unknown volume of produced water was discovered during a routine inspection at the Howard 28N-29HZ separator location. The COGCC issued Spill/Release Point 481464 for this release (COGCC Form 19 Document No. 402972739). The facility was subsequently shut-in and on March 14, 2022, clean-up activities were initiated via hydro-excavation of impacted material. Groundwater was encountered within the hydro-excavation area at approximately 7 feet below ground surface (bgs). On March 14, 2022, soil samples were collected from the initial excavation area during ongoing remediation activities. Based on the field screening results and photoionization detector (PID) readings, samples B01@4' and W01@3' were selected for waste characterization purposes and were submitted for laboratory analysis of the full Table 915-1 analytical suite using COGCC-approved methods appropriate for detecting the target analytes. Analytical results for the waste characterization samples indicated that soil impacts were present due to benzene, 1,2,4- and 1,3,5-trimethylbenzene (TMB), polycyclic aromatic hydrocarbons (PAHs), sodium adsorption ratio (SAR), specific conductivity (EC), boron, lead (Pb), and selenium (Se). As such, additional hydro-excavation activities were conducted to address remaining soil impacts, as described herein. The remaining analytical results for waste characterization soil samples B01@4' and W01@3' were in compliance with COGCC standards and/or within the range of site-specific background levels. Soil and groundwater sample location and field screening data are presented in Table 1. The soil and groundwater sample locations are illustrated on Figure 1.

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):

Between March 14 and July 29, 2022, hydro-excavation activities were conducted to address remaining soil impacts at the separator release location. Ten (10) soil samples were collected from the final excavation extent, at depths ranging from approximately 3 to 11 feet bgs. Based on the analytical results for waste characterization samples B01@4' and W01@3' and the COGCC-approved analyte reduction (Document No. 403056997), the 10 confirmation soil samples were submitted for laboratory analysis of BTEX, TPH, TMB, PAHs, SAR, EC, boron, Pb, and Se. Analytical results indicate that constituent concentrations in the 10 confirmation soil samples were in compliance with Table 915-1 standards and/or within the range of site-specific background levels, with exception to the Pb concentration in sample E05@6'. However, this result is within the range of acceptable soil variability, and the Pb concentration alone is not indicative of residual impacts due to a hydrocarbon or produced water release.

Proposed Groundwater Sampling

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

Groundwater was encountered within the hydro-excavation area at approximately 7 feet bgs. On April 7, 2022, a groundwater sample (GW01) was collected from the excavation area and submitted for laboratory analysis of BTEX, naphthalene, 1,2,4- and 1,3,5-TMB by United States Environmental Protection Agency (USEPA) Method 8260D. Groundwater analytical results indicate that the benzene concentration in sample GW01 exceeded the COGCC Table 915-1 standard. Groundwater analytical data is presented in Table 6, and the groundwater sample location is illustrated on Figure 1. The laboratory analytical report is provided in 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):

The laboratory analytical reports for the soil samples collected since the Form 27-Initial (COGCC Document No. 403056997) was submitted on May 31, 2022, are provided as Attachment A. The field notes and a photographic log are provided as Attachment B.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected: 20
Number of soil samples exceeeding 915-1: 11
Was the areal and vertical extent of soil contamination delineated? Yes
Approximate areal extent (square feet): 475

NA / ND

-- Highest concentration of TPH (mg/kg): 44.44
-- Highest concentration of SAR: 35.7
BTEX > 915-1: Yes
Vertical Extent > 915-1 (in feet): 11

Groundwater

Number of groundwater samples collected: 1
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet): 7
Number of groundwater monitoring wells installed: 0
Number of groundwater samples exceeding 915-1: 1

-- Highest concentration of Benzene (µg/l): 11.2
-- Highest concentration of Toluene (µg/l): 9.61
ND Highest concentration of Ethylbenzene (µg/l):
-- Highest concentration of Xylene (µg/l): 6.61
NA Highest concentration of Methane (mg/l):

Surface Water

0 Number of surface water samples collected

Number of surface water samples exceeding 915-1

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?

Background soil samples BG01@2' - BG04@2', BG01@4' - BG04@4', BG06@6' - BG08@6', and BG06@10' - BG08@10' were collected from native material adjacent to the release area. The background soil samples were submitted for laboratory analysis of Table 915-1 metals and Soil Suitability for Reclamation Parameters using standard methods appropriate for detecting the target analytes in Table 915-1. Analytical results for the background soil samples are presented in Tables 4 and 5.

☐ 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?

Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the remaining groundwater impacts. The temporary groundwater monitoring wells will be sampled on a quarterly basis and submitted for laboratory analysis of Table 915-1 constituents.

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 March 14 and July 29, 2022, approximately 196 cubic yards of impacted hydro-excavation soil slurry with groundwater were removed from the excavation area via vacuum truck and transported to the Kerr-McGee Aggregate Recycle Facility in Weld County, Colorado for recycling. Laboratory analytical results indicate that constituent concentrations in the 10 confirmation soil samples collected from the final hydro-excavation extents were in compliance with Table 915-1 standards and/or within the range of site-specific background levels, with exception to the Pb concentration in sample E05@6'. However, this result is within the range of acceptable soil variability, and the Pb concentration alone is not indicative of residual impacts due to a hydrocarbon or produced water release. The affected facility infrastructure will be repaired and/or replaced, and the shydro-excavation area will be backfilled and contoured to match pre-existing conditions.

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 analytical results indicate that constituent concentrations in the 10 confirmation soil samples collected from the final hydro-excavation extents were in compliance with Table 915-1 standards and/or within the range of site-specific background levels, with exception to the Pb concentration in sample E05@6'. However, this result is within the range of acceptable soil variability, and the Pb concentration alone is not indicative of residual impacts due to a hydrocarbon or produced water release. On July 14, 2022, approximately 55 pounds of OxPure® activated carbon were added to the groundwater within the deep excavation area, to mitigate remaining hydrocarbon impacts in groundwater. The SDS for the activated carbon is provided as Attachment C. Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the remaining groundwater impacts. The temporary groundwater monitoring wells will be sampled on a quarterly basis and submitted for laboratory analysis of Table 915-1 constituents. 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**

- ____ 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) 196
  - Name of Licensed Disposal Facility or COGCC Facility ID # 434766
- 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.

Groundwater monitoring wells will be installed at the site to fully define the extent and magnitude of the remaining groundwater impacts. The temporary groundwater monitoring wells will be sampled on a quarterly basis and submitted for laboratory analysis of Table 915-1 constituents. A groundwater monitoring location figure illustrating the locations of the surveyed temporary monitoring wells will be provided in a Form 27-Supplemental update.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

[X] Quarterly [ ] Semi-Annually [ ] Annually [ ] Other

[ ] **Request Alternative Reporting Schedule:**

[ ] Semi-Annually [ ] Annually [ ] Other

Rule 913.e:
After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

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

[X] Other Remediation progress update

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).
If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

KMOG has sufficient insurance and bonding to fully address the anticipated costs of Remediation, including the remaining estimated costs for this project. KMOG currently has over 40 million in bonds with the Colorado Oil and Gas Conservation Commission. The cost for remediation is a preliminary estimate only, costs may change upwards or downward based on site-specific information. KMOG makes no representation or guarantees as to the accuracy of the preliminary estimate.

Operator anticipates the remaining cost for this project to be: $

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 196 cubic yards of impacted hydro-excavation soil slurry with groundwater were removed from the excavation area via vacuum truck and transported to
the Kerr-McGee Aggregate Recycle Facility in Weld County Colorado for recycling.

Volume of E&P Waste (solid) in cubic yards 196

E&P waste (solid) description Impacted hydro-excavation soil slurry with groundwater

COGCC Disposal Facility ID #, if applicable: 434766

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? No

If YES:

[ ] Compliant with Rule 913.h.(1).

[ ] Compliant with Rule 913.h.(2).

[ ] Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards?

Does the previous reply indicate consideration of background concentrations?

Does Groundwater meet Table 915-1 standards?

Is additional groundwater monitoring to be conducted?

Operator shall comply with the COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

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 will be restored to its pre-release grade and Kerr-McGee's production infrastructure will be repaired and/or replaced.

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 provide the seed mix?

If YES, does the seed mix comply with local soil conservation district recommendations?

Did the local soil conservation district provide the seed mix?

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation.

Proposed date of completion of Reclamation.

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 03/03/2022

Actual Spill or Release date, or date of discovery. 03/03/2022

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/03/2022

Proposed site investigation commencement. 03/14/2022

Proposed completion of site investigation.

REMEDIAL ACTION DATES

Proposed start date of Remediation. 03/14/2022

Proposed date of completion of Remediation.

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

☐ Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

OPERATOR COMMENT

Form 27-Supplemental updates will be submitted to the COGCC on a quarterly basis until the extent of groundwater impacts has been fully delineated. The project implementation summary is provided as Attachment D.

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

Signed: Gregory Hamilton Title: Environmental Consultant

Submit Date: 08/31/2022 Email: Gregory_Hamilton@oxy.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: 12/27/2022

Remediation Project Number: 23466

COA Type	Description
0 COA	

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
403152763	FORM 27-SUPPLEMENTAL-SUBMITTED
403152918	PHOTO DOCUMENTATION
403152920	SOIL SAMPLE LOCATION MAP
403152922	ANALYTICAL RESULTS
403152923	IMPLEMENTATION SCHEDULE
403152924	ANALYTICAL RESULTS
403152925	OTHER

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
Environmental	This Form 27 Supplemental is being approved as submitted. However, the next Form 27 Supplemental must be populated with the Adequacy of Operator's General Liability Insurance and Financial Assurance data field under the Remediation Progress Update tab to describe how Operator's Financial Assurance meets the requirements of Rule 703.b. and General Liability Insurance meets the requirements of Rule 705.b.	12/27/2022

Total: 1 comment(s)