

State of Colorado
Energy & Carbon Management Commission

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Report taken by:
Taylor Robinson

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 ECMC 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 INFORMATION

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP	Operator No: 47120	Phone Numbers Phone: (970) 515-1161 Mobile: ()
Address: P O BOX 173779		
City: DENVER	State: CO	Zip: 80217-3779
Contact Person: Phil Hamlin	Email: Phillip_Hamlin@oxy.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 29090 Initial Form 27 Document #: 403378231

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.
- 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.
- 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: WELL	Facility ID: _____	API #: 123-15304	County Name: WELD
Facility Name: FOUR RAI TH UNIT 1	Latitude: 40.234950	Longitude: -104.759890	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWSE	Sec: 10	Twp: 3N	Range: 66W Meridian: 6 Sensitive Area? Yes
Facility Type: SPILL OR RELEASE	Facility ID: 484643	API #: _____	County Name: WELD
Facility Name: Four Raith Unit 1 Wellhead	Latitude: 40.234950	Longitude: -104.759890	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWSE	Sec: 10	Twp: 3N	Range: 66W Meridian: 6 Sensitive Area? Yes

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? No

Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Domestic water well approximately 1,055 feet (ft) southeast; Groundwater at approximately 13 ft below ground surface (bgs).

SITE INVESTIGATION PLAN

DENIED

TYPE OF WASTE:

- E&P Waste Other E&P Waste Non-E&P Waste
- Produced Water Workover Fluids
- Oil Tank Bottoms
- 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	TBD	Groundwater samples/laboratory analytical results
Yes	SOILS	85' (N-S) x 70' (E-S) x 20' bgs	Inspection/soil samples/laboratory analytical 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.

Wellhead cut and cap operations and flowline removal activities were completed at the Four Raith Unit 1 wellhead on June 20 through December 12, 2023, as summarized in the approved Form 27 Supplemental Document No. 403837529. Laboratory analytical results indicated that the benzene, total petroleum hydrocarbons (TPH), naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, pH, SAR, boron, 1- and 2-methylnaphthalene, fluorene, arsenic, and/or cadmium concentrations in soil samples WHB01@8' and FL-B01@4' exceeded the ECMC Table 915-1 allowable levels or background levels. As such, a Form 19 Initial/Supplemental Spill/Release Report (Document No. 403441220) was submitted on June 22, 2023 and the ECMC issued spill/Release Point ID 484643. The excavation area is depicted on Figure 1.

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):

From December 12, 2023 through April 9, 2024, excavation activities were conducted to address soil impacts at the former wellhead location and 17 confirmation soil samples were collected from the base and sidewalls of the final excavation extent, at depths ranging from six to 20 ft bgs. Based on the waste characterization results (WH-B01@8'), the confirmation soil samples were submitted for analysis of benzene, ethylbenzene, total xylenes, TPH, TMBs, pH, SAR, boron, metals, and polycyclic aromatic hydrocarbons (PAHs), as previously approved in Form 27 Supplemental Document No. 403837529. Analytical results indicate that benzene, naphthalene, 1,2,4-TMB, 1,3,5-TMB, 1- and 2-methylnaphthalene, arsenic, lead, and selenium impacts remain in the excavation area. However, due to the presence of groundwater, excavation activities were unable to safely continue. The remaining exceedances will be addressed through groundwater monitoring, as approved in the Form 27 Document No. 403837529.

Proposed Groundwater Sampling

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

Groundwater was encountered in the wellhead excavation area at approximately 19 ft bgs. On April 8, 2024, one groundwater sample GW-01 was collected from the excavation area and submitted for laboratory analysis of Table 915-1 organic constituents in groundwater as approved in the Form 27 Initial Document No. 403378231. Groundwater analytical results indicated that constituent concentrations in sample GW-01 were in compliance with ECMC Table 915-1 allowable levels for organic constituents. Based on groundwater in contact with impacted soil, monitoring wells were installed and identified that dissolved-phase impacts are present at the site. The groundwater analytical results are summarized in Table 1. The groundwater sample location is depicted on Figure 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):

On June 20 through December 12, 2023, visual inspection and field screening of soil were conducted at two sidewall locations within the wellhead excavation area, four locations at the ground surface adjacent to the excavation, and seven flowline removal potholes. Based on the inspection and screening results, no soil samples were submitted from these areas in accordance with ECMC Operator Guidance.

On July 7, 2023, a soil gas survey was conducted at three soil vapor points (SVP-03 - SVP-05) installed adjacent to the former wellhead. Soil vapor points SVP-01 and SVP-02 were unable to be screened as the wellhead excavation was backfilled. GEM 5000 readings were non-detect for methane at the remaining SVPs.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 57

Number of soil samples exceeding 915-1 56

Was the areal and vertical extent of soil contamination delineated? No

Approximate areal extent (square feet) 5950

NA / ND

-- Highest concentration of TPH (mg/kg) 2320

-- Highest concentration of SAR 12.3

BTEX > 915-1 Yes

Vertical Extent > 915-1 (in feet) 20

Groundwater

Number of groundwater samples collected 89

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 13

Number of groundwater monitoring wells installed 37

Number of groundwater samples exceeding 915-1 26

-- Highest concentration of Benzene (µg/l) 13.8

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 29.6

-- Highest concentration of Xylene (µg/l) 27.9

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 WH-BG01 - WH-BG12 were collected from native material -adjacent to the wellhead cut and cap excavation at depths ranging from 3 ft to 20 ft bgs. The background soil samples were submitted for laboratory analysis of electrical conductivity (EC), sodium adsorption ratio (SAR), pH, boron and Table 915-1 metals using ECOMC-approved methods. Laboratory analytical results indicate that levels of pH, SAR, EC, arsenic, barium, cadmium, hexavalent chromium, lead, nickel, and selenium are naturally high in the native soil.

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?

Monitoring wells will be installed downgradient from MW10, MW17, and MW18 to establish point 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 2,300 cubic yards of impacted soil were removed from the site and transported to the Buffalo Ridge Landfill located in Keenesburg, Colorado for disposal. Disposal records are kept on file and are available upon request. The excavation areas were backfilled and contoured to match pre-existing conditions.

REMEDICATION 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 benzene, naphthalene, 1,2,4-TMB, 1,3,5-TMB, 1-methylnaphthalene, 2-methylnaphthalene, arsenic, lead, and selenium concentrations exceeding ECMC Table 915-1 standards and site-specific background limits remain at the site. However, the remaining impacts will be left in-place due to the presence of groundwater within the excavation, and will be addressed through quarterly groundwater monitoring, as approved without condition in the Form 27 Document No. 403837529. Prior to backfilling, approximately 150 pounds of WPX® activated carbon and approximately 70 pounds of COGAC-pH® activated carbon were added to the groundwater within the excavation area, to aid in the remediation of hydrocarbon impacts in groundwater.

Soil Remediation Summary

In Situ

Ex Situ

_____ Bioremediation (or enhanced bioremediation)
 _____ Chemical oxidation
 _____ Air sparge / Soil vapor extraction
 _____ Natural Attenuation
 _____ Other _____

Yes Excavate and offsite disposal
 _____ If Yes: Estimated Volume (Cubic Yards) _____ 2300
 _____ Name of Licensed Disposal Facility or ECMC Facility ID # _____
 No Excavate and onsite remediation
 _____ Land Treatment
 _____ Bioremediation (or enhanced bioremediation)
 _____ Chemical oxidation
 _____ Other _____

Groundwater Remediation Summary

_____ Bioremediation (or enhanced bioremediation)
 _____ Chemical oxidation
 _____ Air sparge / Soil vapor extraction
 _____ Natural Attenuation
 Yes Other WPX® activated carbon and
 _____ COGAC-pH® activated carbon

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 at wells MW01 through MW37 is being conducted on a quarterly basis for full list Table 915-1 constituents in groundwater. Due to the soil impacts approved to be left in place and monitored in groundwater in Form 27 Document No. 403837529, groundwater samples are also being submitted for analysis of 1-methylnaphthalene, 2-methylnaphthalene, dissolved arsenic, dissolved lead, and dissolved selenium. Samples collected in December 2024 and March 2025 were also submitted for dissolved cadmium; however, background data cleared all remaining cadmium results in soil and, therefore, cadmium exceedances are not present at the site. All results were below the Water Quality Control Commission (WQCC) Regulation 41 allowable level prior to discontinuing monitoring for dissolved cadmium. Cross-gradient and compliant monitoring wells MW27 and MW35 were used to determine inorganic compliance at the site. Based on the second quarter 2025 analytical results, POC has been achieved for organic constituents. POC for inorganic constituents has not yet been achieved downgradient of MW10, MW17, or MW18. Monitoring wells will be installed downgradient from MW10, MW17, and MW18 to establish point of compliance (POC). The monitoring well locations are depicted on Figure 1. A groundwater elevation contour map generated using the June 2025 gauging data is included as Figure 2. The groundwater analytical results are summarized in Table 1 and the laboratory analytical reports from the March and June 2025 monitoring events are attached.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

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
 Other _____

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 ECMC. 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: \$ 20000 _____

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 _____ 2300

E&P waste (solid) description _____ Impacted soil

ECMC Disposal Facility ID #, if applicable: _____

Non-ECMC Disposal Facility: _____ Buffalo Ridge Landfill located in Keenesburg, Colorado

Volume of E&P Waste (liquid) in barrels _____ 0

E&P waste (liquid) description _____

ECMC Disposal Facility ID #, if applicable: _____

Non-ECMC 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 ECMC 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 reseeded program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

The site will be reclaimed in accordance with ECMC 1000 Series Reclamation Rules.

Is the described reclamation complete? _____

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. 03/01/2023

Actual Spill or Release date, or date of discovery. 06/21/2023

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/20/2023

Proposed site investigation commencement. 06/20/2023

Proposed completion of site investigation. 12/31/2026

REMEDIAL ACTION DATES

Proposed start date of Remediation. 06/21/2023

Proposed date of completion of Remediation. 12/31/2027

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

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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 Environmental Rep.

Submit Date: 08/25/2025

Email: Phillip_Hamlin@oxy.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: _____

Date: _____

Remediation Project Number: 29090

COA Type**Description**

0 COA	
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ATTACHMENT 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
404302650	FORM 27 DENIED
404302750	SITE MAP
404302752	GROUND WATER ELEVATION MAP
404302755	LABORATORY ANALYTICAL REPORT
404302756	LABORATORY ANALYTICAL REPORT
404302757	ANALYTICAL DATA SUMMARY TABLE(S)
404304915	LABORATORY ANALYTICAL REPORT
404304916	LABORATORY ANALYTICAL REPORT
404342650	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 9 Files

General Comments

User Group	Comment	Comment Date
Environmental	Previous Form 27 Document # 404121161 was denied. As this Form relies on that previous Form 27 it is also denied. All ongoing/unaddressed comments/COAs from previous Form 27 Document # 404121161 remain applicable.	09/04/2025

Total: 1 comment(s)