

State of Colorado  
Energy & Carbon Management Commission

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Document Number:  
404121161  
Receive Date:  
05/21/2025

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	<b>Phone Numbers</b>
Address: P O BOX 173779		Phone: (970) 515-1110
City: DENVER	State: CO	Zip: 80217-3779
Contact Person: Macy Kiel	Email: DJRemediation_Forms@oxy.com	Mobile: ( )

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 RAITH 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 1055' SE  
Surface water: none  
Wetland: none  
Spring: none  
Livestock: none  
Occupied Building: none  
High Priority Habitats: none

## SITE INVESTIGATION PLAN

### 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
UNDETERMINED	GROUNDWATER	TBD	Groundwater samples/laboratory analytical results
Yes	SOILS	TBD	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 #403837529. Laboratory analytical results indicated that the benzene, TPH, naphthalene, 1,2,4-TMB, 1,3,5-TMB, pH, SAR, boron, 1 and 2-methylnaphthalene, fluorene, arsenic, and/or cadmium concentrations in soil samples WH-B01@8' and FL-B01@4' exceeded the applicable ECMC Table 915-1 standards and/or site-specific background limits, and the ECMC issued spill/Release Point ID 484643.

From 12/12/23 - 04/09/24, excavation activities were conducted to address remaining soil impacts at the former wellhead location (WH-B01@8') and 17 confirmation soil samples were collected from the base and sidewalls of the final excavation extent, at depths ranging from 6' - 20' 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 PAHs, as previously approved in Form 27-Supplemental Document #403837529, approved on 10/23/24. Analytical results indicate that benzene, naphthalene, 1,2,4-TMB, 1,3,5-TMB, 1 and 2-methylnaphthalene impacts remain in the excavation area. However, due to the presence of groundwater, excavation activities were unable to safely continue.

### 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 ):

To delineate and characterize remaining impacts, 37 soil borings were advanced in and around the final excavation extent to total depths of approximately 12.5' - 17.5' bgs. Monitoring wells were installed in each boring location. Soil samples were collected based on the interval exhibiting the highest PID and/or from the interval above the observed water table. The soil samples were submitted for analysis of the full Table 915-1 analytical suite using ECMC-approved methods. Final analytical results for the soil samples collected during monitoring well installation indicate that impacts have not been fully defined, and additional soil borings will be advanced to further delineate the remaining impacts. The soil boring and monitoring well sample locations are illustrated on Figures 1 and 2. The soil analytical results are summarized in Tables 2 through 5. The Fourth Quarter 2024 and First Quarter 2025 laboratory analytical results are attached.

#### Proposed Groundwater Sampling

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

Depth to groundwater was observed at approximately 14' - 16' bgs within the 14 monitoring wells that have been gauged and sampled. On 12/13/24, groundwater samples (MW-01 - MW-14) were collected and submitted for laboratory analysis of Table 915-1 organic and inorganic compounds in groundwater, as well as 1,2-methylnaphthalene, and dissolved metals (As, Cd, Pb, Se). Analytical results indicate that 1,2,4-TMB, 1-methylnaphthalene, and/or 2-methylnaphthalene concentrations in groundwater samples MW-04, MW-09, MW-11 and MW-14 exceeded the ECMC Table 915-1 standards. Multiple step-out wells have been installed to further delineate impacts. The full network of monitoring wells will be gauged, surveyed, and sampled during the First Quarter of 2025. Following receipt of these results, an upgradient background monitoring well will be established to calculate local background limits for inorganic parameters, and additional step-out wells will be installed to fully delineate impacts.

**Proposed Surface Water Sampling**

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

[Empty box for surface water sampling details]

**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 soils was 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 all three SVPs. SVP screening results are presented in Table 9.

**SITE INVESTIGATION REPORT**

**SAMPLE SUMMARY**

Soil	NA / ND
Number of soil samples collected <u>113</u>	-- Highest concentration of TPH (mg/kg) <u>2320</u>
Number of soil samples exceeding 915-1 <u>70</u>	-- Highest concentration of SAR <u>12.3</u>
Was the areal and vertical extent of soil contamination delineated? <u>No</u>	BTEX > 915-1 <u>Yes</u>
Approximate areal extent (square feet) <u>5950</u>	Vertical Extent > 915-1 (in feet) <u>20</u>
Groundwater	
Number of groundwater samples collected <u>15</u>	-- Highest concentration of Benzene (µg/l) <u>1.56</u>
Was extent of groundwater contaminated delineated? <u>No</u>	ND Highest concentration of Toluene (µg/l) <u></u>
Depth to groundwater (below ground surface, in feet) <u>14</u>	-- Highest concentration of Ethylbenzene (µg/l) <u>11.6</u>
Number of groundwater monitoring wells installed <u>37</u>	-- Highest concentration of Xylene (µg/l) <u>27.9</u>
Number of groundwater samples exceeding 915-1 <u>4</u>	NA Highest concentration of Methane (mg/l) <u></u>

**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?

[Empty box for adjacent property impacts]

Were background samples collected as part of this site investigation?

Background soil samples WH-BG01 - WH-BG19 were collected from native material -adjacent to the former wellhead excavation at depths ranging from 3' to 20' bgs. The background soil samples were submitted for laboratory analysis of the Soil Suitability for Reclamation Parameters and Table 915-1 metals using standard methods appropriate for detecting the target analytes in Table 915-1. Analytical results for the background soil samples are presented in Tables 3 and 5. The background sample locations are illustrated on Figure 3.

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?



On 12/5/24 - 1/29/25, 37 temporary groundwater monitoring wells (MW-01 - MW-37) were installed at the site to delineate remaining impacts and to assess groundwater conditions. Analytical results indicated that 1,2,4-TMB, 1-methylnaphthalene, and/or 2-methylnaphthalene concentrations in groundwater samples MW-04, MW-09, MW-11, and MW-14 exceeded the ECMC Table 915-1 standards. As such, additional step-out groundwater monitoring wells have been installed to fully delineate remaining impacts. The full network of monitoring wells will be gauged, surveyed, and sampled during the First Quarter of 2025. Following receipt of these results, an upgradient background monitoring well will be established to calculate local background limits for inorganic parameters, and results will be included in a forthcoming Form 27-Supplemental update. Based on the remaining impacts, groundwater monitoring wells will continue to be sampled on a quarterly basis and submitted for laboratory analysis of the ECMC Table 915-1 groundwater analytical suite, as well as 1 and 2 methylnaphthalene. The groundwater analytical results are summarized on Tables 7 and 8.

## 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 reseeding 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. 12/31/2026

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**

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

Signed: Macy Kiel

Title: Environmental Engineer

Submit Date: 05/21/2025

Email: DJRemediation\_Forms@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	

**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**

404121161	FORM 27 DENIED
404122254	LOGS
404122265	PHOTO DOCUMENTATION
404122286	GROUND WATER SAMPLE LOCATION
404122291	SOIL SAMPLE LOCATION MAP
404122303	SOIL SAMPLE LOCATION MAP
404122305	SOIL SAMPLE LOCATION MAP
404122307	LABORATORY ANALYTICAL REPORT
404122337	LABORATORY ANALYTICAL REPORT
404122338	LABORATORY ANALYTICAL REPORT
404122860	LABORATORY ANALYTICAL REPORT
404122861	LABORATORY ANALYTICAL REPORT
404122862	LABORATORY ANALYTICAL REPORT
404122863	LABORATORY ANALYTICAL REPORT
404122864	LABORATORY ANALYTICAL REPORT
404122866	LABORATORY ANALYTICAL REPORT
404122871	LABORATORY ANALYTICAL REPORT
404122872	LABORATORY ANALYTICAL REPORT
404122873	LABORATORY ANALYTICAL REPORT
404122877	LABORATORY ANALYTICAL REPORT
404122916	LABORATORY ANALYTICAL REPORT
404122919	LABORATORY ANALYTICAL REPORT
404122920	LABORATORY ANALYTICAL REPORT
404122921	LABORATORY ANALYTICAL REPORT
404122923	LABORATORY ANALYTICAL REPORT
404122924	LABORATORY ANALYTICAL REPORT

404122927	LABORATORY ANALYTICAL REPORT
404122957	ANALYTICAL DATA SUMMARY TABLE(S)
404342642	FORM 27-SUPPLEMENTAL-SUBMITTED

Total Attach: 29 Files

### General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
Environmental	ECMC has denied this Form. Verification samples of this magnitude are not considered valid. If the Operator chooses to use verification samples for every sample point, then the Operator must explain their scientific justification for running multiple reruns/resamples.	09/04/2025
Environmental	Based on the impacts to groundwater, the pathway to groundwater has been completed. Therefore, concentrations exceeding Table 915-1 Protection of Groundwater Soil Screening Levels are applicable and exceedances cannot be addressed through groundwater monitoring.	09/04/2025
Environmental	Arsenic concentrations are above RSSLs and site specific background; this cannot be addressed through groundwater monitoring as proposed. Operator shall propose additional remediation or conduct background determination.	09/04/2025
Environmental	<p>Multiple background samples were collected from areas within the extent of impacts and are not representative of background conditions near the spill/release. Operator shall conduct a thorough review of the spatial relationships between impacted samples and current background samples. Samples found to have been collected from within the extent of impacts shall be omitted from future background determination calculations.</p> <p>Background sampling locations should be sufficiently away from the impacted area to reflect conditions not impacted by oil and gas activity, and should be obtained from similar depths and soil horizons or lithologic materials for comparison to confirmation soil samples.</p> <p>Note: Background sample locations cannot be approved until the extent of impacts has been delineated.</p>	09/04/2025

Total: 4 comment(s)