

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:  
Candice (Nikki) Graber

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 INFORMATION

Name of Operator: GREAT WESTERN OPERATING COMPANY LLC	Operator No: 10110	<b>Phone Numbers</b>
Address: 1775 SHERMAN STREET STE 3000		Phone: (720) 595-2132
City: DENVER	State: CO	Zip: 80203
Contact Person: Jason Davidson	Email: jdavidson@gwp.com	Mobile: ( )

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 17902 Initial Form 27 Document #: 402674196

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

No Multiple Facilities

Facility Type: TANK BATTERY	Facility ID: 463941	API #: _____	County Name: WELD
Facility Name: Kielian 2-2 battery	Latitude: 40.335184	Longitude: -104.850155	
** correct Lat/Long if needed: Latitude: 40.335184		Longitude: -104.850155	
QtrQtr: SESE	Sec: 2	Twp: 4N	Range: 67W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications GM Most Sensitive Adjacent Land Use Residential  
 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**

The Kielian 2-2 battery is surrounded by private ranching and agricultural mixed-use properties in all directions. There are residential properties ~400' west and ~300' southeast. The wellhead is located ~250' northwest of the battery. A small pond is in place ~60' west of the battery and a gravel pit is in place ~600' east. The Thompson and Platte Ditch is in place ~1,180' south of the battery. There is 1 groundwater well mapped within a 1/4 mile of the battery. Groundwater depth is unknown but is expected to be encountered at <20' bgs. The 100-year floodplain of the Big Thompson River drainage is mapped ~260' north of the battery. The battery is located within a Mule Deer Severe Winter Range Buffer and an Aquatic Native Species Conservation Waters buffer is mapped ~1,050' northwest of the battery.

**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	Unknown	Site Investigation Activities
Yes	SOILS	50' E/W x 65' N/S x 7' deep	Site Investigation Activities

**INITIAL ACTION SUMMARY**

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

During facility closure activities, soil and potential groundwater impacts were observed in test pits advanced to groundwater below the partially buried produced water tank and below the horizontal separator on May 5, 2021.

**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 ):

Confirmation soil samples will be collected from the sidewalls of the final extent of excavation to demonstrate compliance with Table 915-1 RSSLs for benzene, toluene, ethylbenzene, total xylenes (BTEX), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, Total Petroleum Hydrocarbons (TPH)-gasoline range organics (GRO), and TPH-diesel range organics (DRO). Please refer to the attached Operator Comments Document for further discussion.

**Proposed Groundwater Sampling**

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

The next quarterly groundwater sampling event is scheduled for late-May 2022.

**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 2  
Number of soil samples exceeding 915-1 1  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 3250

### NA / ND

-- Highest concentration of TPH (mg/kg) 0.968  
NA Highest concentration of SAR \_\_\_\_\_  
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 7

### Groundwater

Number of groundwater samples collected 9  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 6'  
Number of groundwater monitoring wells installed 9  
Number of groundwater samples exceeding 915-1 0

-- Highest concentration of Benzene (µg/l) 4.75  
ND Highest concentration of Toluene (µg/l) \_\_\_\_\_  
-- Highest concentration of Ethylbenzene (µg/l) 8.56  
ND Highest concentration of Xylene (µg/l) \_\_\_\_\_  
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?

One background sample was collected during initial site investigation activities on 5/17/21.

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.

Based on the results of the investigations conducted to date, GWOC proposes to conduct source removal excavation of soils above Table 915-1 RSSLs at the Site, which will commence within 90 days of COGCC approval of this plan. Please refer to the attached Operator Comments Document for further discussion.

### 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.

Based on the results of the investigations conducted to date, GWOC proposes to conduct source removal excavation of soils above Table 915-1 RSSLs at the Site, which will commence within 90 days of COGCC approval of this plan. To mitigate any potential residual dissolved phase hydrocarbons, a groundwater remediation amendment (Chemically Oxygenated Granular Activated Carbon (COGAC) or a mixture of sodium persulfate, calcium peroxide, and chelated iron) will be applied to the exposed groundwater in the open excavation prior to backfilling. Please refer to the attached Operator Comments Document for further discussion.

### Soil Remediation Summary

In Situ

Ex Situ

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

- \_\_\_\_\_ Excavate and offsite disposal
- \_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) \_\_\_\_\_
- \_\_\_\_\_ Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_
- \_\_\_\_\_ 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
- \_\_\_\_\_ 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.

On February 10, 2022, groundwater monitoring was conducted in monitoring wells MW01 through MW09. Monitoring wells MW07 through MW09 were developed by purging at least 10 casing volumes. Prior to purging, depth to water measurements were collected in all nine monitoring wells using an oil water interface probe to determine relative groundwater elevations and calculate well specific target purge volumes. No free product was observed in any of the monitoring wells. After purging at least three casing volumes from monitoring wells MW01 through MW06 and following development activities at MW07 through MW09, each monitoring well was sampled using a peristaltic pump. Groundwater samples were collected into laboratory provided containers, placed on ice, and delivered with a completed chain-of-custody form to Origins Laboratory (Origins) in Denver, Colorado, for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, and naphthalene by EPA Method 8260D.

During the February 2022 groundwater monitoring event, depth to groundwater ranged from approximately 5.20 feet below ground surface (ft bgs) in monitoring well MW04 to 9.44 ft-bgs in monitoring well MW01. Groundwater was calculated to flow north-northeast with an average hydraulic gradient of 0.0036 feet of vertical rise per foot of horizontal run as measured from well MW01 to well MW02.

All groundwater analytical results were reported at concentrations either below their respective COGCC Table 915-1 groundwater standards or below their respective laboratory reporting limits. The groundwater analytical results are displayed on the attached Figure 1.

# 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 \_\_\_\_\_

## WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation?    No

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

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

E&P waste (solid) description \_\_\_\_\_

COGCC Disposal Facility ID #, if applicable: \_\_\_\_\_

Non-COGCC Disposal Facility: \_\_\_\_\_

Volume of E&P Waste (liquid) in barrels \_\_\_\_\_

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.

If necessary, the site will be reclaimed in accordance with COGCC 1000-Series 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. 04/13/2021

Actual Spill or Release date, or date of discovery. 05/05/2021

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/30/2021

Proposed site investigation commencement. 08/16/2021

Proposed completion of site investigation. 01/20/2022

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 07/25/2022

Proposed date of completion of Remediation. 07/27/2022

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**

Please refer to the attached Operator Comments Document.

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

Signed: Jason Davidson

Title: Senior EHS Specialist

Submit Date: 05/03/2022

Email: jdavidson@gwp.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: Candice (Nikki) Graber

Date: 05/31/2022

Remediation Project Number: 17902

**Condition of Approval****COA Type****Description**

	<p>COGCC again denies Operator's request to use RSSLs.</p> <p>Groundwater has been impacted at the location therefore demonstrating a pathway to groundwater exists. Operator shall comply with Table 915-1 Protection of Groundwater Soil Screening Level Concentrations.</p> <p>In accordance with 913.d.(1) Operator will investigate impacts to soil, Groundwater, and surface water as soon as the impacts are discovered.</p>
1 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**

403036232	FORM 27-SUPPLEMENTAL-SUBMITTED
403036325	ANALYTICAL RESULTS
403036326	SOIL SAMPLE LOCATION MAP
403036330	OTHER

Total Attach: 4 Files

**General Comments****User Group****Comment****Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)