

# State of Colorado Oil and Gas Conservation Commission

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Report taken by:

## 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: GREAT WESTERN OPERATING COMPANY LLC	Operator No: 10110	Phone Numbers Phone: (720) 595-2132 Mobile: ( )
Address: 1001 17TH STREET #2000		
City: DENVER	State: CO Zip: 80202	
Contact Person: Jason Davidson	Email: jdavidson@gwp.com	

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 8430

Initial Form 27 Document #:

#### PURPOSE INFORMATION

- |  |  |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination                                       | <input 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 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 checked="" type="checkbox"/> Other Remediation of previously closed pit (Facility ID 115604)        |

#### SITE INFORMATION

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

Facility Type: WELL	Facility ID:	API #: 121-06411	County Name: WASHINGTON
Facility Name: FLESSNER 9	Latitude: 39.945350	Longitude: -103.693070	
** correct Lat/Long if needed: Latitude: 39.947185		Longitude: -103.695874	
QtrQtr: SWSE	Sec: 19	Twp: 1S	Range: 56W Meridian: 6 Sensitive Area? No

#### SITE CONDITIONS

General soil type - USCS Classifications CL

Most Sensitive Adjacent Land Use Agricultural

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? No

#### Other Potential Receptors within 1/4 mile

None identified

# 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
Yes	SOILS	6.3 acres by 6" to 36" deep	Soil sampling and visual/gps survey

## INITIAL ACTION SUMMARY

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

COGCC mapped an area of stressed or lacking crops in the agricultural field to the east of the tank battery using GPS on 7/27/15. The area measured 6.3 acres in size. Please refer to the attached aerial image for an illustration of COGCC's mapped area. On 3/27/17, twenty soil samples, including two background samples, were collected at depths ranging from 6" to 36" below ground surface (bgs) in the agricultural field to the north and east of the tank battery. Please refer to the attached A.G. Wassenaar Figure 1 for the sample locations, depths, and analytical results. A copy of the laboratory analytical report is also attached. On 6/3/19, twenty additional soil samples, including two background samples, were collected in the same general locations and depths of the 3/27/17 samples. Compared to the 3/27/17 analytical results, there is a noticeable decrease in electrical conductivity (EC) and pH at depths of 6", 18", and 36" bgs to concentrations below their respective COGCC Table 910-1 levels. Sodium Absorption Ratio (SAR) also decreased at depths of 18" and 36", but some SAR values increased at a depth of 6" bgs. The increasing SAR at shallower depths could be an indication of upward migration of salt by capillary action resulting in the observed surface damage. Please refer to the attached CGRS Soil Analytical Results Figure for the locations, depths, and analytical results of the 6/3/19 sampling event. A copy of the laboratory analytical report is also attached.

## 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 monitor soil conditions, confirmation sampling activities will be conducted in mid-May 2020. Up to 20 soil samples will be collected at the same general locations and depths as the 3/27/17 and 6/3/19 events. Samples will be analyzed for pH, EC, and SAR by Saturated Paste Extract. If soil analytical results indicate pH, EC, and SAR values within their respective COGCC Table 910-1 concentration ranges, Great Western will request No Further Action (NFA) and closure of Remediation Project #8340. If analytical results are outside of their respective concentration ranges, Great Western will collect confirmation resamples in the Spring of 2021. If soil analytical results indicate pH, EC, and SAR values within their respective COGCC Table 910-1 concentration ranges, Great Western will request NFA and closure of Remediation Project #8340. If analytical results are outside of their respective concentration ranges, Great Western will determine a plan for next steps.

### Proposed Groundwater Sampling

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

### 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 40  
Number of soil samples exceeding 910-1 26  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 27500  
0

### NA / ND

ND Highest concentration of TPH (mg/kg)             
-- Highest concentration of SAR 37.29  
BTEX > 910-1 No  
Vertical Extent > 910-1 (in feet) 36

### Groundwater

Number of groundwater samples collected 0  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet)             
Number of groundwater monitoring wells installed             
Number of groundwater samples exceeding 910-1           

Highest concentration of Benzene (µg/l)             
Highest concentration of Toluene (µg/l)             
Highest concentration of Ethylbenzene (µg/l)             
Highest concentration of Xylene (µg/l)             
Highest concentration of Methane (mg/l)           

### Surface Water

0 Number of surface water samples collected  
0 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?

Please refer to the attached COGCC – Area of Stressed or Lacking Crops Figure (7/27/15) for an illustration of the impacts to the adjacent agricultural field.

☒ Were background samples collected as part of this site investigation?

Four background soil samples were collected. Please refer to the attached A.G. Wassenaar Figure 1 and the CGRS Soil Analytical Results Figure for the locations, depths, and analytical results.

☐ 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.

Please refer to Remediation Summary below.

### **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.

To decrease residual levels of sodium adsorption ratio (SAR) and electrical conductivity (EC) in the onsite soil to meet COGCC Table 910-1 concentration values, Great Western plans to deep rip the agricultural field to the north and east of the tank battery up to 18 inches bgs and incorporate 2 tons of cornstalks, 6 inches to 8 inches deep. The cornstalks will stimulate soil biota and nutrient cycling which aids in revegetation. Biodegradation of the cornstalks improves soil structure by enhancing aggregate formation which in turn improves soil permeability. Great Western also plans to amend the soil with gypsum at a rate of 16 tons per acre to create a better soil structure, elemental sulfur at a rate of 2 tons per acre to lower the pH, and nitrogen at a rate of 100 pounds per acre to stimulate plant growth. The work is planned for mid-February 2020 and the estimated time to attain NFA status is 3 months. Please refer to the Proposed Soil Sampling section in the Site Investigation Plan tab of this Form 27.

### **Soil Remediation Summary**

☒ In Situ

\_\_\_\_\_ Bioremediation ( or enhanced bioremediation )

\_\_\_\_\_ Chemical oxidation

\_\_\_\_\_ Air sparge / Soil vapor extraction

Yes Natural Attenuation

Yes Other Enhanced permeability, Soil  
amendments (gypsum, sulfur,  
nitrogen) \_\_\_\_\_

☐ Ex Situ

\_\_\_\_\_ 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.

Not applicable.

## REMEDATION PROGRESS UPDATE

### PERIODIC REPORTING

**Frequency:** ☐ Quarterly ☐ Semi-Annually ☒ Annually ☐ Other \_\_\_\_\_

**Report Type:** ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☒ Other Remediation Progress Report \_\_\_\_\_

### WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? \_\_\_\_\_

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: \_\_\_\_\_

## REMEDATION COMPLETION REPORT

### REMEDATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No \_\_\_\_\_

Do all soils meet Table 910-1 standards? \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? \_\_\_\_\_

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? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

## 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.

Following NFA status, Great Western will return the land to the landowner to reseed and farm the area. If necessary, the site will be reclaimed in accordance with COGCC 1000 series rules.

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. \_\_\_\_\_

### **SITE INVESTIGATION DATES**

Date of Initial Actions described in Site Investigation Plan (start date). \_\_\_\_\_

Date of commencement of Site Investigation. 01/10/2014

Date of completion of Site Investigation. 06/03/2019

### **REMEDIAL ACTION DATES**

Date of commencement of Remediation. 02/24/2020

Date of completion of Remediation. \_\_\_\_\_

### **SITE RECLAMATION DATES**

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

### **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: Jason Davidson

Title: Senior EHS Specialist

Submit Date: \_\_\_\_\_

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: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 8430

### **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**

402296301	SITE INVESTIGATION REPORT
402296302	MAP
402296303	SOIL SAMPLE LOCATION MAP

Total Attach: 3 Files

### **General Comments**

#### **User Group**

#### **Comment**

#### **Comment Date**

		Stamp Upon Approval
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Total: 0 comment(s)