

State of Colorado  
Oil and Gas Conservation Commission

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Report taken by:  
Kari Oakman

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	<b>Phone Numbers</b>
Address: 1001 17TH STREET #2000		Phone: (720) 595-2132
City: DENVER	State: CO Zip: 80202	Mobile: ( )
Contact Person: Jason Davidson	Email: jdavidson@gwp.com	

PROJECT, PURPOSE & SITE INFORMATION

**PROJECT INFORMATION**  
Remediation Project #: 12383 Initial Form 27 Document #: 401898095

**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 checked="" 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 Update - Limited Subsurface Investigation and Quarterly Groundwater Monitoring

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

Facility Type: LOCATION	Facility ID: 335863	API #: _____	County Name: ADAMS
Facility Name: Sauvage 12-7	Latitude: 39.984260	Longitude: -104.937470	
	** correct Lat/Long if needed: Latitude: 39.985795	Longitude: -104.932459	
QtrQtr: NWNW	Sec: 7	Twp: 1S	Range: 67W Meridian: 6 Sensitive Area? Yes

**SITE CONDITIONS**

General soil type - USCS Classifications CL      Most Sensitive Adjacent Land Use Agricultural, Unnamed tributary to Big Dry Creek

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**

Residential property 600 feet to the north, German Reservoir No. 1 in place 970 feet to the north/northwest, Unnamed Reservoir in place 1,330 feet to the north/northeast

# SITE INVESTIGATION PLAN

## TYPE OF WASTE:

- |  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> E&P Waste      | <input type="checkbox"/> Other E&P Waste             | <input type="checkbox"/> Non-E&P Waste |
| <input checked="" type="checkbox"/> Produced Water | <input type="checkbox"/> Workover Fluids             |  |
| <input checked="" type="checkbox"/> Oil            | <input type="checkbox"/> Tank Bottoms                |  |
| <input checked="" type="checkbox"/> Condensate     | <input type="checkbox"/> Pigging Waste               |  |
| <input type="checkbox"/> Drilling Fluids           | <input type="checkbox"/> Rig Wash                    |  |
| <input type="checkbox"/> Drill Cuttings            | <input type="checkbox"/> Spent Filters               |  |
|  | <input type="checkbox"/> Pit Bottoms                 |  |
|  | <input type="checkbox"/> Other (as described by EPA) |  |

## DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
No	GROUNDWATER	Not impacted	Subsurface Investigations
Yes	SOILS	35'x16' impacted from 6' to 11' bgs	Subsurface Investigations

## 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 May 28, 2019, a soil boring investigation was conducted to further define vertical and horizontal extent of potentially impacted soil and groundwater at the Site. Eight soil borings were advanced to 14 feet below ground surface (bgs) surrounding the source area. Soil staining was observed from approximately 6 feet to 11 feet bgs. One characterization soil sample from each boring was submitted to Origins Laboratory (Origins) for analysis based on the highest field screening readings using a photoionization detector (PID). Origins analyzed the samples for total petroleum hydrocarbons (TPH)-gasoline range organics (GRO) and TPH- diesel range organics (DRO). Concentrations of TPH-GRO and TPH-DRO were added to calculate TPH. TPH concentrations were reported below the COGCC Table 910-1 concentration level of 500 milligrams per kilogram (mg/kg) in soil samples from soil borings SB-1, SB-2, and SB-4 through SB-9. TPH concentrations were reported at 598.5 mg/kg in the soil sample from 10' bgs in boring SB-3, which is above the Table 910-1 concentration level. Two of the eight borings were converted into groundwater monitoring wells. Monitoring well MW-1 was installed to the west of the source area and MW-2 was installed to the south of the source area.

Please refer to the Operator Comments section under the Submit tab of this Form 27 for a summary of the additional subsurface investigation conducted on March 31, 2020.

## 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 ):

Please refer to the Remediation Summary section under the Remedial Action Plan tab of this Form 27.

### Proposed Groundwater Sampling

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

Please refer to the Groundwater Monitoring section under the Remedial Action Plan tab of this Form 27.

### 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 5  
Number of soil samples exceeding 910-1 1  
Was the areal and vertical extent of soil contamination delineated? Yes  
Approximate areal extent (square feet) 560

### NA / ND

-- Highest concentration of TPH (mg/kg) 510  
NA Highest concentration of SAR           
BTEX > 910-1 No  
Vertical Extent > 910-1 (in feet) 11

### Groundwater

Number of groundwater samples collected 5  
Was extent of groundwater contaminated delineated? Yes  
Depth to groundwater (below ground surface, in feet) 8'  
Number of groundwater monitoring wells installed 5  
Number of groundwater samples exceeding 910-1 0

-- Highest concentration of Benzene (µg/l) 1.11  
ND Highest concentration of Toluene (µg/l)           
-- Highest concentration of Ethylbenzene (µg/l) 238  
-- Highest concentration of Xylene (µg/l) 180  
NA 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?

Were background samples collected as part of this site investigation?

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.

Great Western will either dig and haul or treat any soils onsite that exceed Table 910-1 concentration levels.

## 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.

Great Western proposes to excavate approximately 100 cubic yards of hydrocarbon-impacted source area soil from approximately 6 to 11 feet bgs. Impacted soils will be transported offsite for disposal at a licensed disposal facility. Source removal by excavation will be conducted, based on visual and olfactory observations, field soil screening with a PID, and laboratory analysis. Confirmation soil samples will be collected from the walls and base of the excavation and analyzed for BTEX, TPH-GRO, and TPH-DRO. The number and location of soil samples shall be appropriate to confirm remediation. If necessary, Chemically Oxidized Granular Activated Carbon (COGAC™) will be used as a remedial backfill material to treat the dissolved phase contamination in groundwater exposed in the base of the excavation. Figure 1 illustrates the estimated extent of impacted soil based on data collected during the limited subsurface investigations at the Site. Great Western proposes to conduct the remediation activities during late-spring/early-summer 2020 and estimates a 1-year time frame to attain NFA status.

Groundwater is addressed in the Groundwater Monitoring section under below.

## Soil Remediation Summary

### In Situ

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

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

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

\_\_\_\_\_ Natural Attenuation

\_\_\_\_\_ Other \_\_\_\_\_

### 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.

Groundwater from monitoring wells MW-1 and MW-2 has been sampled for BTEX analysis on a quarterly schedule since June 4, 2019. BTEX concentrations have not been detected at or above laboratory reporting limits in any of the samples that have been collected from monitoring wells MW-1 and MW-2. On 4/1/20, following surveying and development activities, groundwater from monitoring wells MW-3, MW-4, and MW-5 was sampled for BTEX analysis. Concentrations of BTEX were either not reported at or above laboratory detection limits or were reported below their respective Table 910-1 concentration levels in the samples collected from monitoring wells MW-3, MW-4, or MW-5. Groundwater was encountered in the monitoring wells from 7.17 feet to 8.12 feet below the top of casing in each well and was calculated to flow to the southwest across the Site. See the attached Figure 2 depicting the location of the monitoring wells and groundwater analytical results. See Table 2 for a summary of the groundwater analytical results. A copy of the laboratory analytical report is also attached. Refer to Figure 3 for an illustration of the groundwater elevation and flow direction during the combined March 12 and April 1, 2020 sampling events. Great Western proposes to sample groundwater from all five monitoring wells for BTEX analysis on a quarterly schedule. Monitoring well MW-2 will be used as the point of compliance well. Following the receipt of four consecutive quarters of groundwater analytical results below Table 910-1 concentration levels for BTEX, no further action will be requested for Remediation Project #12383.

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

Frequency:  Quarterly  Semi-Annually  Annually  Other \_\_\_\_\_

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

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.

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). 07/13/2015

Date of commencement of Site Investigation. 05/28/2019

Date of completion of Site Investigation. 04/01/2020

## **REMEDIAL ACTION DATES**

Date of commencement of Remediation. \_\_\_\_\_

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

## **SITE RECLAMATION DATES**

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

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

**OPERATOR COMMENT**

On March 31, 2020, an additional subsurface investigation was conducted to further delineate the vertical and horizontal extent of the hydrocarbon impacted soil and groundwater in the source area. Five soil borings were advanced to depths ranging from 15 feet to 23 feet bgs. Soil staining was observed from approximately 7 feet to 10 feet bgs. One characterization soil sample from each boring was submitted to Origins for analysis based on the highest field screening readings using a PID. Origins analyzed the samples for benzene, toluene, ethylbenzene, and total xylene (BTEX), TPH-GRO, and TPH-DRO. Concentrations of BTEX were either not detected at or above laboratory reporting limits or were reported below their respective Table 910-1 concentration levels. Concentrations of TPH-GRO and TPH-DRO were added to calculate TPH. TPH concentrations were not detected at or above laboratory reporting limits in the soil samples from soil borings MW-3 and MW-5 and were reported below the Table 910-1 concentration level in the soil samples from soil borings SB-10 and S-11. TPH concentrations were reported at 510 mg/kg in the soil sample from 10' bgs in boring MW-4, which is above the Table 910-1 concentration level. Groundwater was encountered at approximately 7.5 feet bgs. Three of the five borings were converted into 2-inch diameter groundwater monitoring wells installed to depths ranging from approximately 15 feet to 22 feet bgs using 10 feet to 15 feet of screen and 5 feet of riser. Monitoring well MW-3 was installed to the southeast of the source area, MW-4 was installed in the source area, and MW-5 was installed to the north of the source area. The analytical results from the subsurface investigation are summarized on the attached Tables 1 and 2 and are illustrated on Figures 1 and 2. Copies of the boring logs for MW-3, MW-4, and MW-5 and the laboratory reports are also attached.

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: 04/28/2020

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: Kari Oakman

Date: 04/28/2020

Remediation Project Number: 12383

**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**

402381970	FORM 27-SUPPLEMENTAL-SUBMITTED
402382941	SOIL SAMPLE LOCATION MAP
402382942	GROUND WATER SAMPLE LOCATION
402382944	GROUND WATER ELEVATION MAP
402382946	ANALYTICAL RESULTS
402382951	ANALYTICAL RESULTS
402382956	ANALYTICAL RESULTS
402382961	LOGS
402382962	ANALYTICAL RESULTS
402382963	ANALYTICAL RESULTS

Total Attach: 10 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)