

State of Colorado
Oil and Gas Conservation Commission

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Receive Date:

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 8430 Initial Form 27 Document #: _____

PURPOSE INFORMATION

- 901.e. Sensitive Area Determination
- 909.c.(1), Rule 905: Pit or PW vessel closure
- 909.c.(2), Rule 906: Spill/Release Remediation
- 909.c.(3), Rule 907.e.: Land treatment of oily waste
- 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure
- 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
- Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
- Rule 909.e.(2)B.: Closure of remediation project
- Rule 906.c.: Director request
- 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:

- | | | |
|--|--|--|
| <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 type="checkbox"/> Oil | <input type="checkbox"/> Tank Bottoms | |
| <input 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
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.

REMEDIATION 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: _____

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.

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

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: j davidson@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.

<u>Att Doc Num</u>	<u>Name</u>
402296301	SITE INVESTIGATION REPORT
402296302	MAP
402296303	SOIL SAMPLE LOCATION MAP

Total Attach: 3 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)