

# State of Colorado Oil and Gas Conservation Commission

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Report taken by:

RICK ALLISON

## 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: <u>GREAT WESTERN OPERATING COMPANY LLC</u>	Operator No: <u>10110</u>	<b>Phone Numbers</b>
Address: <u>1001 17TH STREET #2000</u>		Phone: <u>(720) 595.2078</u>
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Ben Huggins</u>	Email: <u>bhuggins@gwogco.com</u>	Mobile: <u>(303) 332.4548</u>

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 10100Initial Form 27 Document #: 401235959

#### 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 type="checkbox"/> Other _____   |

#### SITE INFORMATION

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

Facility Type: <u>SPILL OR RELEASE</u>	Facility ID: <u>445284</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>SPILL/RELEASE POINT</u>		Latitude: <u>40.486085</u>	Longitude: <u>-104.870475</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>NESE</u>	Sec: <u>15</u>	Twp: <u>6N</u>	Range: <u>67W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

#### SITE CONDITIONS

General soil type - USCS Classifications SMMost Sensitive Adjacent Land Use agricultural, residentialIs domestic water well within 1/4 mile? NoIs surface water within 1/4 mile? YesIs groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

## 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	GROUNDWATER	30 x 40 x 12	Drilling
Yes	SOILS	30 x 40 x 12	Drilling, soil sampling during excavation

### INITIAL ACTION SUMMARY

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

March 2016 excavation of approximately 250 cubic yards of visibly impacted soil in the vicinity of the former produced water storage vessel. The results of a May 2016 investigation determined that groundwater had been impacted at the site, and that impacted soil remained at the site and additional excavation was needed. In October 2016, the excavation was extended and 650 cubic yards of additional impacted soils were removed. An activated carbon remedial agent was incorporated into the soils and groundwater at the base of the excavation, and slotted PVC pipe was installed horizontally within the excavation to provide access to groundwater for possible future remediation efforts.

### 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 ):

#### Proposed Groundwater Sampling

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

Installation of three monitoring at the site: one in the source area, and two downgradient. Groundwater samples will be collected for analysis of BTEX.

#### 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 ):

Installation of three monitoring at the site: one in the source area, and two downgradient.

# SITE INVESTIGATION REPORT

## SAMPLE SUMMARY

### Soil

Number of soil samples collected 4

Number of soil samples exceeding 910-1 0

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 2400

### NA / ND

NA Highest concentration of TPH (mg/kg)           

NA Highest concentration of SAR           

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 12

### Groundwater

Number of groundwater samples collected 4

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 12'

Number of groundwater monitoring wells installed 0

Number of groundwater samples exceeding 910-1 2

-- Highest concentration of Benzene (µg/l) 10900

-- Highest concentration of Toluene (µg/l) 1660

-- Highest concentration of Ethylbenzene (µg/l) 554

-- Highest concentration of Xylene (µg/l) 2770

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?

Installation of three monitoring at the site: one in the source area, and two downgradient.

# 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.

M&M Excavation removed approximately 650 cubic yards of visibly impacted soils from the site, which were disposed of offsite at a licensed facility. The excavation was approximately 30 feet wide in the east-west direction, 40 feet long in the north-south direction, and 12 feet deep. Groundwater was present at the base of the excavation.

## 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.

Once impacted soils had been removed laterally, 1,150 pounds of granular COGAC, an activated carbon remedial agent supplied by Remington Technologies, LLC, were incorporated into the soils and groundwater at the base of the excavation cavity. The COGAC was incorporated into the base of the excavation in order to treat groundwater impact at the Haas #1 site. In order to facilitate possible future remediation efforts and provide access to groundwater, slotted PVC pipe was installed horizontally in the base of the excavation prior to backfilling. The excavation depth was approximately 12 feet. Groundwater was encountered at 9 feet below ground surface (bgs) during the May 2016 investigation, and at 12 feet bgs in October 2016. A 40-feet long, 3-foot-deep trench was advanced within the excavation, to a depth of 15 feet bgs.

Two 4-inch diameter, 20-foot long horizontal perforated PVC pipes connected to a non-perforated vertical PVC pipe were installed in the trench at the base of the excavation. The lateral portion of the gallery was placed in the trench, and surrounded by at least 6 inches of pea-gravel on all sides. The perforated, lateral portion of the gallery was wrapped in a permeable, woven geotextile to prevent the surrounding gravel pack from entering the perforations.

AGW proposes using the previously installed PVC pipe to add oxygen to the groundwater in the area of the former excavation using a small air pump (pond tank bubbler), inverter, and solar cell. The system will be set on the site within a locked box directly connected to two (2) 100-watt solar panels. The solar panels will only operate during the daytime and allow the system to equilibrate during the evening hours. Since the site is vacant, the system can run as long as necessary. It should take no maintenance and will be a standalone system.

## Soil Remediation Summary

☐ In Situ

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

☒ Ex Situ

Yes Excavate and offsite disposal  
\_\_\_\_\_ If Yes: Estimated Volume (Cubic Yards) 900  
Name of Licensed Disposal Facility or COGCC Facility ID # \_\_\_\_\_  
No Excavate and onsite remediation  
\_\_\_\_\_ Land Treatment  
\_\_\_\_\_ Bioremediation (or enhanced bioremediation)  
\_\_\_\_\_ Chemical oxidation  
\_\_\_\_\_ Other \_\_\_\_\_

## Groundwater Remediation Summary

Yes Bioremediation ( or enhanced bioremediation )  
☐ Chemical oxidation  
☐ Air sparge / Soil vapor extraction  
Yes 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.

In order to monitor the effectiveness of the remediation activities, three monitoring wells have been installed at the site: one in the source area, and two downgradient. Based on the groundwater results from sampling events in 2017 and 2018, no considerable reduction of benzene in groundwater has occurred. Quarterly groundwater monitoring will continue to take place until four consecutive sampling events have occurred in which BTEX concentrations are below their respective Table 910-1 values.

## 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 \_\_\_\_\_

### 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:

N/A

Volume of E&P Waste (solid) in cubic yards 900

E&P waste (solid) description hydrocarbon impacted soils

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

Non-COGCC Disposal Facility: Waste Management - North Well  
Landfill

Volume of E&P Waste (liquid) in barrels 0

E&P waste (liquid) description N/A

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

Non-COGCC Disposal Facility: N/A

## 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.

Site will be reclaimed in accordance with 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. 03/22/2016

Actual Spill or Release date, if known. \_\_\_\_\_

### **SITE INVESTIGATION DATES**

Date of Initial Actions described in Site Investigation Plan (start date). 03/15/2016

Date of commencement of Site Investigation. 05/03/2016

Date of completion of Site Investigation. 10/04/2016

### **REMEDIAL ACTION DATES**

Date of commencement of Remediation. 10/04/2016

Date of completion of Remediation. 10/04/2016

### **SITE RECLAMATION DATES**

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

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

**OPERATOR COMMENT**

Please see attached reports since October 2016

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

Signed: Rachel A. Peterson

Title: Senior Project Manager

Submit Date: 11/09/2018

Email: petersonr@agwco.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: RICK ALLISON

Date: 12/07/2018

Remediation Project Number: 10100

**COA Type****Description**

	<ol style="list-style-type: none"><li>1. It appears that quarterly monitoring has not been consistent. Operator shall ensure that quarterly monitoring (approximately every 90 days) continues.</li><li>2. In reviewing the site history and various aerial images, this release was discovered and the separator but no assessment was conducted at the produced water vessel. It appears the original information provided regarding the release location was incorrect. A boring needs to be advanced to groundwater at the former produced water vessel location with soil and groundwater samples collected to confirm compliance with Table 910-1.</li><li>3. The extent of groundwater impacts near MW-2 need to be defined with a downgradient monitoring well and and cross gradient well to the west-northwest of MW-2, at a minimum.</li><li>4. Submit Quarterly Monitoring and Progress Reports for this location.</li></ol>
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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**

401833838	FORM 27-SUPPLEMENTAL-SUBMITTED
401833842	REMEDIATION PROGRESS REPORT
401833844	MONITORING REPORT
401833847	MONITORING REPORT
401833858	MONITORING REPORT
401833861	MONITORING REPORT

Total Attach: 6 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)