

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.

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>	Phone Numbers
Address: <u>1001 17TH STREET #2000</u>		Phone: <u>(720) 595-2132</u>
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Jason Davidson</u>	Email: <u>j davidson@gwogco.com</u>	Mobile: <u>(303) 596-5693</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10100 Initial 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 SM Most Sensitive Adjacent Land Use agricultural, residential

Is domestic water well within 1/4 mile? No 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

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-wide 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 completed installation of the proposed aeration remediation system on November 30, 2018. Consisting of a small air pump, a power inverter, and one (1) solar cell, the aeration system was installed near MW-1, utilizing a slotted horizontal PVC pipe that was installed previously, when impacted soils were excavated at the site. Tubing from the pump was fed into the vertical access pipe and then into the horizontal remediation pipe, increasing the lateral extent to which oxygen can be introduced. Sunlight permitting, the system will run during the daytime and allow the system to equilibrate during evening hours. The system is completely standalone and may run as long as necessary.

Soil Remediation Summary

<input type="checkbox"/> In Situ	<input checked="" type="checkbox"/> Ex Situ
_____ Bioremediation (or enhanced bioremediation)	Yes _____ Excavate and offsite disposal
_____ Chemical oxidation	_____ If Yes: Estimated Volume (Cubic Yards) _____ 900
_____ Air sparge / Soil vapor extraction	_____ Name of Licensed Disposal Facility or COGCC Facility ID # _____
_____ Natural Attenuation	No _____ Excavate and onsite remediation
_____ Other _____	_____ Land Treatment
	_____ Bioremediation (or enhanced bioremediation)
	_____ Chemical oxidation
	_____ Other _____

Groundwater Remediation Summary

Yes _____	Bioremediation (or enhanced bioremediation)
<input type="checkbox"/> _____	Chemical oxidation
<input type="checkbox"/> _____	Air sparge / Soil vapor extraction
Yes _____	Natural Attenuation
<input type="checkbox"/> _____	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, six monitoring wells have been installed at the site. On March 27, 2019 AGW conducted the first groundwater sampling event of three (3) original monitoring wells and three (3) newly installed monitoring wells.

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.

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 _____

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

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.

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

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: Env. Dept. Manager

Submit Date: 11/04/2019

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: Candice (Nikki) Graber

Date: 11/08/2019

Remediation Project Number: 10100

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

402229668	FORM 27-SUPPLEMENTAL-SUBMITTED
402229673	MONITORING REPORT

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)