

State of Colorado
Oil and Gas Conservation Commission

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402167415
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 Phone: (720) -595-2132
City: DENVER State: CO Zip: 80202 Mobile: ()
Contact Person: Jason Davidson Email: jdavidson@gwogco.com

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 11774 Initial Form 27 Document #: 401749307

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 [X]
- 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 [X]
- 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 []

SITE INFORMATION

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

Facility Type: LOCATION Facility ID: 320793 API #: County Name: ARAPAHOE
Facility Name: GREAT WESTERN KRAUS-ALBIN 22-20 Latitude: 39.602846 Longitude: -104.467196
** correct Lat/Long if needed: Latitude: 39.602613 Longitude: -104.467776
QtrQtr: SENW Sec: 20 Twp: 5S Range: 63W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications SC Most Sensitive Adjacent Land Use Rural residential
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

Intermittent drainage in place approximately 200 feet northwest.

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
Yes	GROUNDWATER	Unknown	Subsurface Investigation
Yes	SOILS	Unknown	Subsurface Investigation

INITIAL ACTION SUMMARY

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

The Initial Form 27 (Document number 401749307) provides details for the initial subsurface investigation and delineation of impacted soil and groundwater at the Site. In summary, soil impacts were discovered on 1/23/18, during plugging and abandonment activities. A subsurface investigation was conducted on 3/8/18 and three monitoring wells were installed (see attached boring logs). Quarterly groundwater monitoring has been conducted at the site since April 2018. To further delineate the source area, a subsequent soil boring investigation was conducted at the Site on March 6, 2019. Seven soil borings were advanced to depths ranging from 19.5 feet to 28 feet bgs in the source area, downgradient of the source area to the west and southwest, and upgradient of the source area to the southeast. Two of the seven borings were converted into groundwater monitoring wells. Monitoring well MW-4 was installed downgradient of the source area and MW-5 was installed upgradient of the source area (see attached boring logs). Boring locations and soil analytical results are illustrated on Figure 2 (attached) and summarized in Table 1 (attached). Groundwater monitoring well locations are illustrated on Figure 3 (attached). Quarterly groundwater monitoring was conducted at the Site on 10/18/18, 1/23/19, 4/17/19, and 7/23/19. Groundwater analytical results are illustrated on Figure 3 and summarized in Table 2 (attached). Figures 4-7 (attached) illustrate the potentiometric surface during each quarterly sampling event. Approximately 3.5 inches of free product has been encountered in monitoring well MW-1 during each quarterly sampling event. Benzene was reported above COGCC Table 910-1 concentrations levels in the groundwater samples from monitoring well MW-2, ranging from 107 milligrams liter (ug/L) to 371 ug/L, and from MW-5 ranging from 5.07 ug/L to 13.5 ug/L.

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):

Groundwater monitoring for BTEX compound concentrations and apparent biodegradation processes will continue on a quarterly basis through 2020, with the next quarterly sampling event to occur in October 2019.

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 8
Number of soil samples exceeding 910-1 2
Was the areal and vertical extent of soil contamination delineated? No
Approximate areal extent (square feet) 3250

NA / ND

-- Highest concentration of TPH (mg/kg) 2140
NA Highest concentration of SAR
BTEX > 910-1 No
Vertical Extent > 910-1 (in feet) 25

Groundwater

Number of groundwater samples collected 12
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet) 23'
Number of groundwater monitoring wells installed 5
Number of groundwater samples exceeding 910-1 6

-- Highest concentration of Benzene (µg/l) 371
-- Highest concentration of Toluene (µg/l) 25.8
-- Highest concentration of Ethylbenzene (µg/l) 39.6
-- Highest concentration of Xylene (µg/l) 165
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.

Source removal activities will be determined following free product removal at monitoring well MW-1 and will be addressed in a subsequent Form 27.

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 address the free product consistently encountered in monitoring well MW-1, on 9/5/19, Great Western installed a solar-powered SVE/bubbler unit at the well. The unit will operate 24/7 for up to 8 months or until free product thickness has been reduced to less than 0.02 feet in the well. Please refer to Supplemental Form 27 (402162189). A remedial action plan will be determined following free product removal and will be addressed in a subsequent Form 27.

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
- Yes _____ 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.

For a description of the monitoring plan, please refer to the Proposed Groundwater Sampling Plan section of this Form.

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? _____

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. 01/24/2018

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 01/23/2018

Date of commencement of Site Investigation. 03/08/2018

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 09/03/2019

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: Trent Watne

Title: Project Scientist

Submit Date: _____

Email: twatne@olsson.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: 11774

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>
402167463	ANALYTICAL RESULTS
402167470	ANALYTICAL RESULTS
402167490	ANALYTICAL RESULTS
402181151	ANALYTICAL RESULTS
402182848	LOGS
402182869	SOIL SAMPLE LOCATION MAP
402182872	GROUND WATER SAMPLE LOCATION
402182891	GROUND WATER ELEVATION MAP

Total Attach: 8 Files

General Comments

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

Total: 0 comment(s)