FORM 27 Rev 3/16

State of Colorado
Oil and Gas Conservation Commission

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Report taken by: CHRIS CANFIELD

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 INFORMATON

Name of Operator: GREAT WESTERN OPERATING COMPANY LLC Operator No: 10110
Address: 1001 17TH STREET #2000
City: DENVER State: CO Zip: 80202
Contact Person: Ben Huggins

Phone Numbers
Phone: (720) 595-2078
Mobile: ( )
Email: bhuggins@gwogco.com

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10344 Initial Form 27 Document #: 401312875

PURPOSE INFORMATION

- [ ] 901.e. Sensitive Area Determination
- [ ] 909.c.(1), Rule 905: Pit or PW vessel closure
- [x] 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

SITE INFORMATION

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

Facility Type: LOCATION Facility ID: 336384 API #: County Name: WELD
Facility Name: STANLEY OLSON-62N68W 14SWNE Latitude: 40.141470 Longitude: -104.966310
** correct Lat/Long if needed: Latitude: 40.141467 Longitude: -104.965974
QtrQtr: SWNE Sec: 14 Twp: 2N Range: 68W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

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

Rural residential properties

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [x] **E&P Waste**
  - [x] Produced Water
  - [x] Oil
  - [x] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	GROUNDWATER	Approximately 100' by 28'	Subsurface Investigation
Yes	SOILS	Approximately 100' by 28'	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.

Soil and groundwater impacts were discovered during initial subsurface investigation activities associated with due diligence. A subsurface investigation was attempted on 7/5/17; however, shallow groundwater was encountered at 1 foot to 2 feet bgs from irrigation activities in the area, which prohibited the investigation. A Supplemental Form 27 proposing to postpone the investigation until late-fall/early-winter 2017 was approved on 8/17/17. A limited subsurface investigation was conducted on 12/6-7/17 to delineate hydrocarbon-impacted soil and groundwater at the site. 29 soil borings were advanced with a Geoprobe between and 3 monitoring wells were installed. An additional limited subsurface investigation was conducted on 3/13/18 to further delineate source area impacts. 3 soil borings were advanced and 1 monitoring well was installed. Figures 2 and 3, included with the quarterly groundwater monitoring and progress report, illustrate soil boring and monitoring well locations and analytical results, which are summarized on Tables 1 and 2.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

- [x] Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

20 discreet soil samples were collected during the limited subsurface investigations conducted on 12/6-7/17 and 3/13/18. The samples were analyzed for gasoline range organics (GRO) and diesel range organics (DRO). Figure 2, included with the quarterly groundwater monitoring and progress report, illustrates soil boring locations and analytical results. Analytical results are also summarized on Table 1.

Proposed Groundwater Sampling

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

3 groundwater monitoring wells were installed during the limited subsurface investigation conducted on 12/6-7/17. Groundwater samples were collected on 12/7/17, 1/18/18, 3/26/18, and 6/21/18. 1 additional monitoring well was installed during the limited subsurface investigation conducted on 3/13/18. Groundwater samples were collected on 3/26/18 and 6/21/18. All samples were analyzed for benzene, toluene, ethylbenzene, and total xylene (BTEX). Figure 3, included with the quarterly groundwater monitoring and progress report, illustrates monitoring well locations and analytical results. Analytical results are also summarized on Table 2.

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: 20

Number of soil samples exceeeding 910-1: 4

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

Approximate areal extent (square feet): 2800

NA / ND

-- Highest concentration of TPH (mg/kg): 1686

NA Highest concentration of SAR:

BTEX > 910-1: No

Vertical Extent > 910-1 (in feet): 12

Groundwater

Number of groundwater samples collected: 14

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet): 8`

Number of groundwater monitoring wells installed: 4

Number of groundwater samples exceeding 910-1: 6

-- Highest concentration of Benzene (µg/l): 3210

ND Highest concentration of Toluene (µg/l):

-- Highest concentration of Ethylbenzene (µg/l): 2220

-- Highest concentration of Xylene (µg/l): 18200

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.

The operator proposes to excavate and 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.

The operator proposes to excavate approximately 500 cubic yards of hydrocarbon-impacted source area soil from the surface to approximately 6.5 feet bgs for onsite treatment with commonly used oxidizer mixtures. Source removal by excavation will be conducted, based on visual and olfactory observations, field soil screening, and laboratory analysis. Excavation sidewall and treatment confirmation soil samples will be analyzed for BTEX and GRO by EPA Method 8260C and for DRO by Method 8015C. To treat the dissolved phase contamination in groundwater exposed by the excavation, Chemically Oxidized Granular Activated Carbon (COGAC™) will be used as a remedial backfill material applied as a slurry to the floor of the excavation and mixed with native material to improve distribution across the smear zone. Figures 2 and 3, included with the quarterly groundwater monitoring and progress report, illustrate the estimated extent of impacted soil and groundwater based on data collected during the limited subsurface investigations at the site. The operator proposes to conduct the remediation activities during late 2018/early 2019 and estimates a 2 year time frame to attain NFA status. See Operator Comments for an explanation of the schedule for implementation.

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.

The operator proposes to sample the four groundwater monitoring wells on site for BTEX analysis by EPA Method 8260C on a quarterly schedule until four consecutive quarters of analytical results below Table 910-1 concentration levels for BTEX are obtained. Monitoring wells MW-2 and MW-3 will be used as points of compliance. The well locations are depicted on Figures 2 and 3, included with the quarterly groundwater monitoring and progress report.

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, final reclamation will occur in accordance with COGCC Rule 1004.

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. 06/22/2017

Actual Spill or Release date, if known.

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 07/05/2017

Date of commencement of Site Investigation. 12/06/2017

Date of completion of Site Investigation. 03/13/2018

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

During quarterly groundwater monitoring activities on 6/21/18, groundwater was encountered at 3 feet bgs, approximately 5.5 feet higher than during quarterly groundwater monitoring activities on 3/26/18. Irrigation activities in the area have had a seasonal effect on the water table at the site, causing up to a 10 foot swing in elevation. The operator proposes to conduct the remediation activities during late 2018/early 2019, or when groundwater elevation declines after the irrigation season to approximately 7.5 feet bgs.

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 Geologist

Submit Date:` 07/30/2018 Email: jdavidson@olssonassociates.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: CHRIS CANFIELD Date: 08/02/2018

Remediation Project Number: 10344

COA Type	Description

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
401688664	FORM 27-SUPPLEMENTAL-SUBMITTED
401718935	MONITORING REPORT

Total Attach: 2 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)