

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: WHITING OIL & GAS CORPORATION | Operator No: 96155 | Phone Numbers |
| Address: 1700 BROADWAY STE 2300 | | |
| City: DENVER State: CO Zip: 80290 | | |
| Contact Person: Kyle Waggoner | Email: kyle.waggoner@whiting.com | |
| | | Phone: (970) 4374113 |
| | | Mobile: (432) 6616647 |

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9146 Initial Form 27 Document #: 2314895

PURPOSE INFORMATION

- | | |
|--|--|
| <input type="checkbox"/> 901.e. Sensitive Area Determination | <input checked="" 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 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: LOCATION | Facility ID: 328137 | API #: _____ | County Name: WELD |
| Facility Name: NELSON RANCHES-610N58W 18NWSE | | Latitude: 40.836343 | Longitude: -103.905908 |
| ** correct Lat/Long if needed: Latitude: _____ | | Longitude: _____ | |
| QtrQtr: NWSE | Sec: 18 | Twp: 10N | Range: 58W Meridian: 6 Sensitive Area? Yes |

SITE CONDITIONS

General soil type - USCS Classifications ML Most Sensitive Adjacent Land Use RANGELAND

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 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 | ~1,250'x400' | monitor wells |
| Yes | SOILS | Full extnt unknown;known~125x65x10' | soil borings |

INITIAL ACTION SUMMARY

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

Form 19 (Document # 400817070) previously submitted. Initial action included repairing loose union, liquid was contained and impacted soil was excavated. Confirmatory soil borings indicate impact remains which needs to be further delineated.

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):

During the removal of flowlines additional soil impacts where discovered. A minimum of two bottom hole and four sidewall grab samples will be collected and analyzed for BTEX and TPH.

Proposed Groundwater Sampling

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

Quarterly groundwater monitoring will be conducted at this sites that includes guaging and sampling all the monitor wells that do not contain phase seperated hydrocarbons (PSH). Groundwater samples will be analyzed for 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):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 95

Number of soil samples exceeding 910-1 5

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

Approximate areal extent (square feet) 200

NA / ND

-- Highest concentration of TPH (mg/kg) 1200

NA Highest concentration of SAR

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 30

Groundwater

Number of groundwater samples collected 186

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 30'

Number of groundwater monitoring wells installed 31

Number of groundwater samples exceeding 910-1 118

-- Highest concentration of Benzene (µg/l) 28000

-- Highest concentration of Toluene (µg/l) 38000

-- Highest concentration of Ethylbenzene (µg/l) 2500

-- Highest concentration of Xylene (µg/l) 12000

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?

Further soil sampling is required to delineate the extent of impacts.

REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? Yes _____

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

A poly liner will be installed at the bottom of the excavation and backfilled in order to prevent infiltration and migration of additional impacts from the soils to groundwater. In addition, this will create an impermeable layer to prevent short circuiting during future remediation efforts. Several remedial options will be considered.

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.

Remaining soil impacts at the source area are planned to be remediated via insitu due to the depth they occur. In addition, PSH will continue to be recovered via hand bailing and the automated skimmer system. Additional remedial alternatives will be evaluated as site conditions change.

Soil Remediation Summary

☒ In Situ

Yes Bioremediation (or enhanced bioremediation) _____

Yes Chemical oxidation _____

No Air sparge / Soil vapor extraction _____

Yes Natural Attenuation _____

No 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 _____

No Land Treatment _____

Yes Bioremediation (or enhanced bioremediation) _____

Yes Chemical oxidation _____

No Other _____

Groundwater Remediation Summary

Yes Bioremediation (or enhanced bioremediation) _____

No Chemical oxidation _____

No Air sparge / Soil vapor extraction _____

Yes Natural Attenuation _____

Yes Other skimmer removal _____

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.

Quarterly groundwater monitoring to include guaging all 31 monitoring wells and sampling and analysis (BTEX) of all wells that do not contain PSH.

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? Yes _____

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

NA

Volume of E&P Waste (solid) in cubic yards _____ 0

E&P waste (solid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

Volume of E&P Waste (liquid) in barrels _____ 23

E&P waste (liquid) description _____ purge water and crude oil

COGCC Disposal Facility ID #, if applicable: _____ 440165

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.

Reclamation activities at the site will be compliant with COGCC regulations.

Is the described reclamation complete? _____

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. 03/20/2015

Date of completion of Site Investigation. _____

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

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

Signed: Kyle Waggoner

Title: Field Regulatory Manager

Submit Date: 06/28/2019

Email: kyle.waggoner@whiting.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: 07/01/2019

Remediation Project Number: 9146

COA Type

Description

| | |
|--|---|
| | Submit boring logs and well construction diagrams for monitoring wells MW-23 through MW-31. |
| | Submit Quarterly Monitoring Reports. |

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

| | |
|-----------|--------------------------------|
| 402091321 | FORM 27-SUPPLEMENTAL-SUBMITTED |
| 402091407 | MONITORING REPORT |

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

| | | |
|--|--|---------------------|
| | | Stamp Upon Approval |
|--|--|---------------------|

Total: 0 comment(s)