

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.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: WHITING OIL & GAS CORPORATION	Operator No: 96155	Phone Numbers Phone: (432) 6616647 Mobile: (432) 6616647
Address: 1700 LINCOLN STREET SUITE 4700		
City: DENVER	State: CO	Zip: 80290
Contact Person: Kyle Waggoner	Email: kyle.waggoner@whiting.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 15397 Initial Form 27 Document #: 402363826

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: \_\_\_\_\_

SITE INFORMATION

No Multiple Facilities

Facility Type: LOCATION	Facility ID: 460754	API #: _____	County Name: WELD
Facility Name: Terrace Gas Plant	Latitude: 40.845550	Longitude: -103.908040	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NENW	Sec: 18	Twp: 10N	Range: 58W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications GM 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	Full extent unknown; known MW1	Monitor well
Yes	SOILS	~100'x100'	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.

A Form 19 (Release Point ID 468836) was previously submitted. Hydrocarbon impacted soils was discovered during decommissioning of the facility. The historical impacts were removed via mechanical excavation. Due to the depth of the impacts, soil borings were advanced to delineate the impacts.

**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 decommissioning of the facility soil impacts were 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 site to include gauging and sampling of all monitor wells that do not contain phase separated hydrocarbons (PSH). Groundwater 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 ):

Empty text box for surface water sampling details.

**Additional Investigative Actions**

Additional alternative investigative actions described in attached Site Investigation Plan ( summary ):

Empty text box for additional investigative actions.

**SITE INVESTIGATION REPORT**

**SAMPLE SUMMARY**

**Soil**

Number of soil samples collected 41  
Number of soil samples exceeding 915-1 4  
Was the areal and vertical extent of soil contamination delineated? No  
Approximate areal extent (square feet) 10000

**NA / ND**

-- Highest concentration of TPH (mg/kg) 4300  
NA Highest concentration of SAR \_\_\_\_\_  
BTEX > 915-1 Yes  
Vertical Extent > 915-1 (in feet) 35

**Groundwater**

Number of groundwater samples collected 7  
Was extent of groundwater contaminated delineated? No  
Depth to groundwater (below ground surface, in feet) 49'  
Number of groundwater monitoring wells installed 3  
Number of groundwater samples exceeding 915-1 4

-- Highest concentration of Benzene (µg/l) 5500  
-- Highest concentration of Toluene (µg/l) 8600  
-- Highest concentration of Ethylbenzene (µg/l) 1500  
-- Highest concentration of Xylene (µg/l) 4800  
NA Highest concentration of Methane (mg/l) \_\_\_\_\_

**Surface Water**

0 Number of surface water samples collected  
0 Number of surface water samples exceeding 915-1  
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) 3 Volume of liquid waste (barrels) 1

Is further site investigation required?

Further soil sampling and monitor wells may will be required to delineate the extent of impacts. Once and if the newly installed monitor wells contain water they will be sampled to determine the current extents.

**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.

The impacted soils will be mechanically excavated to a depth that they can be safely removed. Several remedial options will be considered to remediate any remaining impacts that are located >20' BGS.

**REMEDICATION 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.

In order to fully characterize the extent of groundwater impacts Whiting plans on advancing three monitor wells as indicated in Figure 4 of the Groundwater Monitoring Report First Quarter 2021 report. One of the delineation wells has been proposed to the south address any potential impacts related to the pipeline that enters from the south and the Nelson Ranches C-1 areas. The wells will be screened and advanced to a sufficient depth to allow for a ~10' water column. Upon completion of these wells in lieu of ORC socks a 5-day MDPE event will be conducted on the onsite monitor wells. The MDPE event is a more aggressive remediation technology that will both facilitate the remediation of the groundwater and the soils. These proposed activities are planned on being conducted prior to 10/15/21. If these proposed delineations wells are impacted additional wells will be installed to fully delineate the groundwater impacts.

As depicted in the attached 1st quarter groundwater monitoring report we included the analytes Naphthalene, 1,2,4-trimethylbenzene (1,2,4-TMB) 1,3,5-trimethylbenzene (1,3,5-TMB), chloride, sulfate, and TDS were analyzed to comply with COGCC Table 915-1 Clean-up Concentrations. Whiting will continue sampling for these analytes during future groundwater monitoring events.

The extents of the soil impacts in the excavation are depicted in the attached Fig\_2\_AE2\_Soil\_Concentration Map. There is only one location within the larger/southern excavation that exceeds TPH standards (SSW-2 @ 15'), however this was removed and five feet below concentrations are non-detect (SSW-2 @ 20'). The stockpile was sampled on 12/22/20 with each sample representing 100 cubic yards of the stockpile. Three of the samples were above thresholds representing 300 cubic yards of the 2,700 cubic yard stockpile. Whiting is proposing to utilize the portions of the stockpile that are below thresholds to backfill the excavation and dispose of the 300 cubic yards (SP.01,

**Soil Remediation Summary**

<input checked="" type="checkbox"/> <b>In Situ</b>	<input checked="" type="checkbox"/> <b>Ex Situ</b>
Yes <u>        </u> Bioremediation ( or enhanced bioremediation )	Yes <u>        </u> Excavate and offsite disposal
Yes <u>        </u> Chemical oxidation	<u>        </u> If Yes: Estimated Volume (Cubic Yards) <u>        </u> 300
Yes <u>        </u> Air sparge / Soil vapor extraction	<u>        </u> Name of Licensed Disposal Facility or COGCC Facility ID # <u>                                </u>
Yes <u>        </u> Natural Attenuation	No <u>        </u> Excavate and onsite remediation
No <u>        </u> Other <u>                                </u>	<u>        </u> Land Treatment
	<u>        </u> Bioremediation (or enhanced bioremediation)
	<u>        </u> Chemical oxidation
	<u>        </u> Other <u>                                </u>

**Groundwater Remediation Summary**

Yes          Bioremediation ( or enhanced bioremediation )

Yes          Chemical oxidation

Yes          Air sparge / Soil vapor extraction

Yes          Natural Attenuation

No          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.

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

# REMEDIATION PROGRESS UPDATE

## PERIODIC REPORTING

### Approved Reporting Schedule:

Quarterly     Semi-Annually     Annually     Other

### Request Alternative Reporting Schedule:

Semi-Annually     Annually     Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

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 2700

E&P waste (solid) description Impacted Soil

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

Non-COGCC Disposal Facility: Pawnee Waste

Volume of E&P Waste (liquid) in barrels 1

E&P waste (liquid) description Purge water

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

If YES:

- Compliant with Rule 913.h.(1).
- Compliant with Rule 913.h.(2).
- Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards? \_\_\_\_\_

Does the previous reply indicate consideration of background concentrations? \_\_\_\_\_

Does Groundwater meet Table 915-1 standards? \_\_\_\_\_

Is additional groundwater monitoring to be conducted? \_\_\_\_\_

Operator shall comply with the COGCC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

# 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? No \_\_\_\_\_

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim  Final

Did the Surface Owner provide the seed mix? \_\_\_\_\_

If YES, does the seed mix comply with local soil conservation district recommendations? \_\_\_\_\_

Did the local soil conservation district provide the seed mix? \_\_\_\_\_

## SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. \_\_\_\_\_

Proposed date of completion of Reclamation. \_\_\_\_\_

## IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

### PRIOR DATES

Date of Surface Owner notification/consultation, if required. 10/21/2019

Actual Spill or Release date, or date of discovery. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 10/21/2019

Proposed site investigation commencement. 10/21/2019

Proposed completion of site investigation. \_\_\_\_\_

### REMEDIAL ACTION DATES

Proposed start date of Remediation. 10/23/2019

Proposed date of completion of Remediation. \_\_\_\_\_

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

\_\_\_\_\_

**OPERATOR COMMENT**

The excavation has been backfilled and the identified impacted soils were disposed of at Pawnee Waste. The three new monitor wells are scheduled to be installed by Drilling Engineers starting on 11/15/21 and ACI will conduct the MDPE event the week of 10/18/21.

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

Signed: Kyle Waggoner

Title: Reclamation Coordinator

Submit Date: 10/12/2021

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: 11/05/2021

Remediation Project Number: 15397

**Condition of Approval****COA Type****Description**

	Pursuant to Rule 913.d., Operator will adhere to the proposed schedule for installation of the monitoring wells starting November 15, 2021. Any deviation from the schedule must be approved by the Director in writing on a Form 27 Supplemental Report.
	At least one of the three proposed monitoring wells shall be installed south of the excavation, approximately south of MW-1, near the pipeline corridor.
2 COAs	

**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**

402838675	FORM 27-SUPPLEMENTAL-SUBMITTED
402838696	MONITORING REPORT

Total Attach: 2 Files

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

		Stamp Upon Approval
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Total: 0 comment(s)