

State of Colorado Oil and Gas Conservation Commission

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Document Number:

402575373

Receive Date:

01/14/2021

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: <u>BONANZA CREEK ENERGY OPERATING COMPANY LLC</u>	Operator No: <u>8960</u>	Phone Numbers
Address: <u>410 17TH STREET SUITE #1400</u>		Phone: <u>(720) 315-8934</u>
City: <u>DENVER</u> State: <u>CO</u> Zip: <u>80202</u>		Mobile: <u>()</u>
Contact Person: <u>Luke Kelly</u>	Email: <u>LKelly@Bonanzacrk.com</u>	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 15983Initial Form 27 Document #: 402492917

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>477881</u>	API #: _____	County Name: <u>WELD</u>
Facility Name: <u>Park U-4-9XRLC Flowline</u>	Latitude: <u>40.348840</u>	Longitude: <u>-104.429914</u>	
** correct Lat/Long if needed: Latitude: <u>40.348840</u>		Longitude: <u>-104.429914</u>	
QtrQtr: <u>SWSW</u>	Sec: <u>34</u>	Twp: <u>5N</u>	Range: <u>63W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

SITE CONDITIONS

General soil type - USCS Classifications GM Most Sensitive Adjacent Land Use Range Land

Is domestic water well within 1/4 mile? Yes Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Wetlands ~900' SE, CR 50 ~400' W, Irrigation Ditch ~600' SW, Empire Intake Ditch ~1,200' S, Occupied Structure 700' W

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	~150' x 100'	Laboratory analysis
Yes	SOILS	~150' x 100"	Laboratory analysis

INITIAL ACTION SUMMARY

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

Internal corrosion allowed approximately 1,120 bbls of oil and 280 bbls of produced water to be released to the ground and subsurface. Once discovered the flowline was immediately shut in to stop the release and blown down to alleviate the remaining pressure on the line. The pooled fluid and approximately top 18" of soil were removed and hauled to a COGCC approved disposal facility. Ten potholes were dug and sampled to delineate the lateral extent of the subsurface impact and eight soil borings will drilled to delineate the vertical impact. Soil and groundwater samples were collected and submitted for laboratory analysis. An approximately 40' x 40' bell hole was dug around the flowline so the compromised section of the line could be removed and analyzed. The impacted soil was hauled to a COGCC approved disposal facility. Ten bags of activated carbon were mixed into the excavation to promote biodegradation. Bonanza Creek is currently working with an environmental consultant to develop an in situ remediation system to treat the remaining soil and groundwater remaining impact. Once the system is developed Bonanza Creek will update the Form 27 with additional information.

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):

Twentyfour grab type soil samples were collected to vertically and laterally delineate the release footprint. The ten samples collected from the potholes were analyzed for TPH, BTEX, EC, SAR, and pH. The 14 samples collected from the soil borings were analyzed for TPH and BTEX. Additional soil sampling will be conducted as necessary.

Proposed Groundwater Sampling

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

Ten groundwater samples were collected from the potholes used to laterally delineate the subsurface impact. The groundwater samples were submitted and analyzed for BTEX. Three residential wells were sampled on 9/26/2020 and analyzed for the 318A baseline suite. Another recently discovered monitoring well located approximately 375' NW of the release will be sampled on 9/30/2020. All analytical results will be included in a supplemental Form 27. BCEOC is working to develop an air sparge/soil vapor extraction remediation system to treat the remaining soil and groundwater impact in-place.

Proposed Surface Water Sampling

☐ Will surface water samples be collected as part of this investigation? (Number, analyses, and locations of samples):

None

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 24

Number of soil samples exceeding 910-1 6

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

Approximate areal extent (square feet) 15000

NA / ND

-- Highest concentration of TPH (mg/kg) 17900

ND Highest concentration of SAR

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 5

Groundwater

Number of groundwater samples collected 21

Was extent of groundwater contaminated delineated? Yes

Depth to groundwater (below ground surface, in feet) 3'

Number of groundwater monitoring wells installed 21

Number of groundwater samples exceeding 910-1 9

-- Highest concentration of Benzene (µg/l) 1100

-- Highest concentration of Toluene (µg/l) 500

ND Highest concentration of Ethylbenzene (µg/l)

-- Highest concentration of Xylene (µg/l) 1400

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.

Bonanza Creek has been working with a third party consultant to collect and analyze an extensive amount of data including soil samples, groundwater samples, and soil characterization to determine which remediation options would prove to be the most successful. After careful deliberation, Bonanza Creek proposed an air sparge or a phytoremediation system to the surface owner. The surface owner has their own consultant reviewing the data and is expected to communicate their preferred remediation method by 1/15/2021. Once a method has been approved, Bonanza Creek will fine tune their approach and propose it to the COGCC for final approval. Upon approval, Bonanza Creek will work to install the remediation system as soon as practically possible.

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.

If approved by the surface owner, Bonanza Creek proposes to install a phytoremediation system. Due to the location of the release and the shallow depth of groundwater, Bonanza Creek believes this to be the least invasive approach to remediate the subsurface impact while causing minimal disruptions to the adjacent town of Hardin. The remediation system will utilize trees and grasses that have been inoculated with hydrocarbon degrading endophytes. The endophytes will breakdown and feed off the released hydrocarbons in turn growing healthy trees and providing valuable habitat to nearby wildlife such as endangered bald eagles and ferruginous hawks. Bonanza Creek will continue to conduct quarterly groundwater sampling and soil collection as necessary. The estimated time of remediation is approximately 3-5 years for either approach. The surface owner has their own consultant reviewing the data and is expected to communicate their preferred remediation method by 1/15/2021. Once a method has been approved, Bonanza Creek will fine tune their approach and propose it to the COGCC for final approval. Upon approval, Bonanza Creek will work to install the remediation system as soon as practically possible.

Soil Remediation Summary

☒ In Situ

Yes Bioremediation (or enhanced bioremediation)

No Chemical oxidation

Yes Air sparge / Soil vapor extraction

No Natural Attenuation

No Other _____

☒ Ex Situ

Yes Excavate and offsite disposal

If Yes: Estimated Volume (Cubic Yards) 1000

Name of Licensed Disposal Facility or COGCC Facility ID # _____

No Excavate and onsite remediation

Land Treatment

Bioremediation (or enhanced bioremediation)

Chemical oxidation

Other _____

Groundwater Remediation Summary

Yes Bioremediation (or enhanced bioremediation)

No Chemical oxidation

Yes Air sparge / Soil vapor extraction

No 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.

Once a method has been approved, Bonanza Creek will fine tune their approach and propose it to the COGCC for final approval. Upon approval, Bonanza Creek will work to install the remediation system as soon as practically possible.

REMEDATION 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 207

E&P waste (solid) description hydrocarbon bearing soil

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: Buffalo Ridge Landfill

Volume of E&P Waste (liquid) in barrels 1550

E&P waste (liquid) description hydrocarbon impacted groundwater

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: NGL Water Solutions disposal well C-1 and C-6

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.

Upon installation of the remediation system, the disturbance area will be completely reclaimed to pre-disturbance conditions. Any excavations will be backfilled. The release footprint is located on a flat surface so recontouring will not be required. The area will be cross-rippled to a depth of ~18" to alleviate compaction. Topsoil and compost will be trucked in and the area will be crimped with straw and seeded with a surface owner approved seed mix.

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? Yes

If NO, does the seed mix comply with local soil conservation district recommendations? Yes

IMPLEMENTATION SCHEDULE

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 09/09/2020

Actual Spill or Release date, if known. 09/09/2020

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 09/10/2020

Date of commencement of Site Investigation. _____

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 09/09/2020

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

4th Qtr 2020 Remediation Update

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

Signed: Luke Kelly

Title: Senior Env. Specialist

Submit Date: 01/14/2021

Email: LKelly@Bonanzacrk.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: 01/15/2021

Remediation Project Number: 15983

COA Type

Description

	Provide a proposed timeline for successful groundwater remediation with justification and calculation for determination of the timeline.
	Provide boring logs and well construction records for monitoring wells installed at the site with the next Form 27 Supplemental.

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

402575373	FORM 27-SUPPLEMENTAL-SUBMITTED
402575658	ANALYTICAL RESULTS

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)