

State of Colorado  
Oil and Gas Conservation Commission

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Document Number:  
402575373

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

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 15983 Initial 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:**

- |  |  |  |
|--|--|--|
| <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 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	~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.

## 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.

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.

# 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 \_\_\_\_\_ 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

## 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.

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: \_\_\_\_\_

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: \_\_\_\_\_

Date: \_\_\_\_\_

Remediation Project Number: 15983

## **COA Type**

## **Description**

<b><u>COA Type</u></b>	<b><u>Description</u></b>

## **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**

<b><u>Att Doc Num</u></b>	<b><u>Name</u></b>
402575658	ANALYTICAL RESULTS

Total Attach: 1 Files

## **General Comments**

### **User Group**

### **Comment**

### **Comment Date**

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

Total: 0 comment(s)