

**State of Colorado**  
**Oil and Gas Conservation Commission**

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401354394

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Report taken by:

Jim Hughes

## 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>BERRY PETROLEUM COMPANY LLC</u>	Operator No: <u>10091</u>	<b>Phone Numbers</b>
Address: <u>5201 TRUXTUN AVENUE #100</u>		
City: <u>BAKERSFIELD</u>	State: <u>CA</u> Zip: <u>90339</u>	
Contact Person: <u>Tom Hogelin</u>	Email: <u>tgh@bry.com</u>	
		Phone: <u>(970) 2855207</u>
		Mobile: <u>(970) 9482785</u>

### PROJECT, PURPOSE & SITE INFORMATION

#### PROJECT INFORMATION

Remediation Project #: 10238Initial Form 27 Document #: 401206285

#### 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 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 checked="" type="checkbox"/> Other <u>Transfer to Operator #10091</u>                               |

#### SITE INFORMATION

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

Facility Type: <u>LAND APPLICATION SITE</u>	Facility ID: <u>443347</u>	API #: _____	County Name: <u>GARFIELD</u>
Facility Name: <u>School House Point OM L15 696</u>		Latitude: <u>39.520851</u>	Longitude: <u>-108.098989</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>NWSW</u>	Sec: <u>15</u>	Twp: <u>6S</u>	Range: <u>96W</u> Meridian: <u>6</u> Sensitive Area? <u>Yes</u>

#### SITE CONDITIONS

General soil type - USCS Classifications MLMost Sensitive Adjacent Land Use GrazingIs domestic water well within 1/4 mile? NoIs surface water within 1/4 mile? NoIs groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

## 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 type="checkbox"/> Produced Water            | <input type="checkbox"/> Workover Fluids             |  |
| <input 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 checked="" 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
No	SOILS	Confined to bermed treatment area	Visual inspection

### INITIAL ACTION SUMMARY

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

o Approximately 5,455 cubic yards of spoil material that is being treated on site by land farming is remnants from drilling and completion operations. The landfarming operations have taken place since the summer of 2011.  
o Samples taken since June 9, 2011 indicate that this material fails COGCC Table 910-1 for:  
Benzo(b)fluoranthene (0.40 – 1.20). The highest reading was taken on May 5, 2012. The most recent reading taken on October 8, 2016 was 0.364).  
Benzo(a)pyrene also (0.0433 – 0.41). The highest reading was taken on May 2, 2012. The most recent reading taken on October 8, 2016 was 0.137.  
Dibenzo(a,h) anthracene (0.023 – 0.21). The highest reading was taken on May 2, 2012. The most recent reading taken on October 8, 2016 was 0.0733.  
TPH initially failed the standards until 2014. TPH responded favorably to treatment and remains below the standards.

### 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 ):

Samples will be taken semi-annually (twice a year) in the summer and fall.  
• Phase I - Composite sample will be taken from 8 locations on the spoil pile in early summer and analyzed.  
o If composite sample passes, discrete samples will be taken to confirm the composite samples.  
o If discrete samples pass, spoil will be buried per COGCC rules and interim reclamation of the pad will take place.  
o If discrete samples fail, landfarming will continue.  
o If composite sample fails, landfarming will continue.  
• Phase II - Composite sample will be taken from 8 locations on the spoil pile in late fall and analyzed.  
o Procedure will be the same as Phase I

#### Proposed Groundwater Sampling

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

#### 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 9

Number of soil samples exceeding 910-1 9

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

Approximate areal extent (square feet) 11250

### NA / ND

--            Highest concentration of TPH (mg/kg) 1900

--            Highest concentration of SAR 140

BTEX > 910-1 No

Vertical Extent > 910-1 (in feet) 2

### Groundwater

Number of groundwater samples collected 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet)           

Number of groundwater monitoring wells installed           

Number of groundwater samples exceeding 910-1           

           Highest concentration of Benzene (µg/l)           

           Highest concentration of Toluene (µg/l)           

           Highest concentration of Ethylbenzene (µg/l)           

           Highest concentration of Xylene (µg/l)           

           Highest concentration of Methane (mg/l)           

### Surface Water

0 Number of surface water samples collected

           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.

o Spoils will be turned over by an excavator and/or a Kubota farm tractor with a chisel point plow 8 to 10 times (depending on weather and snow conditions) during the warm months in 2017. The soil will be turned over with the frequency established in the plan as a minimum or with a higher frequency if possible. The soil will be spread out to increase exposure to the atmosphere and sunlight as much as possible on the production pad.  
o Pre-treatment samples taken in the early spring will determine the amount of amendments that will be added to the spoil based on an analysis of nutrients present in the spoils.

## 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.

o As of this date, the material being landfarmed has been spread out on the pad to a depth of approximately 14"- 18" and has been tilled two times. The recommendation from the analysis of the pre-treatment soil samples is to add only fulvic acid only on the first round of treatment. A copy of the pre-treatment lab results is attached to the Form 27.

## 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 # \_\_\_\_\_  
Yes \_\_\_\_\_ Excavate and onsite remediation  
Yes \_\_\_\_\_ Land Treatment  
No \_\_\_\_\_ Bioremediation (or enhanced bioremediation)  
No \_\_\_\_\_ Chemical oxidation  
No \_\_\_\_\_ Other \_\_\_\_\_

## Groundwater Remediation Summary

No \_\_\_\_\_ Bioremediation ( or enhanced bioremediation )  
No \_\_\_\_\_ Chemical oxidation  
No \_\_\_\_\_ 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.

## 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? No

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: \_\_\_\_\_

## 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.

Treated drill cuttings will be buried with a minimum of 3' of cover. Pad slopes will be reclaimed not to exceed 3:1 slope where applicable. Horizontal ripping, stair-stepping, grooving, tracking, or pocketing on slopes will be utilized to reduce erosion. Surface roughening shall be utilized on all areas receiving revegetation. Topsoil will be spread over all areas to be revegetated. These areas are identified on the attached drawing. Seed applied by drill will be covered by weed-free straw, mulched and crimped. Seed applied by hydroseeding will be tackified. A copy of the seed mix is attached. Monthly inspections for physical signs of compaction alleviation will be conducted by a qualified inspector while conducting stormwater inspections except when the location is in winter exclusion status. The location will be inspected during the growing season by a qualified contractor capable of identifying noxious weeds and selecting and applying the appropriate chemical to eradicate those noxious weeds.

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? \_\_\_\_\_

## IMPLEMENTATION SCHEDULE

### PRIOR DATES

Date of Surface Owner notification/consultation, if required. 05/11/2010

Actual Spill or Release date, if known. \_\_\_\_\_

### SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/09/2011

Date of commencement of Site Investigation. \_\_\_\_\_

Date of completion of Site Investigation. \_\_\_\_\_

### REMEDIAL ACTION DATES

Date of commencement of Remediation. 10/24/2011

Date of completion of Remediation. \_\_\_\_\_

### SITE RECLAMATION DATES

Date of commencement of Reclamation. \_\_\_\_\_

Date of completion of Reclamation. \_\_\_\_\_

### OPERATOR COMMENT

Transfer REM #10238 from Operator #10516 (Linn Operating, Inc.) to Operator #10091 (Berry Petroleum Co.LLC).

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

Signed: Tom Hogelin \_\_\_\_\_

Title: Construction Foreman \_\_\_\_\_

Submit Date: 07/26/2017 \_\_\_\_\_

Email: tgh@bry.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: Jim Hughes \_\_\_\_\_

Date: 08/24/2017 \_\_\_\_\_

Remediation Project Number: 10238 \_\_\_\_\_

### COA Type

### Description

	This Form 27 is to transfer REM #10238 from Linn Operating, Inc. (Operator # 10516) to Berry Petroleum Co. LLC (Operator #10091).
	The Form 27 is conditionally approved; however, additional information or activities may be required during the course of remediation. Conditions of Approval (COAs) will be forthcoming on Supplemental Form 27s.

### 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

401354394	FORM 27-SUPPLEMENTAL-SUBMITTED
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Total Attach: 1 Files

### General Comments

### User Group

### Comment

### Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)