

State of Colorado Oil and Gas Conservation Commission

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Receive Date:

11/20/2020

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>	Phone Numbers
Address: <u>5201 TRUXTUN AVENUE #100</u>		Phone: <u>(970) 285-5207</u>
City: <u>BAKERSFIELD</u>	State: <u>CA</u>	Zip: <u>90339</u>
Contact Person: <u>Don Wilbourn</u>	Email: <u>dwilbourn@bry.com</u>	Mobile: <u>(970) 210-6693</u>

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 15535 Initial Form 27 Document #: 402377242

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>474500</u>	API #: _____	County Name: <u>GARFIELD</u>
Facility Name: <u>Long Ridge J15</u>		Latitude: <u>39.609861</u>	Longitude: <u>-108.038222</u>
		** correct Lat/Long if needed: Latitude: _____	Longitude: _____
QtrQtr: <u>NW/SE</u>	Sec: <u>15</u>	Twp: <u>5S</u>	Range: <u>95W</u>
		Meridian: <u>6</u>	Sensitive Area? <u>Yes</u>

SITE CONDITIONS

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

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

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	SOILS	177 cu yds	Calculation of excavated soil

INITIAL ACTION SUMMARY

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

Excavated to dry soil and no smell or visible signs of condensate. Excavated floor to bedrock.

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):

A sample was taken from the land farm to assess the progress of the remediation to date. The results will be submitted with next month's Form 27.

Proposed Groundwater Sampling

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

Should groundwater be encountered within the proposed drilling depth a sample will be taken for analysis to determine compliance with Table 910-1 standards.

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):

Berry has successfully delineated both the vertical and horizontal extents of the underground spill. Berry completed six additional wells, 3 of which had water and 3 of which were dry serving as the lateral extent delineations for the spill. Please refer to the attached COA responses for further information.

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 7

Number of soil samples exceeding 910-1 4

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

Approximate areal extent (square feet) 600

NA / ND

-- Highest concentration of TPH (mg/kg) 9372.1

-- Highest concentration of SAR 37.8

BTEX > 910-1 Yes

Vertical Extent > 910-1 (in feet) 8

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) 7.63

-- Highest concentration of Toluene (µg/l) 119

-- Highest concentration of Ethylbenzene (µg/l) 14.5

-- Highest concentration of Xylene (µg/l) 188

NA 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.

Material was excavated and moved to adjoining location. Material was stockpiled on pit liner and will be spread out on location for landfarming operations. Following COGCC guidance Berry's submitted plan an additional 6 exploratory boreholes were completed by 11/18/20. Of the 6 boreholes 3 contained fluid and 3 were dry, the three additional boreholes containing fluid will be outfit with pumps next week to continue fluid removal. To date the fluid removed from the original borehole is as follows, 1,050 BBLs of produced water and 50 BBLs of condensate.

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.

Material will be spread on location and landfarmed until 910 standards are met. Plans to spread material and start landfarming will proceed as soon as approval is granted. An estimated 3 month time frame for soil to pass standards is expected. As an initial remediation step Berry intends to pump the well dry and monitor for any additional inflow this initial strategy serves to purposes, firstly the removal of produced fluids from the subsurface and, secondly, as a potential delineation of the vertical extent of the contamination. It is believed the fluid in the well originated around the 27' bgs mark and made its way down into the bottom of the wellbore prior to the placement of isolating materials around the liner. The removal of the fluid will be performed via a 1" pump which will deposit the fluids into a portable tank. The captured fluids will be taken to Berry's O29 E&P Waste Facility, processed through the gun barrel and placed into the impoundment. Samples of the fluid will be taken for chemical analysis.

To address the residual TPH in the floor of the excavation, 1,100 pounds of sodium percarbonate were distributed around the excavation floor and allowed to sit for a day. The day following the application of the chemical oxidant approximately 60 BBLs of water source from the Colorado river was used to flush the oxidant down into the fractures below the excavated area to oxidize any residual petroleum constituents in the subsurface fractures.

Soil Remediation Summary

☒ In Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Chemical oxidation

_____ Air sparge / Soil vapor extraction

_____ Natural Attenuation

_____ Other _____

☒ Ex Situ

No _____ 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)

Yes _____ Chemical oxidation

Yes _____ Other _____ Landfarm

Groundwater Remediation Summary

☐ _____ Bioremediation (or enhanced bioremediation)

Yes _____ Chemical oxidation

☐ _____ Air sparge / Soil vapor extraction

☐ _____ Natural Attenuation

☐ _____ 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.

At this time Berry does not believe groundwater has been impacted by this spill. However the spill does appear to be contained within a perched area of Long Ridge where recharge waters could be impacted by any residual TPH located in the fractures below the pipeline leak. Berry has applied chemical oxidant to the excavation and washed the material into the subsurface fractures to remediate any residual hydrocarbons. Berry will monitor potential groundwater impacts via downgradient surface water monitoring and observation well monitoring and monitoring beginning in Spring 2021.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☐ Quarterly ☐ Semi-Annually ☐ Annually ☒ Other monthly

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? _____

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: _____

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.

Berry plans to landfarm the contaminated soil at the adjacent J15 wellpad. Once the landfarmed material meets the 910-1 standards Berry will return this material to the excavated locatoin to serve as fill. The returned material will then be covered with topsoil and graded to match the surrounding contours of the pipeline right-of-way. The graded top soil will then be covered with an approved seed mixture and reclaimed to its previous condition.

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? _____

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. 03/30/2020

Actual Spill or Release date, if known. 03/30/2020

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 03/30/2020

Date of commencement of Site Investigation. 03/30/2020

Date of completion of Site Investigation. 04/01/2020

REMEDIAL ACTION DATES

Date of commencement of Remediation. 04/01/2020

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

This form serves as the monthly update for the J15 pipeline spill remediation project. Over the last month Berry has applied 1100 pounds of sodium percarbonate to the excavation floor and washed the chemical into the subsurface fracture network to remediate residual hydrocarbon contamination. Additionally, Berry completed its delineation of the subsurface spill via the completion of 6 additional 60' boreholes offset from the spill location. Three of the six additional holes were observed to have static fluid columns while the remaining three were completely dry. Samples were taken from the new wellbores containing fluid and sent for laboratory analysis along with a sample taken from the J15 spoils landfarming site. The new fluid containing wells are being outfit with pumps to speed up the removal of the contaminating fluid from the subsurface. To date 1,050 gallons of produced water have been removed from MW-1 along with 50 gallons of condensate. All of the recovered fluid has been trucked to Berrys P32 E&P Waste Facility and Impoundment for further processing. Landfarming of the spoils is done for the year as the weather has turned too cold to continue, however work will resume in Spring 2021.

Responses to the COAs from the previous F27-S were too long to provide within this text box, so please refer to the attached document for Berry's responses. The analytical results and in depth details of the work over the last month will be provided by Nicholson GeoSolutions within the next couple of weeks. Berry will provide the report to the COGCC via a Form 27 as soon as it is received from Nicholson.

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

Signed: Jon Armstrong

Title: EH&S Rep, Sr.

Submit Date: 11/20/2020

Email: jarmstrong@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: 11/23/2020

Remediation Project Number: 15535

COA Type**Description**

	The operator shall ensure that all landowner notifications regarding this remediation plan are performed.
	The operator shall ensure that a diagram/map indicating the location of the six additional wells is provided with the J15 report.

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**

402537599	FORM 27-SUPPLEMENTAL-SUBMITTED
402537647	OTHER

Total Attach: 2 Files

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

Environmental	The operator shall ensure that all monitoring wells are properly permitted with the Division of Water Resources as applicable.	11/23/2020
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Total: 1 comment(s)