

State of Colorado Oil and Gas Conservation Commission

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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: LINN OPERATING LLC	Operator No: 10516	Phone Numbers Phone: (970) 2855207 Mobile: (970) 9482785
Address: 600 TRAVIS STREET #1400		
City: HOUSTON State: TX Zip: 77002		
Contact Person: Tom Hogelin	Email: tgh@bry.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 10235

Initial Form 27 Document #: 401203582

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 Update landfarming plan for drill cuttings. |

SITE INFORMATION

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

Facility Type: LAND APPLICATION SITE	Facility ID: 448249	API #:	County Name: GARFIELD
Facility Name: Latham O-29	Latitude: 39.580116	Longitude: -108.193086	
** correct Lat/Long if needed: Latitude:		Longitude:	
QtrQtr: SWSE	Sec: 29	Twp: 5S	Range: 96W Meridian: 6 Sensitive Area? Yes

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? Yes

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
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.

Composite sample of the material to be treated will be analyzed to establish a baseline.

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 11

Number of soil samples exceeding 910-1 6

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) 1390

-- Highest concentration of SAR 20

BTEX > 910-1 Yes

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 Approximately 9,632 cubic yards of spoil material that is being treated adjacent to the wellpad by land farming is from drilling and completions operations. Samples of this spoil were taken in 2011, 2012, and 2013. Analysis of these samples indicated that all COGCC Table 910-1 standards were achieved and sampling was discontinued. A composite sample was taken and tested on October 8, 2015. This material passed the COGCC Table 910-1. Discrete samples from the same stockpile were taken on May 12, 2016. Four of the six samples failed for benzo(a)pyrene (lowest was 0.0234; highest was 0.0574). On November 2, 2016, the stockpile was moved, spread out to a height of approximately 18" and landfarm treatment began consisting of tilling the spoil and adding phosphorus fertilizer to address the benzo(a)pyrene.

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.

To date in 2017, the landfarmed material has been tilled twice with a Kubota farm tractor pulling a chisel point plow. Based on soil nutrient analysis, fulvic acid is the only amendment that was recommended to apply during tilling operations. Tilling and adding amendments will continue once every 10-14 days until the 910-1 standards are met or until weather prohibits activity.

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.

Pit will be backfilled with treated spoils, pit excess spoils, and pad excess spoils. Pad slopes will be reclaimed not to exceed 3:1 slope. 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. 05/04/2011

Actual Spill or Release date, if known. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 05/17/2011

Date of commencement of Site Investigation. _____

Date of completion of Site Investigation. _____

REMEDIAL ACTION DATES

Date of commencement of Remediation. 05/27/2011

Date of completion of Remediation. _____

SITE RECLAMATION DATES

Date of commencement of Reclamation. _____

Date of completion of Reclamation. _____

OPERATOR COMMENT

Submitting landfarm spoils lab results and analysis for O29 596 for samples taken on May 6, 2017.

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: 07/06/2017

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: 08/23/2017

Remediation Project Number: 10235

COA Type

Description

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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

401333244	FORM 27-SUPPLEMENTAL-SUBMITTED
401333249	REMEDATION PROGRESS REPORT

Total Attach: 2 Files

General Comments

User Group

Comment

Comment Date

Environmental	Provide monthly Supplemental F27s describing activities performed as it relates to this remediation.	08/23/2017
Environmental	Provide a table with the sample location IDs and latitude/longitude of each sample that was composited.	08/23/2017
Environmental	Provide a map illustrating locations of where samples were collected.	08/23/2017
Environmental	This supplemental Form 27 is conditionally approved; however, additional information or activities may be required during the course of remediation. Conditions of Approval (COAs) shall be forthcoming on supplemental Form 27s.	08/23/2017

Total: 4 comment(s)