FORM 27 Rev 3/16

State of Colorado
Oil and Gas Conservation Commission

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Report taken by: Steven Arauza

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 INFORMATON

Name of Operator: LARAMIE ENERGY LLC Operator No: 10433
Address: 1401 SEVENTEENTH STREET #1401
City: DENVER State: CO Zip: 80202
Contact Person: Joan Proulx Email: jproulx@laramie-energy.com

Phone Numbers
Phone: (970) 263-3641
Mobile: ( )

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 9640 Initial Form 27 Document #: 2526157

PURPOSE INFORMATION

- [ ] 901.e. Sensitive Area Determination
- [ ] 909.c.(1), Rule 905: Pit or PW vessel closure
- [ ] 909.c.(2), Rule 906: Spill/Release Remediation
- [ ] 909.c.(3), Rule 907.e.: Land treatment of oily waste
- [ ] 909.c.(4), Rule 908.g.: Centralized E&P Waste Management Facility closure
- [ ] 909.c.(5), Rule 910.b.(4): Remediation of impacted ground water
- [ ] Rule 909.e.(2)A.: Notice completion of remediation in accordance with Rule 909.b.
- [x] Rule 909.e.(2)B.: Closure of remediation project
- [ ] Rule 906.c.: Director request
- [x] Other DRILL CUTTINGS REMEDIATION

SITE INFORMATION

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

Facility Type: LOCATION Facility ID: 429734 API #: County Name: MESA
Facility Name: WHF D17 998 Latitude: 39.277469 Longitude: -108.358933
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: NWNW Sec: 17 Twp: 9S Range: 98W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications CL
Most Sensitive Adjacent Land Use RANGELAND
Is domestic water well within 1/4 mile? Yes
Is surface water within 1/4 mile? Yes
Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

NO POTENTIAL RECEPTORS WITHIN 1/4 MILE.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [x] **E&P Waste**
  - [ ] Produced Water
  - [ ] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [x] Drill Cuttings
- [ ] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [ ] Other (as described by EPA) _____
- [ ] **Non-E&P Waste** _____

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	11,000 CUBIC YARDS	FIELD MEASUREMENTS, GIS DATA

INITIAL ACTION SUMMARY

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

A Form 4 #401001343 was approved to notify the COGCC of anticipated activities associated with bio-remediating approximately 11,000 cubic yards of cuttings. Compacted berms were constructed on the pad around the treatment area in which the cuttings were spread. Three remediation water tanks were staged and will be utilized throughout the remediation process.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

- [x] Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

Composite soil monitoring samples were collected roughly every six to eight weeks. Initial baseline sampling consisted of full COGCC Table 910-1 constituents, with follow-up monitoring samples analyzed for constituents that exceeded Table 910-1. The Land Treatment Unit (LTU) was partitioned into twelve (12) sections in which an individual grab sample was collected. The grab samples were then composited and sent to a NELAP certified laboratory for analysis. Sample locations were chosen at random.

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: 24

Number of soil samples exceeeding 910-1: 19

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

Approximate areal extent (square feet): 0

NA / ND

-- Highest concentration of TPH (mg/kg): 3680

-- Highest concentration of SAR: 32

BTEX > 910-1: No

Vertical Extent > 910-1 (in feet): 1

Groundwater

Number of groundwater samples collected: 0

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet): 100`

Number of groundwater monitoring wells installed: 0

Number of groundwater samples exceeding 910-1: 0

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

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?

Three (3) independent background grab samples were collected and analyzed for Arsenic, SAR, pH, and EC. Background samples will be used to request an allowance for Arsenic.

☐ 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.

Based on baseline analytical data, a remediation plan was developed with the intent of bio-remediating the drill cuttings to meet COGCC Table 910-1 standards and to be beneficially re-used by Laramie on-site in interm reclamation activities. This was achieved by applying a blend of microbial organisms formulated to break down and digest hydrocarbons, as well as soil conditioning amendments, nutrients, and gypsum to reduce SAR. The Land Treatment Unit (LTU) was actively treated on a weekly basis (weather permitting) by adding appropriate nutrients and aerating the soils with tractor mounted rototillers to promote microbial activity.

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.

The degradation of hydrocarbons utilizing microbes is a natural process that is enhanced by techniques developed by HRL Compliance Solutions, Inc. Maintaining proper soil conditions and nutrient levels is essential to microbial growth and productivity. Bio-remediation products and nutrients were applied to the LTU to promote microbial growth and proliferation. Water was applied on a regular basis to maintain a moisture content essential to microbial mobility. The LTU was also aeriated on a regular basis to provide oxygen and ensure even treatment distribution and a consistent media for treatment. Nutrient and water applications, in combination with aeriation and two (2) gypsum applications continued until COGCC Table 910-1 standards were achieved.

Soil Remediation Summary

☐ **In Situ**

- ____ Bioremediation (or enhanced bioremediation)
- ____ 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
  - Yes 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.

N/A

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Frequency: ☐ Quarterly ☐ Semi-Annually ☐ Annually ☒ Other Notice of Completion - Closure

Report Type: ☐ Groundwater Monitoring ☐ Land Treatment Progress Report ☐ O&M Report

☒ Other Drill Cuttings Remediation Closure

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:

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? Yes

Does the previous reply indicate consideration of background concentrations? Yes

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? Yes

Is additional groundwater monitoring to be conducted? No

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.

Laramie is planning to utilize the treated drill cuttings onsite for interim reclamation.

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?

IMPLEMENTATION SCHEDULE

PRIOR DATES

Date of Surface Owner notification/consultation, if required.

Actual Spill or Release date, if known.

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date).

Date of commencement of Site Investigation.

Date of completion of Site Investigation.

REMEDIAL ACTION DATES

Date of commencement of Remediation. 03/10/2016

Date of completion of Remediation. 06/06/2018

SITE RECLAMATION DATES

Date of commencement of Reclamation.

Date of completion of Reclamation.

OPERATOR COMMENT

This Supplemental Form 27 is being submitted to inform the COGCC that the last remaining Lift #3 for the water based drilling cuttings was successfully treated utilizing bioremediation techniques as outlined in the approved Form 27 (REM# 9640) and will be reincorporated on location during the interim reclaim. All interim reclaim activities will satisfy requirements outlined in the COGCC 1000 series rules, as well as a seed mix approved by the surface owner.
Per the COA on approved Form 4 #401001343, please refer to Form 4 #402463267.

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

Signed:` Joan Proulx Title: Regulatory Analyst

Submit Date:` 08/10/2020 Email: jproulx@laramie-energy.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: Steven Arauza Date: 10/22/2020

Remediation Project Number: 9640

COA Type	Description
	Approved Initial Form 27 (doc #2526157) indicated that "prior to cuttings being placed within the LTU, pad surface samples were collected to be used in comparison with pad surface samples to be collected at the completion of remediation activities." Operator has not provided documentation for pad surface samples collected before and after completion of remediation activies. Operator shall submit complete documentation (soil sample locations, analytical summary table, complete laboratory reports) of pad samples collected before and after completion of remediation activities to demonstrate compliance with Table 910-1 of material in the former land treatment unit.
	Operator's attached request for relief from Table 910-1 maximum allowable concentration for SAR (doc #402463300) is not approved at this time. Approval of this Form 27 does not constitute COGCC approval of operator's proposed beneficial reuse of cuttings. Operator shall submit Form 4 Beneficial Reuse Sundry with figures of the WHF D17 998 Pad Location (ID No. 429734) showing the existing, post interim and final reclamation contours to COGCC EPS and Reclamation Specialist for approval prior to reuse of cuttings. The operator's Form 4 Beneficial Reuse Sundry shall also address Table 910-1 exceedances for arsenic, SAR, and EC in all lifts associated with this project.

	Operator shall provide all cuttings sampling locations, analytical results, and complete laboratory analytical reports for sampling events taking place from May 2016 to present via a Supplemental eForm 27. If complete cuttings sampling documentation is unavailable, Operator shall demonstrate compliance of the treated cuttings with Table 910-1 by collecting an appropriate number of representative samples for analytes listed on Table 910-1.
	Operator shall submit a revised figure depicting the current layout of the land treatment unit and locations of stockpiled material from previous lifts.
	Approved Initial Form 27 (doc #2526157), Soil sampling and analytical data submission section, describes land treatment of approximately 11,000 cubic yards of cuttings in three (3) lifts, each presumably containing approximately 3,700 cubic yards of cuttings. Attached analytical summary table (doc #402463298) documents one sample result per day. Attached sample map (doc #402463301) depicts fourteen sample locations. Operator shall submit a Supplemental eForm 27 to detail soil sampling procedure (soil sampling frequency, number of soil samples collected during each sampling event, and volume of cuttings represented by each sample).

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
402463216	FORM 27-SUPPLEMENTAL-SUBMITTED
402463298	ANALYTICAL RESULTS
402463300	OTHER
402463301	MAP

Total Attach: 4 Files

General Comments

User Group	Comment	Comment Date
Environmental	Operator indicates under Remediation Completion Summary that this report (doc #402463216) includes a Final Closure Request. This entry has been removed by the COGCC due to the fact that the COGCC is unable to approve the project for closure at this time, due to lacking analytical results to demonstrate compliance of the treated cuttings with Table 910-1. See COAs above.	10/22/2020
Environmental	Operator has not provided complete laboratory report for cuttings samples included in attached analytical summary table.	08/11/2020

Total: 2 comment(s)