

LARAMIE ENERGY, LLC

Drill Cuttings Management Plan

This Drill Cuttings Management Plan (DCMP) outlines the operational requirements to be followed by LARAMIE ENERGY, LLC (Laramie) when generating drill cuttings (cuttings) at the CC 0697-03-07 well pad (COGCC Location ID 452807) (Drill Pad). The land that the Drill Pad and access road are located on is owned by Laramie.

This DCMP is an expansion of the Cuttings Management Plan details included in approved COGCC Form 2A (COGCC Document ID 401387622) that was approved by the COGCC on 10/30/2017. Any changes made to this DCMP will be provided to the Colorado Oil and Gas Conservation Commission (COGCC) via a Sundry Notice.

Management of Cuttings at the CC 0697-03-07 Well Pad

The CC 0697-03-07 pad (location #452807) was approved and built and 13 of the originally permitted 20 wells were drilled in 2018. The rig was then moved off the pad to drill pads to meet other lease obligations. The rig is scheduled to return to the CC 697-03-07 to drill the remaining 7 wells in 2021. During the drilling process, the cuttings will be brought to the surface and stabilized by dewatering them via shaker tables. Typically, during drilling operations, cuttings are captured in a “Catch Pan”. The catch pan is a steel open top flat tank under the cuttings discharge chute with one end open to allow a front loader to come in scoop out cuttings after they have gone through the shakers and press. Once the cuttings are dewatered, they will be temporarily staged on the pad surface within secondary containment berms to prevent them from contacting stormwater runoff.

Cuttings will not be segregated between surface and production drilling intervals. Samples collected from cuttings produced during the drilling of the surface casing hole typically do not exhibit exceedances of the total petroleum hydrocarbons, benzene, toluene, ethylbenzene, or total xylenes Concentration Levels listed in COGCC Table 915-1, while samples collected from cuttings produced during the production casing hole generally do. Mixing the cuttings from various intervals as they are stored on the pad will typically reduce the exceedances of COGCC Table 915-1 criteria to acceptable levels. Laramie will make every effort to assure the cuttings materials are thoroughly mixed prior to sample collection. See Representative Sampling Approach below.

Laramie Management of Excess Cement

During surface casing cement operations, Laramie’s standard practice is to pump more cement than the annular volume to insure good cement integrity from the surface casing shoe to the surface. Whatever excess cement that is pumped and circulates out of the hole needs to be managed. The excess cement (10-15 bbl usually) is diverted around the shaker and pumped into the catch pan. Any free water in the pan is pumped to the mud tanks, while the cement remains in the pan. Current procedure is to allow cement to semi-harden in shaker catch pan (just to the point where a front loader is able to move it), and then transfer it to a bermed area in the cuttings

to let the cement set further. Once the cement has set, it is then mixed into the cuttings pile. Any free water that comes out of the cement as it sets is then pumped into a truck and hauled off or reused by the drilling system.

Storage of Cuttings at CC 0697-03-07 Well Pad

Laramie estimates that an average 425-450 yds will be generated for each well. The CC 0697-03-07 pad has been designed to store a minimum of 3,500 cubic yards (cu/yds). Laramie anticipates approximately 2,975-3,150 cubic yards of cuttings will be produced at the CC 697-03-07 Well Pad from drilling the remaining 7 wells. The storage location and approximate area of the cuttings on the pad is depicted in the attached diagram.

While being stored at this location, the cuttings will be mixed with a drying agent (sawdust) and kept in a bermed containment, frequently inspected, and segregated from any previously recovered topsoil. Cuttings will be isolated from topsoil at all times through the use of a physical barrier and/or a berm. The cuttings may be stacked on the drill pad cut slope and allowed to air dry. Once the rig has completed drilling the 7 wells, the cuttings will remain until well completion (stimulation) operations are finished. Until all stored cuttings are deemed compliant with COGCC Table 915-1 Concentration Levels, the moisture content of the cuttings will be visually monitored in order to prevent any potentially contaminated fluids from migrating off site during a storm surge.

Soil Sampling and Remediation

Representative Sampling Approach

Once all wells have been drilled, baseline samples of the cuttings will be collected to assess constituent levels listed in COGCC Table 915-1. Since the wells are drilled with the same mud program to the same geologic formation, a homogenous sample of the cuttings will be gathered by an independent third-party contractor and analyzed according to Table 915-1 criteria. This data set will also establish baseline criteria levels for future remediation and reclamation. Note: If a well is drilled into a different geologic zone, or the mud program changes that might impact the constituents in the cuttings, the sampling procedure would be reviewed and revised to conduct sampling at the appropriate interval(s). This sampling approach will allow Laramie to manage/remediate any potential impacts from the cuttings more effectively.

In order to collect samples that are representative of the cuttings stockpiles, the cuttings pile will be thoroughly mixed to create a composite of the stored materials. From this soil mixture, a five-point composite sample will be collected and submitted for laboratory analysis of the constituents mentioned above. Each of the five aliquots representing the composite samples will be collected at random depths at least one foot below the surface of the pile.

All the soils that were in contact with (beneath or adjacent to) the cuttings will be sampled according to Table 915-1 criteria and remediated as appropriate.

Cuttings Remediation and Verification

Any cuttings that do not meet Concentration Levels listed in COGCC Table 915-1 will be remediated to comply with COGCC Table 915-1. All personnel responsible for handling the cuttings, including those eventually responsible for reclamation of the cuttings, will be trained and made aware of this stipulation.

At this point in the remediation process, a Form 27 will be submitted to the COGCC per COGCC Rule 913 to notify the Director of our proposed plans for remediating any remaining impacts.

In order to remediate cuttings that exhibit exceedances of COGCC Table 915-1 Concentration Levels, they will be retained within the existing disturbance of the cutting's storage area. While within the boundary of the cutting's storage area, the cuttings will be blended with native soils at an estimated 1:1 ratio. The samples will be turned several times to allow for aeration and biodegradation. Samples will be collected and submitted for laboratory analysis of all COGCC Table 915-1 constituents that exhibited exceedances according to the sampling process detailed above.

If cuttings still exhibit exceedances after the second round of sampling, they will be turned/mixed and re-sampled until compliance with COGCC Table 915-1 Concentration Levels is achieved. If mixing and aeration does not result in Table 915-1 compliance, Laramie will evaluate an alternative method of treatment. Historically, turning and mixing the cuttings allowing for aeration which promotes biodegradation and/or volatilization of the remaining contaminants has been successful in cuttings treatment.

Once compliance with COGCC Table 915 Concentration Levels is met, a Supplemental Form 27 will be submitted to the COGCC per COGCC Rule 913 to notify the Director that all cuttings were successfully remediated to comply with COGCC Table 915-1 Concentration Levels.

Reclamation of CC 0697-03-07 Well Pad

Interim reclamation of the location will not occur until all cuttings are compliant with COGCC Table 915-1 Concentration Levels. Laramie anticipates interim reclamation activities will begin in the late Summer or Fall of 2022 or late Spring of 2023. All interim reclamation activities will be conducted in accordance with COGCC 1000-Series Rules.