



Full List of BMPs

ELU M12-496

W2SW Section 12, T4S R97W

Rio Blanco County, Colorado

December 2023



Caerus Piceance LLC

ELU M12-496

W2SW Section 12 T4S R96W

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Rio Blanco County, CO

Introduction

Caerus Piceance LLC (Caerus) has developed several plans, which include site specific Best Management Practices (“BMPs”) in order to address Energy Carbon Management Commission’s (“ECMC”) Rules for permitting an Oil and Gas Development Plan (“OGDP”). This document lists all of the BMPs Caerus has committed to for the the ELU M12-496 Well Pad (Well Pad).

Summary of Fugitive Dust Best Management Practices (BMPs) – Rule 427.a(.7)

- 1) Speed limit of 25 mph on unpaved roads.
- 2) During extremely dry conditions or when dust is visible, vehicular speeds will be reduced
- 3) No construction will occur during high wind days.
- 4) Field personnel will notify construction and operations personnel of high wind days.
- 5) Water trucks will be utilized to wet roadways as needed to prevent fugitive dust.
 - a. Magnesium chloride or freshwater may be used depending on the circumstance.
- 6) Construction activities that occur on unpaved surfaces shall be discontinued in periods when activities are causing dust plumes that cannot be abated with dust suppression methods.
- 7) Visual vehicle inspections will occur to assess presence of dirt and any action needed to suppress dust Caerus will primarily use freshwater.
- 8) All major surface disturbance will occur outside of seasonal winter migration for mule deer and elk, and during lekking and breeding seasons for sage grouse.

Summary of Water Use Plan Best Management Practices (BMPs) – Rule 304.c.18

- 1) Use of recycled produced water for completions
- 2) No use of any downhole constituents listed in the ECMC Table 437-1

Summary of Wildlife Management Plan pursuant to Rule Series 1200

- 1) Operational BMPs
 - a) Three-phase gathering systems, where economically and technically feasible, to reduce footprint remaining during production phase, eliminate traffic, and reduce venting and potential spills. **(WQ, T, GH, HW)**
 - b) Remote well control and monitoring to reduce traffic through work/project prioritization and increase emergency response efficiency. **(WQ, T, GH, HW)**
 - c) Solar panels as an alternate energy source for on-location production equipment. **(T, GH)**
 - d) Temporary surface water delivery lines to reduce truck traffic. **(T, HW, WQ, GH)**
 - e) Remote completions to reduce the size of pad needed for simultaneous operations. **(T, HW)**
 - f) Average well pad surface disturbance of 0.5 acres or fewer per well (well pad disturbance does

- not include associated pipelines, access roads, or facilities) wherever possible. **(HW)**
- g) Where feasible, electric power will be used at existing and future compressor stations to reduce on-site emissions. **(GH)**
- h) Use of gas lift to automate some production activities, reduces traffic to the well-site and reduces gas vented to the atmosphere by reducing the frequency of the “blow down / unloading” of a well. **(T, GH)**
- i) Prohibit Caerus employees and contractors from carrying projectile weapons (including bows) on Caerus property, except during company-organized events. **(HW)**
- j) Prohibit pets on Caerus property. **(WQ, HW)**
- k) Reduce traffic impacts by carpooling personnel to project locations, when appropriate and feasible. **(T)**
- l) When feasible, reduce additional surface disturbance by utilization of the staging/storage yard at the TLQ and the Caerus gravel pit (TS5 R96W section 34). **(HW)**
- m) Strategically apply fugitive dust control measures on the NPR to reduce coating of vegetation and deposition in water sources, including enforcing established speed limits on private Caerus roads. **(WQ, HW)**
- n) Caerus has volunteered to be a member of One Future and The Environmental Partnership. These voluntary programs require a commitment to reduce methane emissions. Caerus will report reduction targets and annual metrics through the Caerus ESG Report. **(GH)**

2) Pad Development

- a) New directional drilling technology, such as longer reaches, shorter total depth times, and natural gas-powered rigs, when possible. **(WQ, T, GH, HW, DT)**
- b) Reoccupy existing pads if/when possible. **(HW)**
- c) Simultaneous drilling and completions activities may be employed to shorten the disturbance time necessary to drill, complete, and bring the pad to production. **(T, HW, DT)**
- d) Green completions to reduce venting of natural gas to atmosphere during completions. **(GH)**
- e) Project Canary will be used for fence line air monitoring during pre-production operations on all new locations. **(GH)**
- f) Toe berms of adequate size on all fill slopes facing and or adjacent to potential water to contain any erosion from the fill slope. **(WQ, HW)**
- g) Topsoil windrows on all new facility construction for perimeter control to divert to terminal discharge points. **(WQ, HW)**
- h) Hydraulic mulch or armoring on all exterior slopes adjacent to waterways. **(WQ, HW)**
- i) Follow the North Parachute Ranch Integrated Vegetation Management Guidance Document for interim and final reclamation practices, including identifying appropriate seed mixes and invasive weed control measures. Selection of seed mixes will be based upon the type of ecosystem affected. **(HW)**

3) Pipeline Construction

- a) Gathering line placement adjacent to roads wherever possible unless the existing road is adjacent to waterways. **(WQ, HW)**
- b) Multiple gathering lines placed in a single trench to minimize disturbance and construction times for multiple lines. **(T, HW, WQ)**
- c) Trench plugs (sloped to allow wildlife or livestock to exit the trench should they enter) at known wildlife or livestock trails to allow safe crossing on long spans of open trench. **(HW)**
- d) Pipelines installed at right angles to the drainages, wetlands, and perennial water bodies. **(WQ, HW)**
- e) Equipment bridges for pipeline construction made from either clean rock and flume pipes or timber equipment mats with flume pipes. **(WQ)**
- f) Horizontal directional drill techniques at perennial water bodies and wetland complexes. **(WQ, DT)**
- g) In-stream construction activity limited to 24 hours for waterbodies less than ten feet wide and to 48 hours for waterbodies greater than ten feet wide at locations where horizontal boring is not feasible. **(WQ, HW, VTS)**
- h) A minimum of five feet of soil cover maintained between the pipeline and the lowest point of the drainage or water body channel. **(WQ)**

4) Road and Pad Construction

- a) Existing roads used in lieu of new construction wherever feasible. **(HW, WQ)**
- b) All access roads and facilities other than well pads seeded in a timely manner after construction has been completed and seeding of all topsoil on pad construction. **(WQ, HW)**

5) Aquatic Resources

- a) Water sampling to monitor for changes in water quality. Sampling will occur at a minimum annually within areas of development activity. Existing and new water sampling data will be maintained by Caerus. **(WQ)**
- b) Use two or more stormwater best management practices on new disturbance to control sediment runoff and control or contain any potential spills, wherever surface disturbance must occur within a riparian habitat, as defined by the presence of riparian associated vegetation. **(WQ, HW)**
- c) Relocate temporary travel routes necessary for development (such as secondary access routes) and long-term travel routes, wherever feasible, away from riparian habitat (as defined by vegetation) at the time of interim reclamation. **(WQ, HW, T)**
- d) Maintain spill response kits at strategic locations adjacent to riparian areas or other centralized locations. **(WQ, HW)**
- e) Install engineering controls (one-way valves, installed draw hoses with screened intakes, overhead loading, and loading from tanks) on all water points from Parachute Creek to prevent contamination. **(WQ, HW)**
- f) Use voluntary timing limitations for cutthroat trout. **(HW, WQ, VTS)**
- g) Block low water crossing at Light Gulch to eliminate unnecessary traffic through Parachute Creek. (Completed 2010). **(WQ, T, HW)**
- h) Use existing head gates and analyze the strategic use of additional head gates on road culverts as a tertiary containment (these are not the culverts in the waterway but draining to the waterway during storm events). **(WQ, HW)**

6) Wildlife Resources

- a) Perform biological site surveys (on-site) for each new development, using the most recent data sets for wildlife and aquatic resources (the report format is based upon Federal on-site surveys). **(WQ, HW)**
- b) Perform pre-disturbance surveys when the on-site inspection and commencement of disturbance occur in different field seasons (e.g., new raptor nests), using the most recent data sets for wildlife and aquatic resources. **(WQ, HW, VTS)**
- c) Use the Wildlife Resources Matrix (Attachment B) and Caerus' wildlife resources database and maps to identify and document (where appropriate) potential impacts or concerns during the project planning phase for proposed drilling operations, new or existing locations to be used for siting completions operations, and construction of roads, pads and pipelines. The Wildlife Resource Matrix reflects a prioritization of species habitat sensitivity as agreed upon by CPW and Caerus. **(WQ, HW, VTS)**

7) Black Bear

- a) Conduct regular contractor and employee training with respect to wildlife awareness. **(HW)**
- b) Reinforce training at worksite tailgate meetings, monthly safety meetings, and the Environmental Health and Safety (EHS) hazard identification program, and through the use of signs. **(HW)**

8) Mule Deer and Elk

- a) Avoid disturbance of big game production areas and winter range wherever possible, but this will be a secondary consideration to preserving sage-grouse habitat. **(HW, VTS)**
- b) Prior to construction of new surface structures within five primary migratory corridors (Figure 2) Caerus will consult with CPW consistent with the Wildlife Resource Matrix in Attachment B. **(HW, VTS)**
- c) Only essential traffic will be permitted to access sites throughout the NPR where no active operations are occurring. **(HW, T)**

9) Raptors

- a) New development will require raptor surveys if appropriate habitat exists per Caerus' Initial Baseline Assessment (ISA) process. **(HW)**
- b) Perform pre-disturbance raptor surveys prior to interim and final reclamation. **(HW, VTS)**
- c) When feasible and appropriate, single pass presence/absence surveys may be conducted for high priority species; this snapshot may not meet the standards of the nest occupancy survey. **(HW, VTS)**
- d) Schedule the commencement of development activity for the time of year outside of average breeding seasons for the species of concern, if the duration of operations on a location prevents seasonal avoidance (e.g., during drilling and completion operations that exceed 12 months per location). **(HW, VTS)**

10) Greater Sage-Grouse: Caerus will adhere to the following best practices for GrSG mitigation and monitoring for Caerus operations.

- a) Where feasible, raptor perch deterrents will be installed on cross arms of power poles and other documented raptor perches, such as radio towers, where birds are noted perching. Monitor all structures exceeding six feet in height within occupied GrSG habitat for the presence of perching raptors or ravens. Perch deterrents need not be installed if they pose a safety issue (e.g., on the handrails of a tank battery). **(HW)**

- b) Locate new pads outside occupied GrSG habitat wherever possible or in habitat that is already disturbed. **(HW, VTS)**
- c) Implement three-phase-gathering on existing locations, where economically and technically feasible, to reduce onsite facilities and increase the acreage put into interim reclamation. **(T, HW, DT)**
- d) Apply a 1-mile radius No-Disturbance buffer around active lek sites (documented activity by CPW in the last five years) from 5:00 AM to 9:00 AM, March 15 through May 15. Where practicable, traffic and other disturbances will be restricted during this date range after sunset when GrSG are congregating around the lek until 9:00 AM the following morning when birds depart the lek. **(HW, T, VTS)**
- e) Restrict New Disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1. **(HW, VTS)**
- f) Site New Disturbance using topographic features to shield leks from new disturbance whenever feasible. **(HW)**
- g) Schedule cross-country pipeline construction and installation (not including lines along roads) outside of the Critical Habitat Season. **(HW, VTS)**
- h) Use interim reclamation to redevelop, as quickly as possible, ground cover that provides for secure ground movements of GrSG and is an effective precursor to the reestablishment of appropriate sagebrush cover. Detailed guidelines and practices for interim and final reclamation are outlined in Caerus' North Parachute Ranch Integrated Vegetation Management Guidance. **(HW)**
- i) Reseed disturbances exceeding 15 feet in width in mapped occupied GrSG grouse habitat with local sagebrush seed, where topography and weather conditions allow safe access to do so. **(HW)**
- j) The following are approved exceptions to the above-described schedules and practices:
 - a. Well maintenance south of the Upper West Fork will not be considered New Disturbance but will be minimized to the extent practicable during the Critical Habitat Season. **(HW, VTS)**
 - b. Response to emergencies (an immediate threat to life, property, or the environment) will not be considered New Disturbance and will be permitted without timing limitations. **(WQ, HW)**
- k) Definitions of Terms
 - a. "Critical Habitat Season" means the time period from March 15 to July 1 each year.
 - b. "New Disturbance" means any new activity that will cause or leave a long-term and noticeable change to the landscape, including construction of access roads, gathering facilities and pipelines, and any drilling or completion activities.
 - c. "Disturbance" includes, but is not limited to, noise, lights, vehicle traffic and New Disturbance, as defined above.

Best Management Practices Reference

Summary T = Traffic Management = 15

references as BMP **DT** = Drilling Technologies =

4 references as BMPs

GH = Greenhouse Gas/Emissions Management = 9 references as BMPs

WQ = Water Quality Management = 30 references as BMPs

HW = Habitat & Wildlife Management Practices = 53 references as BMPs

VTS = Voluntary Timing & Siting Considerations = 14 references as BMPs

Summary of Lighting Best Management Practices (BMPs) – Rule 427

- 1) Lighting will be used during drilling, completions and flowback
- 2) Utilize low-glare or no-glare lighting whenever possible
- 3) Conduct lighting inspections to confirm the lighting fixtures are oriented according to the Lighting Management Plan and to appropriate safety plans
- 4) Lighting will be turned off when not required, such as when personnel are not on site or if adequate lighting is already supplied, or work is not occurring in the area
- 5) No long-term lighting necessary for the production phase of operations

Summary of Emergency Response Best Management Practices (BMPs) – Rule 304.c

Caerus will use the following site-specific BMPs at the RNP H28 197 to evaluate and determine that all above-ground and below-ground onsite (and offsite) fluid handling, storage, transmission, and transportation equipment have integrity and comply with the applicable standards cited in the ECOM rules include the following:

- 1) Audio, Visual, and Olfactory (AVO) inspections: AVO inspections will be conducted as required.
- 2) Routine inspection of all production equipment, wellheads, pit liner, etc.; Routine physical inspections of production equipment (by Caerus production personnel); Air Compliance inspections and monitoring (by Caerus Air Compliance staff); SPCC Inspections (by 3rd party contractor), Stormwater Management inspections (by 3rd party contractor), and continuous, dedicated SCADA monitoring of fluid production rates and pressures, and fluid storage volumes (by Caerus production personnel).
- 3) As part of our LDAR, STEM, and OOOOa inspection/compliance programs, Caerus will adhere to the use of Approved Instrument Monitoring Methods (AIMM) for inspecting production equipment.
- 4) Flowlines will be integrity-tested per the 1100 Series rules.
- 5) The ELU M12-496 will be covered by the Caerus SPCC plan. Employees will be trained to respond to any potential release.
- 6) Caerus spill response procedures will be adhered to for any spills or releases occurring at the location. The Caerus Waste Management Plan will be followed and is provided with this OGD submittal. All spills will be managed in accordance with the ECOM 900 Series rules.
- 7) Production equipment is physically inspected on a weekly basis, and some locations are visited more often. During these routine site visits, the Production Technicians are visually inspecting all components of the production process for any signs or evidence of active leaks, drips, releases, or pending leaks. The routine physical inspection of the location and production equipment includes a close examination of the following components:
 - a. Wellheads, Meter Skids, Gas Lift Skids, Flowlines and Production Piping (between processing equipment), and Off Location Piping.

If a leak or loss of fluid is confirmed, the Lease Operator will take immediate action to stop the flow of liquids (if possible) and initiate the appropriate repairs. The Lease Operators will communicate details of the incident to the Caerus Operations Command Center (OCC). The OCC will notify the EHS on-call responder. All spills are immediately investigated by EHS and Operations personnel. Impacted soils are assessed to determine if they exceed regulatory cleanup standards and require removal, treatment, or off-site commercial disposal. Characterizing potentially contaminated soils is accomplished by field screening the impacted soils to determine relative hydrocarbon concentrations, and/or by collecting samples of the impacted soils and sending the samples to an approved commercial lab for analysis. If a

spill incident is subject to agency reporting requirements, the appropriate agencies are notified within the regulatory timelines.

Summary of Topsoil Protection Plan Best Management Practices (BMPs) – Rule 304.c.(14)

Pre-disturbance Soil Evaluation

- 1) Soil pits were evaluated to determine pre-disturbance soil horizon depths.
- 2) Topsoil samples were collected for laboratory analysis to determine pre-disturbance agronomic characteristics.
- 3) Pre-disturbance topsoil depth was used to estimate topsoil salvage volumes.

Topsoil Protection Procedures

- 1) Topsoil will be salvaged from the construction area to a depth of six to fourteen inches (6"-14").
- 2) Topsoil will be stockpiled with slopes no greater than 3:1 (when soil volume and stockpile space allows).
- 3) Stockpile locations will be marked and clearly identified on site maps, and construction drawings available on-site until the soils are redistributed during interim reclamation.
- 4) Salvaged topsoil will be seeded and stabilized with mulch while stockpiled.
- 5) Caerus employees and contractors will monitor topsoil stockpiles for erosion and establishment of undesirable and noxious weeds.
- 6) Weeds will be treated mechanically when feasible. Chemical treatment of weeds will be spot-specific only. Soil sterilant and non-selective herbicides will not be used.
- 7) Erosion will be repaired as soon as practicable and additional control measures will be installed as necessary to prevent reoccurrence.
- 8) During reclamation, topsoil will be redistributed throughout the interim reclamation area and contoured to match pre-disturbance topography.
- 9) The interim reclamation area will be seeded with a mix approved by the surface owner and temporarily stabilized with crimped straw mulch.
- 10) Topsoil will be monitored throughout all phases of development to identify potential degradation and make repairs as soon as practicable.

Summary of Stormwater Management Plan Best Management Practices (BMPs) – Rule 304.c.(15)

- 1) Implement Control Measures (CMs) to minimize the discharge of pollutants from identified potential pollutant sources at the site.
- 2) Implement CMs for Temporary and/or Final Stabilization on our disturbances. Caerus is committed to installing Perimeter Controls until Temporary or Final Stabilization CMs can be implemented.
- 3) Minimize erosion and transport of sediment during discharge.
- 4) Stormwater runoff from all disturbed areas and soil storage areas must utilize or flow to one or more control measures to minimize erosion or sediment in the discharge.
- 5) Structural and nonstructural vehicle tracking controls shall be implemented to minimize vehicle tracking of sediment from disturbed areas and may include tracking pads, minimizing site access, and downgradient sediment control measures.