CAERUS OIL AND GAS, LLC

Best Management Practices for Sediment Tracking Controls

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Contents

1.0 Scope

The purpose of this Practice is to maintain compliance with Colorado Department of Public Health and Environment (CDPHE) and Colorado Oil and Gas Conservation Commission (COGCC) regulations for sediment tracking control.

Upon new construction, locations fall under the CDPS General Permit for Stormwater Discharges Associated with Construction Activity and are given authorization to discharge stormwater under the Colorado Discharge Permit System. To comply with this permit, Caerus is required to maintain a stormwater management plan to minimize discharging sediment to the extent it is practical. The CDPS General Permit requires BMPS (they refer to them as control measures) to be implemented to minimize the discharge of pollutants form all potential pollutant sources at the site in Part1.B.1.i(a) and Part1.B.1.i(b) :

> *(a) Vehicle tracking controls shall either be implemented to minimize vehicle tracking of sediment from disturbed areas, or the areas where vehicle tracking occurs shall meet subsection Part I.B.1.a.i(b);*
> *(b) Stormwater runoff from all disturbed areas and soil storage areas for which permanent or temporary stabilization is not implemented, must flow to at least one control measure to minimize sediment in the discharge. This may be accomplished through filtering, settling, or straining. The control measure must be selected, designed, installed and adequately sized in accordance with good engineering, hydrologic and pollution control practices. The control measure(s) must contain or filter flows in order to prevent the bypass of flows without treatment and must be appropriate for stormwater runoff from disturbed areas and for the expected flow rate, duration, and flow conditions (i.e., sheet or concentrated flow);*

Locations are covered under the CDPS General Permit until they have reached final stabilization, defined by the CDPHE as:

'All ground surface disturbing activities at the construction site are complete; and, for all areas of ground surface disturbing activities, either a uniform vegetative cover with an individual plant density of at least 70 percent of pre-disturbance levels is established, or equivalent permanent alternative stabilization methods are implemented'.

According to these rules, small ruts on an access road would not prevent a location from being considered final stabilized.

The Colorado Oil and Gas Conservation Commission (COGCC) also regulates stormwater tracking on Caerus locations from new construction until they are final abandoned, and stormwater BMPs must be implemented and maintained in accordance with rule 1002.f:

> *To control potential sediment discharges from operational roads, well pads, and other unpaved surfaces. Practices could include road and pad design and maintenance to minimize rutting and tracking, controlling site access, street sweeping or scraping, tracking*

pads, wash racks, education, or other sediment controls.

While eliminating all traces of sediment discharge is not feasible or required by the rules, Caerus has utilized a multitude of erosion control, sediment control, and administrative BMPs to minimize off-site sediment transportation from our well pads and access roads, as detailed in Section 5.

2.0 Roles and Responsibilities

EH&S	Responsible for developing, implementing, communicating, evaluating, maintaining, and improving this Practice. Implementation consists of making this Practice available to all staff and providing appropriate training materials and system tools for use. EH&S will make appropriate changes to the Practice for improvement as needed. Responsible for ensuring the annual environmental inspection is complete; address any resulting corrective actions. Responsible for delivering Annual Environmental Training to field staff, including the information covered in this Practice. Responsible for assisting with necessary reporting to appropriate regulatory agencies if required.
Caerus leadership	Responsible for implementing this Practice by providing adequate resources to support the Practice.
Caerus filed staff and in-house field contractors.	Responsible for following this Practice and incorporating its requirements into their work. Responsible for (1) understanding basic stormwater regulations and how to identify an issue that needs attention (2) Making appropriate internal notifications when an issue is identified.

3.0 Description of Best Management Practices

All stormwater related BMPs will fall under at least one of the following three types of controls:

- **Erosion Control.** Any source control practice that protects the soil surface and/or strengthens the subsurface in order to prevent soil particles from being detached by rain or wind, thus controlling raindrop, sheet, and/or rill erosion.

- **Runoff Control.** Any practice that reduces or eliminates gully, channel, and stream erosion by minimizing, diverting, or conveying runoff.

- **Sediment Control.** Any practice that traps the soil particles after they have been detached and moved by wind or water. Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them prior to leaving the site boundary.

- **Administrative Control.** Any practice that changes work procedures such as written policies, schedules, and training, with the goal of protecting the integrity of the site.

BMPs may also be classified as either structural or non-structural controls:

- **Structural Control.** Handles sediment-laden stormwater prior to it leaving each site. Structural BMPs are used to delay, capture, store, treat, or infiltrate stormwater runoff. Some examples of structural BMPs include sediment traps, diversions, and silt fences. Most Runoff Controls and Sediment Controls can also be classified as Structural Controls.

- **Non-structural Control.** Reduces the generation and accumulation of pollutants, including sediment, by stabilizing disturbed areas and preventing the occurrence of erosion. Some examples of non-structural BMPs include revegetation, mulching, and surface roughening. These types of stabilization techniques are not only the most effective method for reducing soil loss, but they are also normally the most cost effective due to low initial cost and reduced maintenance requirements. Most, but not all, Erosion Controls can also be classified as Non-structural Controls.

4.0 Implementation of Best Management Practices

4.1 New Construction

New construction locations fall under the CDPS General Permit, and all requirements of the permit will be followed. This includes a site-specific plan detailing a phased approach to BMP implementation. While specific BMPs used vary by site, the general approach is as follows:

- Training is used as an administrative control, and all staff and in-house contractors receive an annual environmental awareness training, which includes an awareness level of stormwater BMP requirements. Operators are urged to make internal notifications upon discovering any stormwater issue, so the issue can be resolved as soon as possible.
- Limiting access and strategic staging is another important administrative control used until the access road and working surface can be stabilized with gravel, compaction, and blading. Earth moving construction vehicles will remain in construction areas throughout excavation and grading activities. Most other vehicles remain in stabilized areas and do not enter construction areas until that area is stabilized.
- Documented stormwater inspections are completed at a minimum of every 7 to 14 days during active construction, and at a minimum of every 30-days until final stabilization is achieved. Any issues identified by the trained stormwater inspector are addressed as soon as practical. Any changes in BMPs on location (added or removed) are also documented in the Stormwater Management Plan. Additionally, roads and facilities are surveyed after major weather events (flooding, etc.), and any egregious stormwater issues discovered are repaired as soon as practical.
- Stormwater volumes and velocity are typically reduced through land forming and opportunistic catchment placement.
- The erosion control strategy of elevating and importing compacted gravel surfacing to shed water from access roads and working surfaces to perimeter catchments is implemented as soon as practical. Culverts and washed aggregate check dams are also added to access roads and around the perimeter of the well pad working surface to control the flow of water and limit erosion.

- Stabilizing all areas of the location, including areas ‘upstream’ of the access road, greatly reduces the potential off-site sediment tracking and migration. For example, hydraulic application of mulch on the cutslope prevents erosion of the cutslope, and thus sediment from the cutslope does not reach the road and is not tracked off-site. Thus, the location is stabilized as soon as possible with erosion control BMPs such as mulch, seeding, surface roughening, armoring, erosion control blanket, retaining walls, and terracing.
- Sediment control BMPs are also implemented and act as an additional tier of protection. For example, wattles are always installed around the down gradient perimeter of a new construction disturbance. Other sediment controls that may be implemented include velocity checks, berms, roadside ditches, wing ditches sediment traps, and rumble strips.

4.2 Stabilized Locations

Once a location is stabilized using either a uniform vegetative cover with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent alternative stabilization methods, such as gravel and compaction, are implemented, the following BMPs are typically used to reduce sediment transport.

- Training is used as an administrative control, and all staff and in-house contractors receive an annual environmental awareness training, which includes an awareness level of stormwater BMP requirements. Operators are urged to make internal notifications upon discovering any stormwater issue, so the issue can be resolved as soon as possible.
- Documented stormwater inspections performed by trained stormwater inspectors are completed annually. Any issues identified by the trained stormwater inspector are addressed as soon as practical.
- Minor issues on access roads and working surfaces, such as rutting, re-grading, and cleaning ditches/culverts, are typically addressed twice a year. It is most practical to perform this maintenance after spring snowmelt and in the fall, prior to snowfall. Scheduling biannual routine maintenance allows all issues to be addressed in an effective manor; it limits heavy truck traffic thereby preventing additional road damage that would occur by trying to maintain and drive on a wet road with heavy equipment and/or dust issues and is cost effective.
- Major issues identified on access road or working surfaces are addressed as soon as practical. Additionally, roads and facilities are surveyed after major weather events (flooding, etc.), and any egregious stormwater issues discovered are repaired as soon as practical.
- Vegetation is established and acts as a primary erosion control BMP. Areas of the location that are stabilized with vegetation and other erosion control BMPs, including areas located ‘upstream’ of the access road, greatly reduce potential off-site sediment tracking and migration. Revegetation, armoring, erosion control blanket, retaining walls, and terracing are still in place, though mulching is no longer needed.
- Temporary sediment control BMPs, such as wattles, are generally removed. Permanent sediment controls, such as sediment traps, berming and velocity checks, are typically left in place.