

Cumulative Impacts Plan

GMT EXPLORATION COMPANY LLC

Cinnamon 6-64 9-17
Sec. 19 T6S R64W (S/2NW/4)
Elbert County, Colorado
Surface: Fee

Submitted as an accompaniment to the Form 2A Application
and consistent with the requirements of Rule 427.a.

Prepared by:



UPSTREAM
Petroleum Management, Inc.

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1.0 INTRODUCTION

This Cumulative Impacts Plan has been prepared pursuant to Rule 304.c.(19) of the Colorado Oil and Gas Commission and addresses the following resources:

- Air Resources
- Public Health
- Water Resources
- Terrestrial and Aquatic Wildlife Resources and Ecosystems
- Soil Resources
- Public Welfare

This plan documents how the Operator (POCO) will address cumulative impacts to resources identified pursuant to Rule 303.a.(5) that includes:

- A. A description of all resources for which cumulative adverse impacts are expected (Section 4.0);
- B. A description of specific measures taken to avoid or minimize the extent to which cumulative adverse impacts are increased (Section 5.0);
- C. A description of all measures taken to mitigate or offset cumulative adverse impacts to any of the resources (Section 6.0); and
- D. Additional information determined to be reasonable and necessary to the evaluation of cumulative impacts by the Operator, the Director, CDPHE, CPW, or the Relevant Local Government (Sections 1.0, 2.0, and 3.0).

The Cumulative Impacts Plan for the GMT Exploration Company LLC's (GMT's) Cinnamon 6-64 19-7 location was prepared based on the information included in the preliminary Oil and Gas Location Assessment (Form 2A) and Cumulative Impacts Data Identification (Form 2B).

2.0 PROJECT DESCRIPTION

GMT Exploration Company LLC's (GMT's) proposed Cinnamon 6-64 19-7 Pad "Location" is located in Township 6 South Range 64 West of Section 19 in Elbert County, Colorado. The proposed location is on fee surface with a total Location disturbance of 18.531 acres which includes the active working pad surface area of 7.976 acres. During interim reclamation and the production phase 12.318 acres will be reclaimed leaving a disturbed production area of 6.213 acres. Construction is anticipated to begin no sooner than January 2023.

2.1 SURFACE DISTURBANCE

Construction of the proposed Location would result in an estimated total disturbance of 18.531 acres. After completion of approximately 12.318 acres of interim reclamation, long-term disturbance would be reduced to an estimated 6.213 acres. Residual disturbance includes acreage that would remain unvegetated for the life of the project, which is estimated to be 35 years. Within six months of operations, site reclamation would be initiated for portions of the well pad not required for the continued operation of the well, weather permitting.

Table 2-1 Estimated Surface Disturbance

Project Feature	Length (miles)	Short-term Disturbance (acres)	Long-term Disturbance (acres)
Well Pad	NA	18.531	6.213
Access Road	0.6	0	4.47
Location Total	0.6	18.531	10.683

3.0 CUMULATIVE IMPACT METHODOLOGY

Cumulative impacts may result when impacts associated with project implementation are added to other similar impacts associated with past, present and reasonably foreseeable future actions. The Cinnamon 6-64 19-7 location is sited in an agricultural area of Elbert County, Colorado. Publicly available data sources including county, state, federal, and public domains, were used to characterize the past, present, and reasonably foreseeable development in the vicinity of the proposed project. Based on COGCC data, there are 2 oil and gas locations (38 wells) that are active and built within one mile.

Each resource addressed in this cumulative impacts analysis is assigned a spatial and temporal scale that establishes the extent of the analysis. The spatial component of this analysis is referred to as the "Cumulative Impact Analysis Area (CIAA). The CIAA varies by resource and can be relatively smaller for some resources, as for vegetation, or much larger as in the case for air quality. **Table 3-1** presents the geographic extent for each resource CIAA. The temporal boundary for most resources is the 35-year life of the project. For wildlife and vegetation that temporal boundary includes an additional 5 years toward achievement of agency-approved reclamation standards.

Table 3-1 Geographic Scope for Cumulative Impact Analysis

Resource	Cumulative Impact Analysis Area (CIAA)
Air Quality	1-mile radius
Public Health	1-mile radius
Water	½-mile radius
Terrestrial and Aquatic Wildlife Resources and Ecosystems	1-mile radius
Soils	Full extent of disturbance
Vegetation	1-mile radius
Public Welfare	1-mile radius

4.0 SUMMARY OF RESOURCE IMPACTS

4.1 AIR

4.1.1 Resource Description

There are a variety of air emission sources at the Cinnamon 6-64 19-7 location and within the CIAA including: agricultural fields, vehicle traffic, and oil and gas production sites. Implementation of the Cinnamon 6-64-19-7 project would have a cumulative impact on air quality within the 1-mile CIAA. Demonstrated by the Emissions Inventory in Form 2B, the cumulative effects of the proposed project on air emissions in the CIAA would be minor.

4.1.2 Direct and Indirect Impacts

CDPHE's February 21, 2017, report titled "Assessment of Potential Public Health Effects from Oil and Gas operations in Colorado" evaluated over 10,000 air samples in regions of Colorado where people are living near oil and natural gas development. It concluded that all measured air concentrations were below short- and long-term safe levels. In addition, the CTEH, LLC July 28, 2020 report titled "Compilation of Benzene Measurements Near Wellpads in Colorado: A Comparison to Health Guideline Exposure Values" compiled over 6,500 air samples of benzene during various operational phases. Their findings showed 99.9% of measured values were below the acute value for benzene of 9 ppb. Based on these reports and findings, it is not anticipated that the proposed operations will present any potential acute or chronic, short- or long-term incremental impacts to public health.

Construction, drilling and completions operations will result in an increase in emissions for the surrounding area from both stationary and mobile sources.

Pre-Production Estimated Emissions

NOx	CO	VOCs	Methane	Ethane	CO2	N2O
29.21	19.02	63.19	23.74	1.81	3,779.34	0.01

Post-Production Estimated Emissions

NOx	CO	VOCs	Methane	Ethane	CO2	N2O
17.71	40.31	152.32	0.25	1.56	11,235.18	0.01

4.1.3 Cumulative Impacts

Impacts to air resources would be minimized and mitigated by the measures described in Sections 5 and 6 of this Plan. Emissions would be permitted and regulated by the Colorado Department of Public Health and Environment, Air Pollution Control Division, and would be subject to appropriate controls to reduce emissions to minimal levels. Based on the level of emissions expected to be released as the result of implementation of this proposed project, the contribution to past, present, and reasonably foreseeable projects represents a minor cumulative increase to emissions in the air resources in the CIAA.

4.2 PUBLIC HEALTH

As described in the Form 2B, The Public Health section refers to emissions of different pollutants that may be emitted from equipment and activities during drilling and/or completions operations on the Oil and Gas Location. The discussion of these emissions is addressed in the Air Resources section, above.

4.3 WATER RESOURCES

4.3.1 Resource Description

There are no water bodies (i.e., ponds, stream, rivers) in areas proposed for disturbance. Proposed facilities are in an area that is typically active agriculture crop production. There are no drainages included within areas proposed for disturbance.

4.3.2 Direct and Indirect Impacts

Construction and operation of the proposed project could potentially impact water resources that exist within ½-mile of the proposed facilities based on the potential for increases in localized erosion and sedimentation rates. Implementation of the proposed Project could temporarily increase soil compaction on nearby existing roads, and on the proposed new access road and well pad. As a result of the localized increases in soil compaction, there is the likelihood that surface runoff would be increased and would be higher than in undisturbed areas near the proposed project. Based on the lack of substantial pathways (surface drainages) near the proposed project and with the successful implementation of project-related soil erosion control measures, there is low likelihood of substantial sedimentation of intermittent drainages in the area.

4.3.3 Cumulative Impacts

Construction and production activities at the proposed Cinnamon 6-64 19-7 site combined with other past, present, and reasonably foreseeable activities in the area could increase the possibility for accidental releases of industrial products, including fuels, lubricants, and other petroleum products. Such accidental releases could impact local groundwater resources, if releases are of sufficient magnitude. The proposed Cinnamon 6-64 19-7 location will store approximately 4000 barrels (bbls) of oil in 8 tanks; 2000 bbls of produced water in 4 tanks; and Successful implementation of project-related best practices and mitigation measures will result in negligible cumulative impacts to local water resources.

Water would be obtained from Rangeview Metropolitan District including an estimated 1500000 bbls of surface water.

4.4 TERRESTRIAL ECOSYSTEM AND WILDLIFE RESOURCES

4.4.1 Resource Description

The habitats within the proposed Cinnamon 6-64 19-7 project area are characterized as disturbed. All of the proposed disturbance area is occupied by rangeland. No trees, natural habitats, or other wildlife

resources are known to exist in the area proposed for disturbance. There are no High Priority Habitats within 1 mile of the project area.

4.4.2 Direct and Indirect Impacts

Based on the evaluation of a wildlife biologist the proposed project would not have any direct impacts on special status species or their habitats.

Implementation of the proposed project could result in direct and indirect impacts to wildlife. There are no native plant habitats in areas proposed for disturbance; as such there would no direct impacts to native or special status plant species. Direct impacts are those that result in mortality, injury, and behavioral changes (for example: displacement) to wildlife. Direct impacts to wildlife typically occur during construction when wildlife is unable to avoid operating construction equipment and other project-related vehicles. Because the areas proposed for disturbance are not expected to offer high quality habitats for wildlife species, direct impacts would likely be negligible. Indirect impacts to wildlife typically include habitat loss, changes in local habitats based on the introduction of noxious weeds, and project-related increases in predator densities or concentrations. Indirect impacts to wildlife species are expected to be minimal, as no undisturbed wildlife habitats would be impacted through implementation of the proposed project.

4.4.3 Cumulative Impacts

Implementation of the proposed Cinnamon 6-64 19-7 project would have a minor cumulative impact on locally occurring wildlife and wildlife habitats, as the project is proposed for an area typically used as rangeland. Implementation of the proposed project would not result in cumulative impacts on High Priority Habitats (HPH) because none exist in areas proposed for disturbance.

4.5 SOIL RESOURCES

4.5.1 Resource Description

The proposed Cinnamon 6-64 19-7 project area (including access road) includes Bresser-Truckton Sandy Loams, 8 to 25 percent slopes (18.531 acres).

4.5.2 Direct and Indirect Impacts

Implementation of the proposed project, including surface disturbing activities, could result in soil compaction, and increased erosion and sedimentation. Compaction of soils can lead to decreases in water and air absorption. Severe compaction can also lead to a conversion from aerobic to anaerobic soil conditions, thereby altering organisms in the soil and subsequently causing changes in soil nutrient cycling.

4.5.3 Cumulative Impacts

Implementation of the proposed project will have a negligible cumulative impact on soil resources in the area. Past, present, and reasonably foreseeable projects and activities in the area have likely resulted in similar impacts to soil resources.

4.6 PUBLIC WELFARE

4.6.1 Noise

Resource Description

The proposed project is located in Elbert County where agricultural operations and residential and commercial development has taken place. There are no RBU's within 2,000'. There are no high occupancy building units (HOBUs, not including school and daycares) within 5,280 feet of the proposed working pad surface. There are no schools or day care centers within 1 mile of the Location.

Direct and Indirect Impacts

Receptors to noise impacts will be the nearby Residential Building Units which are more than 2,000' from the location. Noise originating from pre-production operations should not increase the ambient noise in the surrounding area. The Operator plans on using the topography and installing berms on the north side of the wellpad to mitigate noise impacts.

Receptors to increased noise levels due to operations related to construction, drilling, completions and flowback are the nearby RBUs and wildlife. The typical primary noise sources generated by oil and gas drilling operations include the drilling rig engines, compressors, generators, mud pumps, shakers, and ancillary support equipment.

The maximum noise levels generated during oil and gas completions operations are produced from the truck mounted engines which drive the high-pressure pumps. Support equipment such as sand trucks, water pumps and generators have a small contribution to the over-all noise levels of the operations. Off-site fracturing noise levels typically do not vary greatly from operator to operator, but the off-site transmission of the noise can be affected by the surrounding topography of the fracture site.

Cumulative Impacts

Short term noise impacts will not have cumulative impacts to the surrounding receptors. Noise levels will decrease significantly once all wells have been completed and are in production.

4.6.2 Odor

Resource Description

There will be a temporary increase in odors during pre-production operations from equipment and traffic exhaust and fluid management during drilling and completions operations.

Receptors to an increase in odors are the nearby RBUs and wildlife.

Direct and Indirect Impacts

Implementation of the proposed project has the possibility of creating short-term and temporary changes to odors in the vicinity of the project. Such impacts would primarily occur during drilling and be associated with using oil-based mud and drill cuttings temporarily stored on the site.

Cumulative Impacts

Implementation of the proposed project would result in short-term and temporary odor impacts within the ½ mile CIAA. These impacts would not be uncommon to other similar oil and gas projects in the region and would likely be familiar to most people that live or work in the area.

4.6.3 Light

Resource Description

Proposed lighting to facilitate low-light working conditions will be exterior flood and spot type lighting. During drilling and completions operations, the proposed lighting will be temporary and be provided by portable light towers and lights permanently affixed to equipment (e.g., the drilling rig). The development of the project will require most of the work operations to be performed continuously (7-days a week & 24-hour a day). Proposed lighting will change for each work operation of each phase of the project. Lighting Best Management Practices (see Section V, below) will be used to minimize light pollution during all work operations of the proposed project. All lighting shall conform to Federal, State, and Industry recognized standards for both on-site workplace safety and off-site public and wildlife protection. Care will be taken to keep lighting levels at the specified levels on the lighting plans while providing safe, well-lit working areas. Care will also be taken to prevent unintended light from leaving the site and becoming a hazard or nuisance to the public or surrounding wildlife habitat.

Direct and Indirect Impacts

The greatest potential for light impacts would occur during the drilling and completions phases of the proposed project. Natural topography and berms will serve to shield RBUs from light sources during the drilling and completion phases of the project.

Cumulative Impacts

There would not be any long-term permanent light-related cumulative impacts associated with implementation of the proposed project. It is expected that the permanent lighting utilized during Production Operations will not exceed the maximum permissible light levels.

5.0 MINIMIZATION MEASURES

In § 34-60-106 (2.5), C.R.S., the COGCC defines “minimizing adverse impacts” as

“providing necessary and reasonable protections to reduce the extent, severity, significance, or duration of an unavoidable direct, indirect, and cumulative adverse impacts to public health, safety, welfare, the environment, or wildlife resources from oil and gas operations.”

Minimization measures reduce impacts to the greatest degree that is practical and can include operational and mechanical controls. GMT has committed to the minimization measures listed in the following sections. These are the same minimization measures presented in the Operations Plan that was submitted as an attachment to the Project’s Form 2A.

5.1 AIR QUALITY

- Measures associated with fugitive dust include:
- GMT will gravel all working surfaces and perform interim reclamation within six months of well drilling and completion.
- Utilize existing vegetation, trees slash or brush piles to cover disturbed areas not used for vehicle traffic.
- Application of fresh water to disturbed areas during construction and dry season.
- Applications of approved chemicals may be applied to areas not needed for traffic to form a less erodible soil.
- Operations will be confined to the location working surface.
- Continuous monitoring of disturbed areas to evaluate additional BMPs needed.

- Fresh water or magnesium chloride application to graveled surfaced of the Location and associated roads.
- Speed limit signs will be posted per surface owner agreement.
- Contractors will be notified of speed limits if no signs are posted.
- Regular road maintenance such as grading and adding additional gravel as needed.
- Remote technologies (for example, supervisory control and data acquisition (SCADA) will be used to monitor well operations. This will reduce emissions from vehicle traffic by reducing the number of vehicle trips to the site.
- Produced water storage tank emissions will be captured and routed to an emission control device that has at least 95 percent design destruction efficiency.
- Instrument air will be used to operate all pneumatic control valves on location.
- Tanks and vapor control systems will be designed and constructed in accordance with Air Quality Control Commission Regulation Number 7.
- A Leak Detection and Repair Program will be implemented. This will include monthly inspections using infrared cameras.
- There will be no emission-producing reserve pits.

5.2 PUBLIC HEALTH

- Remote technologies (for example, supervisory control and data acquisition (SCADA) will be used to monitor well operations. This will reduce emissions from vehicle traffic by reducing the number of vehicle trips to the site.

5.3 WATER RESOURCES

- A Stormwater Management Plan will be prepared. This plan will guide site-specific efforts to protect Waters of the State that could receive stormwater runoff from the proposed location.
- There will be no staging, refueling, or chemical storage areas in the vicinity of onsite water resources.
- Potential pollutants located onsite will be sealed, wrapped, or covered when not in use so as to eliminate or minimize contact with stormwater runoff.
- Proper storage, safe-handling, good housekeeping and spill prevention practices will be used to prevent pollutants from leaving the site.
- During construction, disturbed slopes may be covered with coconut blankets, straw mulch, or straw wattles and maintained for the life of the project or until slopes are stabilized and revegetated.
- With appropriate landowner authorization, baseline water quality samples will be collected from agency-approved water wells in the vicinity of the proposed oil and gas location.
- Proposed wells will be equipped with technology that will allow for automatic well shut-in in the event of an unplanned release.

5.4 TERRESTRIAL ECOSYSTEMS AND WILDLIFE RESOURCES

- Proposed production facilities will be consolidated and centralized as much as possible in an effort to minimize impact to wildlife habitats.
- Fugitive dust control measures will be implemented.
- Screens and other nesting barriers will be installed on stacks, heater treater openings, and fired vessels to prevent nesting by migratory bird species.

5.5 SOIL RESOURCES

- Topsoil and Stormwater Management Plans will be prepared for the proposed site and will include measures that will avoid and minimize impacts to soil resources. Some of these measures include the following:
 - Topsoil will be stripped from the disturbance area and will be stored onsite for future use.
 - Topsoil stockpiles will be protected from wind and water erosion.
 - Weed management practices will be used to prevent weed establishment on the topsoil stockpile.
 - Installation of coconut blankets, straw mulch, or straw wattles, sediment basins, swales, and perimeter ditches will be used to minimize erosion from disturbed areas.
 - Biweekly inspections by a third-party contractor of BMP integrity and effectiveness will be implemented. Deficiencies will be noted and submitted to the operator and addressed in a timely manner.
 - Construction activities will be curtailed during wet periods in an effort to avoid unnecessary soil disturbance.
 - All roads will be recontoured and revegetated to a stable condition, unless the landowner directs differently.
- Cut and fill areas will be regraded to match pre-project contours, to the extent possible.
- The topsoil stockpile will be graded to ensure all surface stability.
- Soils in areas associated with production operations or for subsequent drilling operations will be stabilized toward minimization of dust and erosion in these areas.
- A Spill Prevention, Control, and Countermeasure Plan will be prepared and implemented toward protecting soils from spills and releases.

5.6 PUBLIC WELFARE – NOISE, ODOR, AND LIGHT

Public Welfare

- Equipment, including welding trucks, will be equipped with fire extinguishers and spark arresters.
- Where public exposure to pipeline corridors is possible, warning signs will be installed to inform the public of the presence of the pipeline.
- Vehicle operators will be instructed to travel at low speeds and to stay on existing public roadways, project-related travel routes, and the well pad at all times.
- Vehicle trips to the location will be reduced through the use of technologies that allow for remote monitoring of the wells (for example, SCADA). Vehicle trips to the location will also be reduced via piping rather than trucking oil from location.

Noise

- Berms will be constructed to shield the location and help to mitigate noise.

Odor

- Drilling rig engine exhausts are pointed straight up so as not to be directed towards any occupied buildings.
- To mitigate the effects of odor from GMT's operations, GMT employs only International Association of Oil & Gas Producers (IOGP) Group III drilling base fluids with <0.5 weight % aromatics and will not use drilling fluids based on diesel. These Group III drilling fluids are odorless and contain no BTEX.
- Drilling mud chillers are used to keep drilling fluid temperatures low.

- Low drilling fluid temperatures reduce the volume of fluid vaporized into the air.
- All drilling fluids will be routed through a closed loop system.
- No open earthen pits to store fluids or drill cuttings.
- Drill piping is wiped down each time the drilling operation “trips” out of the hole.
- Drill cuttings are placed in metal bins and covered to minimize odors prior to being transported to the designated waste management facilities.

Light

- LED fixtures will be used, when feasible, toward reducing skyglow.
- Lighting on the well pad will be of sufficient intensity to allow for safe pre-production activities.
- Direct lights to drilling and completion tasks only.

6.0 MITIGATION MEASURES

COGCC defines “mitigating adverse impacts” as:

“measures that compensate for unavoidable direct, indirect, and cumulative adverse impacts and loss of such resources from oil and operations”.

Mitigation measures are used to offset the intensity or severity of impacts and can include compensatory actions and administrative controls. The following mitigation measures for resources based on the cumulative impact analysis described in this Plan will be implemented.

6.1 AIR QUALITY

Minimization measures described in the previous section will address potential impacts associated air resources in the CIAA. No additional mitigation measures for air quality are included.

6.2 PUBLIC HEALTH

HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the well pad location. No additional mitigation measures are required.

6.3 WATER RESOURCES

Minimization measures included in the site-specific SWMP combined with other measures listed in the previous section will address the potential for impacts to water resources in the CIAA. No other mitigation measures are required.

6.4 TERRESTRIAL ECOSYSTEMS AND WILDLIFE RESOURCES

- As part of final reclamation, all roads and pads will be recontoured and revegetated to a condition similar to pre-project conditions.
- For trenches, wildlife escape ramps will be installed every 0.25 mile.

6.5 SOIL RESOURCES

6.6 MINIMIZATION MEASURES DESCRIBED IN THE PREVIOUS SECTION WILL ADDRESS POTENTIAL FOR IMPACTS TO SOIL RESOURCES IN THE CIAA. NO OTHER MITIGATION MEASURES ARE REQUIRED. PUBLIC HEALTH – NOISE, ODOR, AND LIGHT

Noise

- Minimization measures described in the previous section will address potential impacts associated with noise in the CIAA. No additional measures for noise are included.

Odor

- Minimization measures described in the previous section will address potential impacts associated with odors in the CIAA. No additional mitigation measures for odors are included.

Light

- Minimization measures described in the previous section will address potential impacts associated with project lighting in the CIAA.