United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-CO-N050-2020-0024-EA

Caerus BJU M33 and G35 pads

July 2020

Estimated Lead Agency Total Costs Associated with Developing and Producing this EA: $78,000

U.S. Department of the Interior
Bureau of Land Management
Northwest District
White River Field Office
220 East Market St
Meeker, CO 81641

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1. INTRODUCTION

1.1. Identifying Information

Project Title: Caerus BJU M33 and G35 Well Pads

Legal Description: SWSW Sec 33 and SWNE Sec 35, T4S, R96W, 6th PM

Applicant: Caerus Piceance LLC

NEPA Document Number: DOI-BLM-CO-N050-2020-0024-EA

Lease/Casefile/Project Number: M33 COC65555 and COC65556
G35 COC61138 and COC69557
(Lease stipulations documented in Appendix B)

1.2. Background

Caerus Piceance LLC (hereafter, Caerus) has identified that they would like to begin expansion of two existing locations for the proposed wells on August 16, 2020 and construction activities would continue through approximately November 15, 2020.

M33 Pad
Caerus has submitted 16 APDs and plans to start reworking the Big Jimmy Unit (BJU) M33 pad after August 15, 2020. This pad is in the SWSW, Section 33, Township 4 South, Range 96 West, 6th PM in Garfield County, Colorado. This location is on private surface overlying Federal minerals. This existing location was constructed in 2007 and four wells (three Producing Gas Wells (PGW) and one well in Temporary Abandoned (TA) status) were drilled in November 2007. The current disturbance for the well pad and associated infrastructure (e.g., remote frac pad and access road) is approximately 5.74 acres. Expansion of the well pad to accommodate the 16 new wells, re-routing the access road, and installation of pipelines would add approximately 7.91 acres of new surface disturbance. This will result in a total of 13.65 acres of new disturbance since the entire pad location is being reworked, including boundary edges and pad elevation. The operator plans to begin drilling wells on the M33 pad in August 2021.

Caerus has said that drilling and completing the proposed 16 wells for this location would develop every Williams Fork location that they have booked on COC65556 (the surface location lease). As such, the BLM assumes that there would be no need for future wells on this lease at least in the foreseeable future.

G35 Pad
The operator has submitted 20 APDs for the G35. This pad is in the SWNE, Section 35, Township 4 South, Range 96 West, 6th PM in Garfield County, Colorado. This location is on private surface overlying Federal minerals. The G35 is an existing pad that was built in 2007. The pad currently has 2 PGW wells that were drilled in September 2007. The existing disturbance at the G35 pad and associated infrastructure (frac pad and access road) is 4.57 acres.

The proposed new additional surface disturbance for this pad location (including pad expansion, access road re-route, and pipelines) is projected to be 11.1 acres. This will result in a total of 15.67 acres of new disturbance since the entire pad location is being reworked, including boundary edges and pad elevation.

1.3. Purpose and Need for Action

The purpose of the action is to provide the applicant the opportunity to develop oil and gas resources consistent with their federal oil and gas lease. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 (MLA), as amended [30 USC 181 et seq.], the Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA) of 1987, and the Energy Policy Act (EPA) of 2005. The MLA authorizes the BLM to issue oil and gas leases for the exploration of oil and gas and permit the development of those leases. It is the policy of the BLM to make mineral resources available for leasing and to encourage development of mineral resources to meet national, regional, and local needs while protecting other natural resources. The existing lease is a binding legal contract that allows development of the mineral by the lessee.

1.4. Decision to be Made

Based on the analysis contained in this EA, the BLM will decide whether to approve or deny the proposed Applications for Permits to Drill and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA), the BLM must determine if there are any significant environmental impacts associated with the Proposed Action warranting further analysis in an Environmental Impact Statement (EIS). The Field Manager is the responsible officer who will decide one of the following:

- To approve the APDs with design features as submitted;
- To approve the APDs with additional mitigation added;
- To analyze the effects of the Proposed Action in an EIS; or
- To deny the APDs.

1.5. Conformance with the Land Use Plan

The Proposed Action is subject to and is in conformance (43 CFR 1610.5) with the following land use plan:

Land Use Plan: White River Record of Decision and Approved Resource Management Plan (ROD/RMP), as amended by the White River Field Office Oil and Gas Development Approved Resource Management Plan Amendment (RMPA) and the Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment

Land Use Plan Amendment: White River Field Office Oil and Gas Development Approved Resource Management Plan Amendment

> **Date Approved:** August 2015
>
> **Decision Language:** "Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values." (page 2-34)

"Manage BLM public lands, including the siting of public and private facilities through the issuance of applicable land use authorizations, in a manner that balances the needs of oil and gas development with the management for other resources values." (page 2-39)

Land Use Plan Amendment: Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment

Date Approved: September 2015

Objective MR-2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator or project proponent in developing an Application for Permit to Drill for the lease to avoid, minimize, and compensate for impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps guide development of such federal leases. (page 2-15)

MD MR-8: Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded. (page 2-15)

MD MR-9: In PHMA and within 4 miles of an active lek, develop lease or unit that would result in the fewest impacts possible to GRSG. (page 2-15)

MD MR-10: Prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during leking, nesting, and early brood-rearing (March 1 to July 15). (page 2-15)

MD MR-14: For future actions in ADH [All Designated Habitat], require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. (page 2-16)

2. PUBLIC INVOLVEMENT

The BLM uses a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to identify issues, concerns, and potential impacts that require detailed analysis. Scoping is both an internal and external process. Internal scoping was initiated when the project was presented to the White River Field Office (WRFO) interdisciplinary team on March 10, 2020. External scoping was conducted by posting this project on the WRFO's on-line National Environmental Policy Act (NEPA) register on April 15, 2020.

3. PROPOSED ACTION AND ALTERNATIVES

3.1. Proposed Action (Alternative A)

3.1.1. Project Components and General Schedule

M33 Well Pad

Caerus has submitted 16 APDs and plans to start reworking the Big Jimmy Unit (BJU) M33 pad after August 15, 2020. This location, and all surface disturbing aspects of this project, being on private surface overlying Federal minerals (Figures 1 and 2). The current existing disturbance, for the well pad and the proposed remote frac pad, is 5.70 acres. Existing access road re-route is at 0.04 acres. The proposed new surface disturbance for this location is projected to be 6.01 acres for the drilling pad and remote frac pad, 0.98 acres for the access road re-route, and 0.92 acres for the pipeline corridor. The total surface disturbance for the drilling pad, remote frac pad, production pad, access road and pipeline corridor would be 13.65 acres (Table 1). The surface disturbance for the production pad and access road, after interim reclamation is projected to be 3.21 acres.

The operator plans to begin drilling wells on the M33 pad in August 2021. The wells would be drilled in two pods of 8 wells each, a North pod and the South pod. The Caerus anticipates that they would drill the North pod first. The rig would then move to the South pod and begin drilling while completions activities begin on the North pod wells, resulting in Simultaneous Operations (SimOps). Water use for drilling, hydrostatic testing and dust control is estimated to be 14,000 bbls per well. Produced water would be recycled and used for completions activities. New proposed pipelines for this pad location consist of the following: one 12-inch steel, buried, pipeline (717 ft) for three-phase production gathering; one 12-inch steel, buried, pipeline (853') for frac/completions; one 12-inch steel, temporary surface pipeline for three-phase flowback; one <8-inch poly temporary surface high pressure pipeline for frac/stimulation completions, and one 12-inch" poly temporary surface water to pad pipeline (1,761 ft). The corridor for these pipelines is proposed to be 30 feet wide.

G35 Well Pad

Caerus has submitted 20 APDs for the G35 location (Figures 1 and 3). This location, and all surface disturbing aspects of this project, is on private surface overlying Federal minerals. The existing disturbance at the G35 pad is 4.44 acres for the well pad and frac/production pad, 0.13 acres for the access road re-route. The proposed new surface disturbance for this pad location is projected to be 8.61 acres for the drilling pad and frac/production pad, 0.65 acres for the access road re-route, and 1.84 acres for pipeline corridor. The total surface disturbance for the drilling pad, frac/production pad, access road and pipeline corridor would be 15.67 acres. The proposed well pad and production pad disturbance would be reclaimed back to 2.75 acres for those pads, and 0.65 acres for the access road for a total of 3.40 acres total disturbance after interim reclamation. (Table 1).

The wells would be drilled in three pods, two pods of 6 wells each and one pod of eight wells. Drilling is proposed to start on the north pod and then move south. Well completions would begin on the north pod after the rig has moved to the middle pod, resulting in SimOps for this location. Drilling of the wells on this location has been projected to not start until after the wells

on the M33 have all been drilled. Water use for drilling, hydrostatic testing and dust control is estimated to be 14,000 bbls per well. Produced water would be recycled and used for completions activities. New proposed pipelines for this pad location consist of the following: one 12-inch steel buried pipeline (692 ft) for three-phase production gathering; one 12-inch steel buried pipeline (497 ft) for frac/completions; one 12-inch steel temporary surface pipeline for three-phase flowback; one <8-inch poly temporary surface high pressure pipeline for frac/stimulation completions; and one 12-inch poly temporary surface water to pad pipeline (2,327 ft). The corridor for these pipelines is proposed to be 30 feet wide.

Table 1. Anticipated Surface Disturbance for the M33 Well Pad Location

Project Component	Disturbance During the Construction Phase (acres)	Disturbance During the Production Phase/After Interim Reclamation (acres)	Disturbance After Abandonment/Final Reclamation (acres)
M33 Well Pad Areas (with Maximum Extent of Disturbance)	11.71	2.10	0.0
Access Roads	1.02	1.11	0.0
Pipelines	0.92	0.0	0.0
Total	13.65	3.21	0.0

Table 2. Anticipated Surface Disturbance for the G35 Well Pad Location

Project Component	Disturbance During the Construction Phase (acres)	Disturbance During the Production Phase/After Interim Reclamation (acres)	Disturbance After Abandonment/Final Reclamation (acres)
G35 Well Pad Areas (with Maximum Extent of Disturbance)	13.05	2.75	0.0
Access Road	0.78	0.65	0.0
Pipelines	1.84	0.0	0.0
Total	15.67	3.40	0.0

3.1.2. Design Features Information

The entire Surface Use Plan of Operations (SUPO) is incorporated into the Proposed Action and is available for review at the WRFO. Key items relevant to the issues associated with the Proposed Action are listed in Appendix C.

3.1.3. WRFO Standard Conditions of Approval

The WRFO routinely requires a standard set of conditions of approval (COAs) that are applicable to most oil and gas development projects (most of these standard COAs are described in Appendix 2 of the Oil and Gas Development RMPA). Relevant COAs that were not already included in the SUPO are listed in Appendix D. Site-specific mitigation measures, if applicable, are identified as mitigation in the EA in each analysis section below (and compiled in Appendix E).

3.2. No Action Alternative (Alternative B)

The No Action Alternative constitutes denial of the APD(s) associated with the Proposed Action. Under the No Action Alternative, none of the proposed project components described in the Proposed Action would take place. However, the current 5.7 acres of habitat loss and operational disturbance (e.g., noise, human and vehicular traffic, work-overs, etc.) associated with the existing infrastructure on M33 (well pad, four wells, remote frac pad, and road) would continue for the life of the wells until final reclamation is achieved. Similarly, the current 4.57 acres of habitat loss and operational disturbance associated with the existing infrastructure on G35 (well pad, two wells, remote frac pad, and road) would continue for the life of the wells until final reclamation occurs.

3.3. Alternatives Considered but Eliminated from Detailed Analysis

No feasible alternative surface locations were identified for the proposed project that would result in less impacts than the proposed location.

4. ISSUES

The CEQ Regulations state that NEPA documents "must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1(b)). While many issues may arise during scoping, not all of the issues raised warrant analysis in an environmental assessment (EA). Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) if the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of the impacts. The following sections list the resources considered and the determination as to whether they require additional analysis.

4.1. Issues Analyzed

The following issues are analyzed in detail in this EA (Section 5):

Air Quality

1. How would emissions generated from the equipment used in the development and operations of the proposed project impact air quality? (Section 5.3.1)

Wildlife Habitat

2. How would construction of the M33 and G35 well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect habitat used by greater sage-grouse and migratory birds? (Section 5.4.1)

3. How would activity associated with construction, drilling, completions, and operation of the wells on the M33 and G35 well pads affect habitat used by nesting raptors? (Section 5.4.2)

4. How would construction of the M33 and G35 well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect big game seasonal ranges? (Section 5.4.3)

4.2. Issues Considered but not Analyzed

1. **How would surface disturbing activities, drilling, completion operations, and transportation of products affect vegetation and soil resources?**

   The proposed project is on private surface. Vegetation in the project area consists of sagebrush shrublands and mountain shrublands, while aspen woodlands are present farther down the sideslopes of the ridges. Native forbs and grasses dominate the understory in all vegetation communities present (WestWater 2019).

   The G35 pad is located on Northwater loam and the M33 is located on Parachute-Irigul complex (WestWater 2019). Neither site is classified as prime farmland, fragile soil, or affect steep slopes. An estimated 6.6 acres (G35 ~3.4 acres and M33 ~3.2 acres) of the proposed 30 acres of disturbance would remain disturbed during the life of the wells (approximately 30 years). The surface disturbing activities would result in a direct loss of woody and herbaceous vegetation. In addition to direct vegetation loss, the increased traffic and soil disturbance could potentially result in the introduction and establishment of noxious and/or invasive weeds. Without prompt establishment of desirable species from reseeding and continued weed control, noxious and/or invasive weeds would readily establish in the disturbed areas. All impacts to vegetation occur on private lands and would not impact public vegetation resources. Implementation of Caerus's drilling plan and SUPO (Appendix C Design Features numbers 1-11 and 14) along with the Standard Conditions of Approval (COA) in section D.8. Reclamation Procedures (Appendix D) would and help maintain the productivity, stability, and limit loss of topsoil from erosion until a desirable vegetative cover is re-established.

   Caerus's Design Features include the use, inspection, monitoring, and corrective actions of structural and non-structural controls to manage erosion, drainage, and sediment in and adjacent to disturbed areas. They also include measures that would help optimize the success of interim and final reclamation.

   Contamination of soils could occur from the unintentional releases of exploration and production liquids. Potential loss of soil productivity from contamination would be minimized with the implementation of Design Features numbers 3, 4, and 15 through 17 (Appendix C) and the and Colorado Oil and Gas Commission's (COGCC) 300, 600, 900, 1000, and 1100 Series Rules regulating oil and gas exploration and production wastes, including spill control, reporting, and cleanup. Any releases from construction, drilling,

completion, and operations would likely be small in nature and would be cleaned up immediately.

Implementation of the control measures, interim and final reclamation procedures would minimize the potential loss of topsoil until a self-sustaining diverse native vegetative community is re-established. Once this is achieved, it is likely soil and vegetative cover would return to pre-disturbance productivity levels.

2. How would construction, drilling, completion, operations and transportation of products affect surface water and groundwater?

The proposed project is not within mapped COGCCs Rule 317b public water system protection area. It is located on a ridgeline and the edge of disturbances are more than 500 feet from the nearest mapped intermittent stream and more than 3,500 feet from mapped perennial streams.

Potential impacts to surface water and groundwater from the development of the proposed project could result from sediment transportation and unintentional releases of chemicals or produced fluids during construction, drilling, completion, production, and transportation. The Design Features, Standard COAs, and COGCC Rules previously mentioned in the soil section would minimize potential impacts to surface water by controlling and containing the transportation of sediment and unintentional releases. These control measures would limit their dispersion into surface water or waterways.

Groundwater could be impacted by the infiltration of unintentional releases and when drilling operations penetrate freshwater zones, encounter a loss circulation zones. The COGCC 300, 600, 900, 1000, and 1100 Series Rules regulating oil and gas exploration and production wastes, including containment, spill control, reporting, and cleanup limit the potential for impacts to groundwater from infiltration from the surface. Surface casing is required to extend below all known or reasonably estimated freshwater levels. Standard COAs in Appendix D, section D.6. Waste; include the use of freshwater and water base muds during the drilling and setting of the surface casing. Caerus's SUPO (Appendix C Design Features numbers 3,4, 15-17) tank containment, containment lining, cuttings management, and tank contained completion flow back would limit potential for unintentional releases. Any spills from drilling and completion equipment would likely be small in nature and would be cleaned up immediately.

Water usage for each well is anticipated to be 248,000 barrels (~32 acre-feet); 14,000 barrels (1.8 acre-feet) would be freshwater and the remaining 234,000 barrels (30.2 acre-feet) would be recycled produced water. Total freshwater usage of proposed 36 well project would be 64.8 acre-feet and total recycled water would be 1,087 acre-feet. Water rights would not be affected by the proposed action. Freshwater used for construction and drilling would be obtained under Caerus's Industrial Rights.

No riparian areas or aquatic wildlife are located in the immediate project area. The water depletion for this action is covered under the Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006 TAILS 65413-2008-F-0073-R001) with the U.S. Fish and Wildlife Service (FWS) for water usage that could indirectly impact threatened and endangered fish species.

3. **How would the underlying fossil-bearing formation be impacted by construction activities associated with the M33 and G35 well pads?**

   Both the G35 and the M33 pads are situated on the Uinta Formation, which the BLM classifies as a Potential Fossil Yield Classification (PFYC) 5 formation for its very high potential to yield scientifically noteworthy fossils. Therefore, any excavations into the underlying rock formation has the potential to impact important fossil resources via crushing or displacement. Exposed fossils could be subject to collection or long-term erosion. Therefore, any excavations that may impact the underlying rock formation should be monitored by a permitted paleontologist to avoid or minimize such impacts (Appendix D, #7).

5. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1. General Setting & Access to the Project Area

The existing well pad locations are located in the south-central portion of the BLM White River Field Office area. The M33 well pad is at approximately 8,415 ft. elevation, and the G35 well pad is at approximately 8,188 ft. elevation. Both are on ridge tops with mixed mountain shrubs, including sagebrush, and scattered pockets of aspen trees.

Caerus intends to access the locations using the existing roads starting at Parachute, Colorado from the South: Garfield County (GarCo) Road 215 approximately 10.6 miles North to a private road, continuing North approximately 6.4 miles to the intersection with GarCo Road 401 and GarCo Road 403. Then continue West on GarCo Road 401 approximately 1.5 miles to the BJU G35 access road intersection. To get to the BJU M33 location, continue going west on GarCo Road 401 another 3 miles and then North on private access road to BJU M33 pad.

5.2. Cumulative Impacts

5.2.1. Cumulative Impacts Analysis Areas

The geographic extent of cumulative impacts varies by the type of resource and impact. The timeframes, or temporal boundaries, for those impacts may also vary by resource. Different spatial and temporal cumulative impact analysis areas (CIAAs) have been developed and are listed with their total acreage in Table 3.

Table 3. Cumulative Impact Analysis Areas by Resource

Resource	CIAA	Total CIAA Acreage	Temporal Boundary
Air	WRFO	~2.7 million acres	2½ years for construction, drilling, completions; 30 years operations
Greater Sage-Grouse Habitat	PHMA and GHMA in MZ 17, habitat affected within 4-mile buffered analysis area.	PHMA: ~32,200 acres (10% of total GRSG habitat in MZ 17)	Anticipated impacts associated with construction, drilling, and reclamation activities would be reduced once these activities cease.

		GHMA: ~22,000 acres (7%)	Reclamation of pipelines and interim reclamation (3-4 years) would return some foraging habitat while the wells are in production. Other impacts associated with habitat avoidance due to production activities or the loss of habitat on the well pad would remain for decades (assuming the wells are in production for 35 years) until the wells are plugged, the land reclaimed, and the shrub component is allowed to re-establish.
Raptor and Migratory Bird Habitat	Watershed subbasins Middle Fork Parachute Creek and Stewart Gluch	~49,550 acres	Anticipated impacts associated with avoidance of suitable habitat due to human activity during construction, drilling, and reclamation would be reduced once these activities cease.
Big Game Habitat	Summer Range in GMU 22	~ 82,400 acres	Anticipated impacts associated with construction, drilling, and reclamation activities would be reduced once these activities cease. Reclamation of pipelines and interim reclamation (3-4 years) would return some foraging habitat while the wells are in production. Other impacts associated with habitat avoidance due to production activities or the loss of habitat on the well pad would remain for decades (assuming the wells are in production for 35 years) until the wells are plugged, the land reclaimed, and the shrub component is allowed to re-establish.

5.2.2. Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects are defined in the CEQ regulations (40 CFR 1508.7) as "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

In 2015 the BLM published the Oil and Gas Development Proposed RMP Amendment/FEIS, which considered changes in the location, type, and level of oil and gas development within the resource area. Based on an updated 2007 RFD scenario, it is assumed that the majority of oil and gas development would occur within the Mesaverde Play Area (MPA; Piceance Basin) and consist of multi-well pads. The proposed amendment in the Proposed RMPA/FEIS considered drilling up to 15,040 wells from 1,100 well pads with an associated surface disturbance of 13,200 acres (Section 2.4.6, page 2-29 of the Proposed RMPA/FEIS). An estimated 12 acres per pad would be disturbed initially (including areas needed for associated infrastructure) however that would be reduced to 5 acres per pad following interim reclamation (see Table 4-2 of the Proposed RMPA/FEIS). Further, it was assumed there would be up to 790 miles of roads and 565 miles of utility lines (pipelines and power lines) developed to support this activity (see Table 4-3 of the Proposed RMPA/FEIS).

There are approximately 3,420 active wells (e.g., producing, shut-in, temporarily abandoned, injection, and drilling status) within the WRFO. The Colorado Oil and Gas Conservation Commission (COGCC) online database indicates 88 wells have been spud since January 2019.

For the M33 location, estimates of surface disturbance within the lease (COC65556 at the surface location) that are most likely attributed to oil and gas activities equal approximately 23 acres. This area represents 3.6 percent of the total area of the lease, which is approximately 640 acres in size. There are approximately 25 acres of pipeline corridors within this lease. These acres are considered reclaimed and not counted as disturbance. Producing well density in the project area equals 4 producing well per square mile, while road density in the project area equals approximately 2.16 miles of road per square mile.

For the G35 location, estimates of surface disturbance within the lease (COC61138 at the surface location) that are most likely attributed to oil and gas activities equal approximately 15 acres. This area represents 2.3 percent of the total area of the lease, which is approximately 640 acres in size. There are approximately 10 acres of pipeline corridors within this lease. These acres are considered reclaimed and not counted as disturbance. Producing well density in the project area equals 4 producing well per square mile, while road density in the project area equals approximately 2.15 miles of road per square mile.

This project is located within the 598,600-acre MPA, where it was assumed that full-field development would include a total of 972 well pads and require two to three pads per section.

Other past, present, and reasonably foreseeable actions in the project area include livestock grazing and associated range improvement projects, vegetation treatments, and both wildfires and prescribed burns. Other mineral development within the area includes oil shale research tracts. Recreation use is characterized by dispersed camping, OHV use, and hunting.

5.3. Air Quality

5.3.1. How would emissions generated from the equipment used in the development and operations of the proposed project impact to air quality?

Affected Environment

The proposed wells are in the northwest portion of Garfield County, Colorado on private surface in an area that meets the National Ambient Air Quality Standards (NAAQS) for Criteria Pollutants. They are situated a straight-line distance of 15 miles north of Parachute, Colorado on ridgelines with an average elevation of roughly 8,300 feet. No private residences are within two miles of the proposed wells.

There are approximately 3,420 active wells (e.g., producing, shut-in, temporarily abandoned, injection, and drilling status) within the WRFO. The Colorado Oil and Gas Conservation Commission (COGCC) online database indicates 88 wells have been spud since January 2019.

Oil and gas development activity in the vicinity of the proposed well is relatively high. According to the COGCC database, there are 352 active and 7 plugged/drilled and abandoned wells within a two-mile radius (an area representing approximately 13,500 acres) of the proposed pads. Forty eight of the 352 active wells were spud since January 2019. Approximately 8 percent (~1,030 acres) of the area within the two mile-radius is federal surface and 65 percent (~8,800 acres) is federal oil and gas mineral estate. Included in the area is a portion of the Big Jimmy Federal Oil and Gas Exploratory Unit COC74105X (19,288 acres). The proposed wells would be in-fill wells for COC74105X. Table 4 is a summary of the oil and gas mineral ownership and active wells within the two-mile radius area.

Table 4. Oil and Gas Mineral Ownership and Active Wells Within the Two-Mile Radius Area.

Oil and Gas Mineral Ownership	Unit	Acres Within 2-Mile Radius	Percent of 2-Mile Radius Area	Active Wells[1]	Producing Wells
Federal	COC74105X	6,750	50%	269	212
	Non Unit Leased	2,000	15%	4	4
Non Federal	Non Unit Private	4,750	35%	82	57
	Total	13,500	100%	355	273

[1] COGCC Active: producing, shut-in, temporarily abandoned, injection, and drilling

In accordance with Section V of BLM Colorado's Comprehensive Air Resource Protection Protocol (CARPP), the BLM Colorado State Office Air Resource Specialists prepared the 2018 Annual Report as a comprehensive assessment tool to assist in the preparation of project level NEPA for oil and gas development projects. The 2018 Annual Report provides up to date information on oil and gas development (current regulations, rates for drilling and production, emissions inventories, etc.) and the state of the atmosphere (air pollutant concentration trends, air quality related values, etc.) for each applicable Colorado Field Office or Planning Area. The report also places this information in the context of the Colorado Air Resource Management Modeling Study (CARMMS 2.0), which provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado out to year 2025.

The 2018 Annual Report is a web-based, dynamic, data-driven document that allows BLM Colorado to convey a vast amount of information in a relatively compact and reusable framework. Consistent with CEQ regulation 40 CFR 1502.21, Incorporation by Reference, and

mandates to reduce paperwork, the data from the 2018 Annual Report for the White River Field Office is incorporated by reference in this analysis to describe the affected environment and cumulative impacts analysis associated with the proposed or preferred action. All of the documents described above are available to the public on BLM Colorado's website at: https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado.

Alternative A (Proposed Action) – Direct and Indirect Effects

In general, Alternative A would have a temporary impact on air quality, which would mostly occur during construction, drilling, completion, and the initial production years of the well before well yields decline (production declines in excess of 50 percent during the first three years are typical). Use of the access roads, pipeline construction, disturbed well pad areas, and development activities such as drilling, hydraulic fracturing, well completion, and equipment installation would all impact air quality through the generation of dust related to worker travel, materials transport, and general construction. This phase would also produce short-term emissions of criteria, hazardous, and greenhouse gas pollutants from vehicle and construction equipment exhausts. Once drilling and completion are complete, the daily activities at the site would be reduced to operational and maintenance checks and product load-out and hauling, which initially may occur as frequently as multiple daily visits (prior to declining production). Emissions from these activities would include vehicle and compression or artificial lift pump exhaust, fugitive emissions of production related gases from infrastructure components, pneumatic devices that use the gas's kinetic energy to operate, and liquid product load-out. Methane is the primary component for the majority of the various gas streams, although at some points in the process the fraction of volatile organic compounds and hazardous air pollutants may be elevated compared to the sales gas fractions.

A detailed emissions inventory for the Proposed Action was prepared in accordance with section III.B of BLM Colorado's CARPP. The inventory was developed using the BLM CO Emissions Tool and supplemented with a proposed drilling and development timeline. The inventories include emissions from construction, drilling, completion, and production related activities and is the best available information. Table 5 contains the cumulative estimated criteria and hazardous air pollutant emissions (Particulate Matter ($PM_{2.5}$, PM_{10}), Volatile Organic Carbon (VOC), Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulfur Oxides (SO_x), Hazardous Air Pollutants (HAPs)) which could occur from the project's 25 year life.

Table 5. Estimated Life of Project Emissions – (tons)

No. Well Pads	No. Wells	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_X	HAPs
2	36	80.7	27.4	113.1	391	302	8.5	27.58

A quantitative analysis of the potential impacts from Alternative A was produced using a screening level gridded near-field assessment tool based on the results of the CARMMS 2.0. This data is useful for determining the relative contribution of federal oil and gas emissions to the cumulative concentrations modelled within the grid cells. In addition to data specific to the project location, the tool also retrieves data for the modelled grid cell (any grid cell) from each CARMMS 2.0 scenario with the closest emissions greater than the project-specific emissions. The scenario with the lowest modelled impacts is used to represent the "project only" modelled emissions (i.e., it is the one least influenced by neighboring grid cells, where higher neighboring emissions would influence adjacent cell concentrations beyond a project specific source estimate) and is used to determine what the project's contributions to the site-specific

concentrations would actually be. There are a variety of factors that can affect the overall accuracy of this approach for describing project-related impacts. However, as a screening assessment there is a high degree of conservatism in using cumulative projected domain-specific data to analyze project impacts (so long as the emissions are fully accounted for). As a first-tier approach for analysis this method provides a fast and reliable way to allocate CARMMS 2.0 gridded emissions and impacts for project tracking assessments at the near-field scale.

A quantitative analysis of the potential impacts from the increased emissions that would result from Federal mineral development was completed using the screening level assessment tool.

The gridded emissions near-field assessment tool was run for the maximum emissions project year (for both NO_X and VOC - 2121). The results from the CARMMS 2.0 modeling domain produced spatially allocated emissions (i.e., the maximum grid cell) in excess of the project emissions for each pollutant analyzed. Table 6 shows the maximum expected modelled concentration in the modeling domain for each year and pollutant analyzed. All concentrations are shown in the form of the NAAQS standards. The $PM_{2.5}$ values represent the daily (24 hour) and annual standards respectively. The CARMMS 2.0 modeling domain predicted no modeled exceedances for any of the NAAQS pollutants analyzed.

Table 6. Gridded Domain Model Impacts

Pollutant (units)	Low CARMMS 2.0 Model Concentration[1]	Percent NAAQS[2]	2021 Project Contributions[3]	SIL[4]
NO2 1 hour (ppb)	34.3	34%	13.56	4
O3 8 hour (ppb)	64.2	92%	1.23	1
PM10 (µg/m3)	8.6	6%	0.47	5
PM2.5 24 hour (µg/m3)	3.9	11%	0.43	1.2
PM2.5 Annual (µg/m3)	2.6	31%	0.23	0.2

[1] Ambient concentration based on the full cumulative model (cleanest background)

[2] The percent of the NAAQS the full cumulative model results represent

[3] The project emissions contributions to the cumulative ambient concentrations

[4] Significant Model Impact Levels (SIL) defined by CDPHE and EPA, to be referenced if NAAQS is exceeded

Climate Change Analysis

No analysis tools exist to describe the project's incremental contributions to the global phenomenon of climate change in terms of potential warming, drought, sea level rise or other common environmental metrics associated with increasing concentrations of atmospheric greenhouse gases. The problem is by nature a cumulative issue, and any downscaling of the projected global climate changes effects to project scales (based on emissions scaling) does not provide meaningful analysis due to the fact that no significance levels have been defined. As identified in the emissions inventory (below) the project would emit greenhouses gases and would thus contribute to the accumulation of atmospheric greenhouse gases, and potential climate change effects if future year global emissions and impacts are consistent with any of the scenarios analyzed by IPCC contributing scientists.

The wells would remain in production for approximately 25 years. Over that time the conservative estimated sum of the total oil and gas produced would equal approximately 9.4 times the initial first year maximum production volumes. This estimate is based on empirical data of Denver-Julesburg Basin well production rates tracked over varying service periods, and the operator's experience in the basin for how these wells might produce during the first year

(where production is typically the highest). The greenhouse gas (GHG) estimates assume that all of the oil and gas production is eventually combusted in one form or another (the exact nature and/or configuration and location of that combustion apparatus is unknown and not reasonably foreseeable). Table 7 summarizes the estimated total project GHG emissions attributable to development.

Table 7. Project GHG Emissions (tons)

Sub-activity	CO_2	CH_4 (CO_2e)	N_2O (CO_2e)	Total CO_2e
Subtotal – Development[1]	284,900	116,300	156,900	558,100
Subtotal – Downstream[2]	3,479,800	846,200	926,000	5,252,000
Total Emissions	3,764,700	962,500	1,082,900	5,810,100

[1] Construction, drilling, operations, and completion related emissions as CO_2e

[2] Oil and Gas production (cumulative)

Alternative B (No Action Alternative) – Direct and Indirect Effects

Under the No Action Alternative, the BLM would not authorize any of the Proposed Action elements and there would be no additional direct or indirect impacts to air quality or climate change beyond that associated with the operation of the existing infrastructure on each pad. Such air quality impacts would continue for the life of the existing wells until final reclamation has been completed.

Cumulative Impacts

As previously mentioned, the Colorado State Office Air Resource Specialists prepared the 2018 Annual Report as a comprehensive assessment tool to assist in the preparation of project level NEPA for oil and gas development projects. The 2018 Annual Report provides up to date information on oil and gas development (current regulations, rates for drilling and production, emissions inventories, etc.) and the state of the atmosphere (air pollutant concentration trends, air quality related values, etc.) for each applicable Colorado Field Office or Planning Area. The report also places this information in the context of the CARMMS 2.0, which provides cumulative analyses for multiple projected oil and gas development scenarios in Colorado out to year 2025. The proposed project would fall within the low CARMMS 2.0 scenario for the WRFO.

The BLM expects oil and gas development to remain on the current track (i.e., tracking low relative to CARMMS 2.0) for the foreseeable future in Colorado. There are currently no foreseeable significant shifts in petroleum market dynamics (supply, demand, etc.), changes or advancements in development / recovery technologies, newly discovered resources / plays, or political influences (tax or regulatory incentives) that would significantly affect the rates of development occurring in Colorado.

Given the low Federal development that has occurred over the monitoring period, it is reasonable to conclude that the WRFO is meeting the air quality goals and objectives defined for oil and gas development within its RMP. Overall development is tracking well below the levels analyzed under the low CARMMS 2.0 scenario. The CARMMS 2.0 data shows that the projected development in WRFO is not likely to have significant impacts on the NAAQS or visibility at nearby Class I areas.

Climate Change Analysis
Mineral production and development of the Proposed Action is estimated to contribute a maximum of 5.8 million tons of carbon dioxide equivalent (CO_2e) over the 25 year estimated project's life, approximately 9.4 percent of BLM Colorado's 2018 annual downstream emissions, and just 0.16 percent of the 2018 annual U.S. total downstream GHG emissions (2018 Annual Report Table 6-1). If compared on the same temporal scale (i.e., annually) the project would contribute far less towards the compared GHG metrics and would rapidly decline as the project ages.

5.4. Wildlife Habitat

5.4.1. How would construction of the M33 and G35 well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect habitat used by greater sage-grouse and migratory birds?

Affected Environment

The proposed action would be located in the Piceance-Parachute-Roan (PPR) greater sage-grouse priority habitat management area (PHMA), Management Zone 17. PHMA are areas identified by the BLM in coordination with Colorado Parks and Wildlife (CPW) as possessing the highest conservation value in maintaining sustainable sage-grouse populations and include breeding, late brood-rearing, and winter concentration areas. Sage-grouse occupy shrub habitats on ridges, plateaus, and upper ends of drainages from 7,000 to 8,700 feet in elevation and occupied ridges and plateaus are naturally fragmented by steep drainages and cliffs (CGSSC 2008). Active leks in the PPR are typically small, ranging from 1 to 33 males, with annual total high counts of males from all PPR leks counted ranging from 77 to 250 males from 2005 to 2017 (CPW,unpublished data)(Shyvers 2018). Overall, this population had been over the 50th quartile for the 30-year median, but is now declining, as reported by CPW in February 2020 during the annual meeting with BLM and the U.S. Fish and Wildlife Service (FWS).

To determine the CIAA (Section 5.2.1, Table 3), a 4-mile buffer around active leks within a 4-mile radius of the proposed action was used to identify associated nesting habitat (NWCO GRSG RMPA, p. E-3). A review of existing studies on conservation buffer distances was generated by the United States Geological Survey (USGS) for the BLM in 2014 infers that 75 to 95 percent of a local population's habitat utilization falls within 3.1 miles of a lek (Mainer et al. 2014):

> "Holloran and Anderson (2005) found that 64 percent of nests in Wyoming occurred within 5 km (3.1 mi) of leks, suggesting considerable protection of sage-grouse within these proximate habitats. More recent analyses have indicated that 90–95 percent of habitat use at the population level was focused within approximately 8 km (5 mi) of several California and Nevada lek sites (Coates and others, 2013), and 95 percent of all nests were located within approximately 5 km (3.1 mi) of leks."

The proposed well pads would be in PHMA, where there are seven active and six inactive leks within 4 miles of the proposed well locations; according to CPW's 3-year average data in 2017, these leks represent an estimated 12.5 percent of the PPR population (CPW 2017, 2020). The M33 pad is along the Divide Road and is between the two prominent complexes of leks in the

Barnes Ridge group; the nearest lek is 1 mile west of the pad and the most attended lek in the PPR population is 1.85 miles west of the pad, both part of an important lek complex and surrounded by high quality, year-round habitat. The G35 is located 2.1 miles east of the nearest active lek and is shielded by intermittent terrain. Due to the parallel ridge and valley terrain of the project area, intervening terrain provides a degree of visual and aural isolation from those leks. Based on recent seasonal habitat modeling (Walker et al. 2015) the CIAA would likely be used for sage-grouse nesting, brood-rearing, and wintering habitat, with sagebrush and sagebrush-grassland habitats at intermediate elevations used during breeding and winter and higher elevations of more diverse sagebrush habitats used during summer and fall. During 2019 surveys, WestWater biologists walked pedestrian surveys across all suitable greater sage-grouse habitat on the ridge top within both project areas; no sage-grouse sign (i.e., fecal pellets, caecal pellets, feathers, etc.) or birds were observed (WestWater 2019).

Sagebrush, mountain shrub, and aspen habitats in the project area are likely also used by migratory birds as nesting habitat largely during the months of May through July, including a number of species warranting higher conservation interest that include Brewer's sparrow (BLM sensitive species), Cassin's finch, and Lewis' woodpecker.

Alternative A (Proposed Action) – Direct and Indirect Effects

Potential impacts associated with oil and gas development were analyzed in the 2015 Northwest Colorado Greater Sage-Grouse Proposed Land Use Plan Amendment and Final Environmental Impact Statement, to which this EA is tiered. The 2015 Sage-Grouse FEIS (pages 4-89 to 4-97) discussed potential impacts to greater sage-grouse from development of leased fluid minerals, including direct habitat loss, habitat fragmentation and alteration, and indirect habitat loss and avoidance; that analysis is incorporated by reference.

In regard to site-specific impacts, the G35 and M33 well pads, completion pads, access roads, and pipelines would require up to about 30 acres of surface disturbance in PHMA. All surface disturbance associated with the proposed action would be located on privately owned surface. There are seven active and six inactive leks within 4 miles of the proposed well locations. The nearest active lek is 1 mile to the west of the M33 location along the Divide Road. The G35 is located 2.1 miles east of the nearest active lek and is shielded by intermittent terrain. Tracked by BLM in SDARTT (Surface Disturbance and Reclamation Tracking Tool), existing disturbance in the 314,800-acre management zone is 1.51 percent of the 3 percent disturbance cap and the density of facilities is calculated as 0.71 per 640 acres of the goal of one facility per section of PHMA (BLM 2020).

A multiscale assessment of factors associated with lek abandonment between 1965 and 2007 found that the level of the human footprint within 5 km (3.1 mi) of the lek was negatively associated with lek persistence (Knick and Hanser 2011) and the Colorado Greater Sage-grouse Steering Committee (2008) recommended a 6.4 km (4 mi) circular buffer. Gregory and Beck (2014) documented lek attendance decline when energy development averaged 0.7 well pads/km^2 (1.81 well pads/sq mile) across multiple populations and different development patterns. Holloran et al. (2010) demonstrated that yearling males reared near natural-gas fields had a lower survival rate and were less likely to establish a breeding territory compared to males reared in areas with limited activities associated with natural-gas fields and the yearling female population generally avoided nesting within 950 m (0.6 miles) of the infrastructure of natural-gas

fields. All of these responses represent indirect effects that contribute to habitat loss. The pattern and density of development varies widely among these studies, but the implications have remained consistent, oil and gas development activity and its infrastructure impact sage-grouse behavior at distances up to 4 miles, prompting declines in lek persistence and male attendance, yearling and adult hen survival, and nest initiation rates and eliciting strong avoidance response in yearling age classes, nesting/brooding hens, and wintering birds.

Noise generated by oil and gas development and production activity has been found to prompt declines in lek attendance and use of nesting habitat. Recent studies suggest that loud noises transmitted at decibels (70 dB at the source and 40 dB at 100 m) to approximate a noise source 400 m (1,300 ft) from leks caused decrease lek activity. These noises attenuate with distance and have been found to decline to levels generally accepted as noise management objectives for sage-grouse lek and nesting habitats (i.e., <10 dB over ambient) 0.75 to 1.5 miles from the source (Blickley et al. 2012, Patricelli et al. 2012). Additionally, COAs based on COGCC Rules 604 c.(2)A for drilling and 802 for rural development designed to restrict noise generated to <70 dB while drilling and 55 dB during long-term production would lessen residual impacts to nesting and brood-rearing habitat associated within 0.6 miles of the well pads. Applying COAs for the restriction of permanent noise generating equipment on the well location will further reduce the overall long-term impacts to nesting and brood-rearing habitats surrounding the project area.

Starting in 2019, Caerus has actively been monitoring sound generated during various stages of drilling and completions from two previously permitted Federal well pads and determined that completion activities are the loudest phase of the process. Caerus collected data 350 ft from the sound source, from the four cardinal directions, in 15 minute increments; BLM staff then averaged the maximum decibels recorded from each well in each direction, generating a maximum average value of 55-63 dB (Summit 2019, 2020), which consistently falls below the COGCC <70 dB limit. Though monitoring indicates that sound levels are within required levels and would attenuate to <10 dB over background at the nearest lek, the issue was discussed during the on-site inspection for the M33 location and it was deemed unfeasible by engineering and constrained by topography to move the completions pad/activities further from the lek and sheltered in an adjacent drainage. It was determined that the completions pad could be sunk down in the slope and excess berm material moved to the ‘fill-side’, to further block and absorb sound, and straw bales or sound walls could be deployed to further buffer sound if needed. Noise generated on the M33 pad by drilling and completion activities with the additional buffering should dissipate to approximately 31-39 dB (https://www.omnicalculator.com) to near background (typically 35-40 dB) at the nearest lek (1 mile). A timing limitation (GRSG-TL-46e), from March 1 through July 15, during lekking, nesting, and early brood-rearing applied to construction, drilling, and completion activities would also minimize disturbance while bird are moving through these more sensitive life-cycle phases.

Drilling and completion activities would impact approximately 400 acres of habitat (within 1,300 feet of both of the well pads) (Blickley et al. 2012). Once the wells are in production and vehicle visits to the well pads are reduced, sage-grouse would likely avoid the infrastructure by 0.6 mile (Holloran et al. 2010), an indicated area of about 1,800 acres (representing 3.3 percent of PHMA within the 55,400-acre CIAA). Interim reclamation of both well pads would return about 23 acres to a grass/forb mix and would be capable of serving as a source of herbaceous forage once that vegetation becomes established.

Additionally, Caerus has a Wildlife Mitigation Plan (WMP) with CPW that contains mitigation measures that were designed to reduce impact to wildlife (including sage-grouse); the following COAs from this plan are considered as design features:

- Site new disturbance so as to use topographic features to shield leks from new disturbance whenever feasible.
- Restrict new disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1.
- Restrict well site visitation in occupied habitat to between 9 AM and 4 PM during lekking season (March 15 to May 15).
- Use interim-reclamation to redevelop ground cover that provides for secure ground movements of sage-grouse and is an effective precursor to the reestablishment of appropriate sagebrush cover.
- Implement three-phase gathering systems to reduce onsite facilities and increase acreage put into interim-reclamation.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action Alternative would not result in the additional impacts associated with the Proposed Action and therefore would not result in any additional loss to available greater sage-grouse habitat above that which has already occurred due to the existing development at each well pad. Sage-grouse and migratory bird avoidance due to disturbing activities at each well pad would continue as described above, commensurate with the level of operations conducted during the life of the existing developments at each well pad. To allow development of the lease, the BLM would still likely evaluate other well pad (APDs) locations in the future that would have similar impacts to the other alternatives.

Cumulative Impacts

The 2015 Sage-Grouse FEIS (Chapter 5, Section 5.4) also discussed potential cumulative impacts to greater sage-grouse across Management Zone II/VII (which includes not only northwest Colorado but also portions of Utah and Wyoming); that analysis is incorporated by reference in its entirety. The 2015 Sage-Grouse FEIS concluded that "The cumulative effect of the conservation measures in the Proposed LUPA would protect GRSG populations. In some localized areas, small populations may be at continued risk due to the cumulative effect of reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, or West Nile virus outbreaks. However, the LUPA area-wide restrictions on land use, in combination with project-specific BMPs and RDFs and other regional efforts, would achieve an overall net conservation for the regional population and would help mitigate the effects on small, at-risk populations." (page 5-70).

In regard to local conditions, a recent study conducted by CPW concludes that the total footprint of energy development has more than doubled within PPR occupied range from 2005 to 2015, most before 2009, resulting in approximately 2.85 percent disturbance of PHMA in MZ 17

(Walker, et. al, 2020). The discrepancy with the BLM's disturbance calculation is reasoned to be incomplete mapping, the exclusion of reclaimed infrastructure from BLM's calculation, the use of different criteria and the interpretation of reclamation status. "Three land cover classes most affected by energy infrastructure were also those strongly selected by Greater Sage-grouse (GrSG). Topographic constraints appear to concentrate energy infrastructure in areas with gentler topography that also have the highest GrSG use. Together, these patterns suggest that future energy development will cause substantial additional loss and modification of GrSG habitat in the PPR" (Walker, et. al, 2020).

Per BLM SDARTT, greater sage-grouse Management Zone (MZ 17) currently has an anthropomorphic disturbance of 1.51 percent of the three percent disturbance cap and an average energy facility density of 0.71 per 640 acres (BLM 2020). Development of the G35 and M33 well pads would contribute approximately 30 acres to cumulative direct habitat loss (associated with surface disturbance) to the existing 1.51 percent (~500 acres of PHMA) overall in Management Zone 17. Long-term avoidance by sage-grouse of these well pads may extend out to an area of approximately 1,800 acres while these wells are in production (30+ years) and it is expected that development would continue into the future until the leases and Big Jimmy Unit reach full development.

Mitigation Measures and Residual Impacts

Mitigation measures #2-4 in Appendix E would help to minimize impacts on greater sage-grouse lekking, nesting, and early brood-rearing activities. To reduce disturbing and disruptive activities during the period of animal occupation, the BLM would implement a timing limitation from March 1 through July 15 for construction, drilling, and completion activities. Noise levels would be restricted to 70 decibels or less measured 350 feet (4 feet above ground level) from the source during drilling and completion activities and restricted to 55 decibels long term, once the wells are in production to reduce disturbance to greater sage-grouse.

Mitigation Measure # 7 in Appendix E requires the operator to provide the BLM, via sundry notice (form 3160-5), an estimated cost to fully reclaim the proposed well location. This estimate will be used to assess the overall cost the BLM would incur to complete the reclamation of the well if the operator is no longer viable**.** The operator's bond will be increased to cover this overall cost for future reclamation of the well site in accordance with Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment (ROD/RMPA).

Additionally, interim reclamation with native seed and control of invasive weed species that would return some habitat to the benefit of foraging birds and final reclamation would ultimately return cover for nesting (as required by COA in Appendix D, Section D8 and Appendix E #1).

5.4.2. How would activity associated with construction, drilling, completions, and operation of the wells on the M33 and G35 well pads affect habitat used by nesting raptors?

Affected Environment

The G35 well pad is located on a ridge top just south of the Piceance Creek-Parachute Creek divide above the headwaters of the Middle Fork of Parachute Creek. The M33 pad is in between

the headwaters of the East Fork and Middle Fork of Stewart Gulch. The elevation at the project area is approximately 8,200-8,400 feet. Both drainages consist of approximately 49,550 acres of a variety of vegetation types that provide habitat for nesting and foraging raptors, including aspen stands at the higher elevations and converting to pinyon-juniper woodlands down drainage. Historic BLM records have documented 17 raptor nests along the Stewart Gulch drainage (on primarily BLM surface) and none within the Middle Fork Parachute Creek, though this is likely a data gap due to most of the landownership being private.

Survey of approximately 52 acres of suitable woodland raptor nesting habitat of mature aspen woodlands and oakbrush shrublands located two raptor nests within the 0.25-mile raptor survey area: an occupied long-eared owl nest and an unoccupied Cooper's Hawk nest (WestWater 2019). Mature aspen woodlands within the area provide poor to good quality raptor nesting habitat. In most aspen stands, many of the trees were dead with some re-sprouting occurring.

Several additional species of raptors may potentially inhabit the region; common species include Cooper's hawk, great horned owl, long-eared owl, northern harrier falcon, red-tailed hawk, and sharp-shinned hawk, flammulated owl (a Bird of Conservation Concern), and northern goshawk (a BLM sensitive species). These raptors generally initiate nesting in April. Nestlings are fledged and generally independent of the nest and associated nest habitat by late July or early August.

Alternative A (Proposed Action) – Direct and Indirect Effects

While the footprint of individual oil and gas wells is minimal relative to other energy developments (e.g., mining), the total habitat lost to the network of wells and connecting roads can be considerable in areas undergoing full-field development (Postovit and Postovit 1989). The potential for oil and gas-related disturbance of nesting, foraging, or roosting raptors arises not only from road and well pad construction, drilling, and equipment installation, but also from continual servicing and maintenance of wells over their productive lifetime (BLM TN 433). Recommendations concerning temporal buffers suggest that nesting areas should be protected from the time of adult arrival through at least the first few weeks after hatch (Suter and Joness 1981, Romin and Muck 2002). Evidence suggests that nesting raptors may be less sensitive to disturbance after hatching (White and Thurow 1985).

Development of the proposed locations would not directly remove raptor nest habitat. An adjacent aspen grove supports an established long-eared owl and is located down-slope from the proposed action, where forest provides some visual and audial screening. Field development and associated infrastructure, as well as well-maintained access, have been in place for several years and continued use during the summer months for construction and well development are not likely to alter nest conditions or status, especially late in the nesting sequence. Raptors and the majority of other birds in the United States are protected by the Migratory Bird Treaty Act (MBTA). Removing or destroying active nests (i.e., nests that contain eggs or young) or causing abandonment of an active nest with intent could constitute a violation of the MBTA.

Impacts to raptors and migratory bird species can be minimized if surface disturbing and disruptive activities take place outside the nesting season. Timing limitations are intended to prevent disruption of ongoing nest efforts, including development-induced absences of the adult birds sufficient to jeopardize egg or nestling survival from malnourishment, exposure, or predation. Nesting season is generally considered to occur from April 1 to August 1 in this area;

impacts to nesting raptors and migratory bird species would be somewhat mitigated by implementing a timing restriction from February 1 through August 1 (WR-TL-15) on surface disturbing and disruptive activities within 0.25 miles of an active raptor nest.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action alternative would have no additional impacts on the available raptor habitat, but disruptive activity associated with the existing development on each pad would still occur and potentially affect nesting raptors in the manner described above. To allow development of the lease, the BLM would still likely evaluate other well pad (APDs) locations in the future that would have similar impacts to the other alternatives.

Cumulative Impacts

There are 17 natural gas well pads, as well as ancillary facilities for compression of gas and water handling (and associated access roads) within the Steward Gulch and Middle Fork Parachute Creek drainages. The approximate 30-acre Proposed Action would contribute to cumulative forms of habitat loss, fragmentation, and disruptive activities. However, there are more than 49,000 acres of available habitat adjacent to the project areas. The Proposed Action would not impact the overall suitability of the habitat in the CIAA.

Mitigation Measures and Residual Impacts

A biological survey located an active nest near the G35 pad and the following mitigation would apply a timing limitation from February 1 through August 1, as a COA (Appendix E #5): "Surface-disturbing and disruptive activities will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest. A survey for nest status would be required before construction, drilling, or completions can proceed. If activities begin outside this window and the nest becomes active (e.g., drilling begins in Dec or Jan) the timing limitation would not be applied. The Authorized Officer may also grant an exception if the nest is unattended or remains unoccupied by May 15 of the project year." The survey did not locate any active raptor nests near the M33 pad, so an exception to the timing limitation is granted while the current survey is valid.

Raptor surveys for both M33 and G35 are valid until June 1, 2021, at which time WR-TL-15 would either be applied to surface disturbing or disruptive activities or re-survey of sites concludes there are no active raptor nests in the project area.

5.4.3. How would construction of the M33 and G35 well pads and associated infrastructure as well as drilling, completions, and operation of the wells affect big game seasonal ranges?

Affected Environment

The project area is located within GMU 22 and is delineated by CPW as elk calving grounds, summer range for mule deer and elk, as well as winter range for elk. These seasonal ranges receive heaviest use from May through November, depending on snow accumulation. Typically, deer and elk herds winter at lower elevations along Piceance Creek and migrate to spring and summer ranges in the upper elevations on the Roan Plateau as green-up occurs.

The WRFO RMPA analyzed threshold allowances, a predetermined percentage of disturbance for of each discrete seasonal range, based on deer seasonal range, within a leaseholding within a GMU. The proposed action is in the RMPA designated big game summer range.

The project area is a landscape of ridges and valleys of sagebrush steppe, montane grasslands, and mixed mountain shrub with pockets of aspen forest down sideslopes and big sagebrush in the bottomlands. The shrubland-aspen complex is a key source of cover and herbaceous forage for deer and elk during post-partum functions (i.e., raising of young) from June through September.

Alternative A (Proposed Action) – Direct and Indirect Effects

Pad, access road, and pipeline construction would create approximately30 acres of disturbance for the G35 and M33 locations, the majority of which is grass and sagebrush shrublands. Interim reclamation would return approximately 23 acres to a grass/forb mix and would be capable of serving as a source of herbaceous forage once that vegetation becomes established.

In addition to the direct habitat loss, behavioral avoidance of activities associated with fluid mineral development is thought to exert one of the most pervasive and substantive influences on big game populations in the WRFO. According to Sawyer, 2017, mule deer consistently avoid energy infrastructure through the period of development and use habitats that are an average of 913 m (0.56 mile) further from well pads (while drilling) compared with predevelopment patterns of habitat use, with documented declines in mule deer abundance of 36 percent during the development period, despite efforts to reduce impacts through directional drilling and gathering systems. The other development infrastructure (i.e., roads and producing pads) altered deer behavior, but to a lesser extent (Nothrup et al 2015). Avoidance was demonstrated to a distance of 200 meters around producing pads and 100 meters around roads and would be further diminished around pipelines as vegetation becomes established.

More pronounced avoidance responses of deer and elk are likely to remain localized during construction, drilling, and completion activities and extend to an estimated 1,600 acres of habitat within 900 meters or less than 1.9 percent of the summer range available GMU 22.

In an effort to encourage clustered development and reduce the extent of seasonal ranges subject to cumulative adverse behavioral effects (i.e., harassment, avoidance) attributable to oil and gas development, exceptions to timing limitations would be offered contingent on development remain below threshold allowances that were analyzed in the WRFO RMPA.

Table 8. Current Thresholds for Caerus Leaseholdings in GMU 22.

Big Game Seasonal Range	Acute Threshold Allowance	Calculated Acute Effects	Collective Threshold Allowance	Calculated Collective Effects
Summer Range	15%	3.4%	20%	0.56%
Winter Range	20%	0	20%	7.8%
Severe Winter Range	15%	0	20%	10.5%
Winter Concentration Area	20%	0	20%	0

*A grace period of 5 years from the time of the RMPA ROD approval in 2015 had been provided to allow compliance in the event leaseholder/operator activity exceeds threshold allowances at the time of ROD approval

as well as providing the BLM adequate time to ensure reclamation meet identified standards outlined in the RMPA ROD. The BLM calculated this estimate using the available data in the DMS (Data Management System) and geospatial data of known data gaps (not uploaded in DMS) of recently permitted and constructed locations. Collective data will continue to be uploaded bringing more certainty to the Collective acreage; the Acute acreage estimates were generated from as-built shapefiles for this calculation.

The 30 acre footprint of the proposed action of ~would result in an acute avoidance area of approximately 465 acres and increase disturbance to **3.7%** of acute and **0.82**% collective effects for the allowable summer range disturbance, **below** the allowable threshold for acute disturbance to summer range habitats (15 percent) for the Caerus lease holdings.

Alternative B (No Action Alternative) – Direct and Indirect Effects

The No Action Alternative would not result in the additional impacts associated with the Proposed Action and therefore would not result in any additional loss to available seasonal range above that which has been lost to the existing development at each well pad. Big-game animal avoidance due to disturbing activities at each well pad would continue commensurate with the level of operations conducted during the life of the existing developments at each well pad. To allow development of the lease, the BLM would still likely evaluate other well pad (APDs) locations in the future that would have similar impacts to the other alternatives.

Cumulative Impacts

Approximately 15 percent (~82,400 acres) of GMU 22 is designated as big game summer range in the RMPA; much of this area is influenced by oil and gas activity. The proposed action would contribute about 1,600 acres to cumulative direct and indirect forms of big game habitat loss, fragmentation, and disruptive activities. These impacts would be diminished after disruptive drilling and completion activities cease and interim reclamation of the pad and pipeline disturbance is revegetated and available as forage. The proposed action is in an area of concentrated development attributed to the Big Jimmy Unit, and though there are oil and natural gas fields of development throughout, there are approximately 760,000 acres of summer range (as delineated by CPW) in GMUs 22, 31, and 32 that provide connectivity from Calamity Ridge to the north, along Cathedral Bluffs and from the Roan Plateau west to Skinner Ridge.

Mitigation Measures and Residual Impacts

The application of a timing limitation (Appendix E #6) from May 1 through August 15 (WR-TL-13) is intended to reduce the intensity, frequency, and extent of disturbances imposed on animals occupying important seasonal habitats during periods when animals are physiologically or energetically challenged; application of timing limitations for big game summer ranges reduce exposure of big game to disruptive activities that place further energetic demands on lactating females and developing young. The behavioral response of animals exposed to these disturbances generally elevates energetic demands (e.g., avoidance movements, elevated metabolism) or reduces foraging efficiency (e.g., disuse of available resources, reduced foraging efficiency) which suppresses animal fitness or reproductive performance.

To qualify for timing limitation exceptions, fluid mineral development activity, must not exceed the percentage of acreage represented by those threshold allowances. The area of acute effects would be defined by the physical footprint of those concentrated, intensive activities associated with, for example, pad and pipeline construction and well drilling and completion operations,

buffered by 660 feet on all seasonal ranges. The area of acute effects would include the area of collective effects in addition to all residual and incomplete lease development activities buffered by 660 feet, including but not limited to: access corridors, multiple-well pads awaiting further drilling or not meeting interim reclamation success criteria (as defined in the WRFO Reclamation Plan), linear ROWs that support vehicle traffic after final reclamation, and facilities receiving frequent visitation (i.e., an average greater than seven vehicle trips per pad per week). The current development activity within the lease holdings of Caerus meets the current identified threshold allowances and would therefore likely be granted an exception to allow for year-round drilling when the operator identifies a need and requests the exception. The timing limitation continues to be issued on the overall project as additional work may occur over the life of the development which would be restricted to those time periods.

Disturbed areas would be revegetated during interim reclamation providing forage for big game species and ultimately would return cover for security as final reclamation becomes established.

6. SUPPORTING INFORMATION

6.1. List of Preparers

Name	Title	Area of Responsibility	Date Signed
Paul Daggett	Mining Engineer	Air Quality; Geology and Minerals; Soil Resources; Surface and Ground Water Quality; Floodplains, Hydrology, and Water Rights; Prime and Unique Farmlands	5/8/2020
Shawn Wiser	Wildlife Biologist	Wetlands and Riparian Zones, Special Status Animal Species, Migratory Birds, Aquatic and Terrestrial Wildlife,	5/19/2020
Anna O'Malley	Ecologist	Vegetation, Invasive, Non-Native Species, Forestry and Woodland Products, Livestock Grazing,	5/19/2020
Luke Trout	Archaeologist	Cultural Resources, Paleontological Resources, Native American Religious Concerns	6/10/2020
Tim Barrett	Natural Resource Specialist/Project Lead	Visual Resources, Hazardous or Solid Wastes, Social and Economic Conditions, Lands with Wilderness Characteristics, Recreation, Access and Transportation, Wilderness, Scenic Byways	6/11/2020
Heather Sauls	Planning & Environmental Coordinator	NEPA Compliance	6/17/2020

6.2. Tribes, Individuals, Organizations, or Agencies Consulted

The Proposed Action was recently inventoried for cultural resources at the Class III (100 % pedestrian) level (Whittenburg 2020a; Whittenburg 2020b). No historic properties were identified as a result of these inventories, and none are known within 1 mile of the project areas that would be susceptible to adverse audible or visual impacts. There would be *no historic properties affected* as a result of the project. This proposal does not require additional consultation with the SHPO pursuant to Section X.F.5 of the State Protocol Agreement between the Colorado State Director of the BLM and the Colorado SHPO.

The U.S. Fish and Wildlife Service issued a Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006 TAILS 65413-2008-F-0073-R001) on December 26, 2017, which concurred with BLM's determination that water depletions are "Likely to Adversely Affect" the Colorado Pikeminnow, Razorback Sucker, Humpback Chub, and Bonytail. The BLM would obtain data on actual freshwater used for the federal action via Condition of Approval (Appendix D, #6) and subsequent sundry notice. These water use amounts would be summarized to calculate a total annual water depletion amount that would be submitted at the end of each calendar year to the U.S. Fish and Wildlife Service and tracked against the overall projected threshold freshwater use.

The BLM and COGCC staff met with Caerus representatives and contractors on the locations on October 17, 2020. CPW Energy Liaison staff had met with the operator on-site the previous day. CPW determined that the application of timing limitations was warranted and that the use of sound buffering berms, straw bales, or sound walls on the M33 completions pad would aid in minimizing impacts to wildlife.

6.3. References

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APPENDIX A. FIGURES

Figure 1 M33 and G35 Vicinity Map

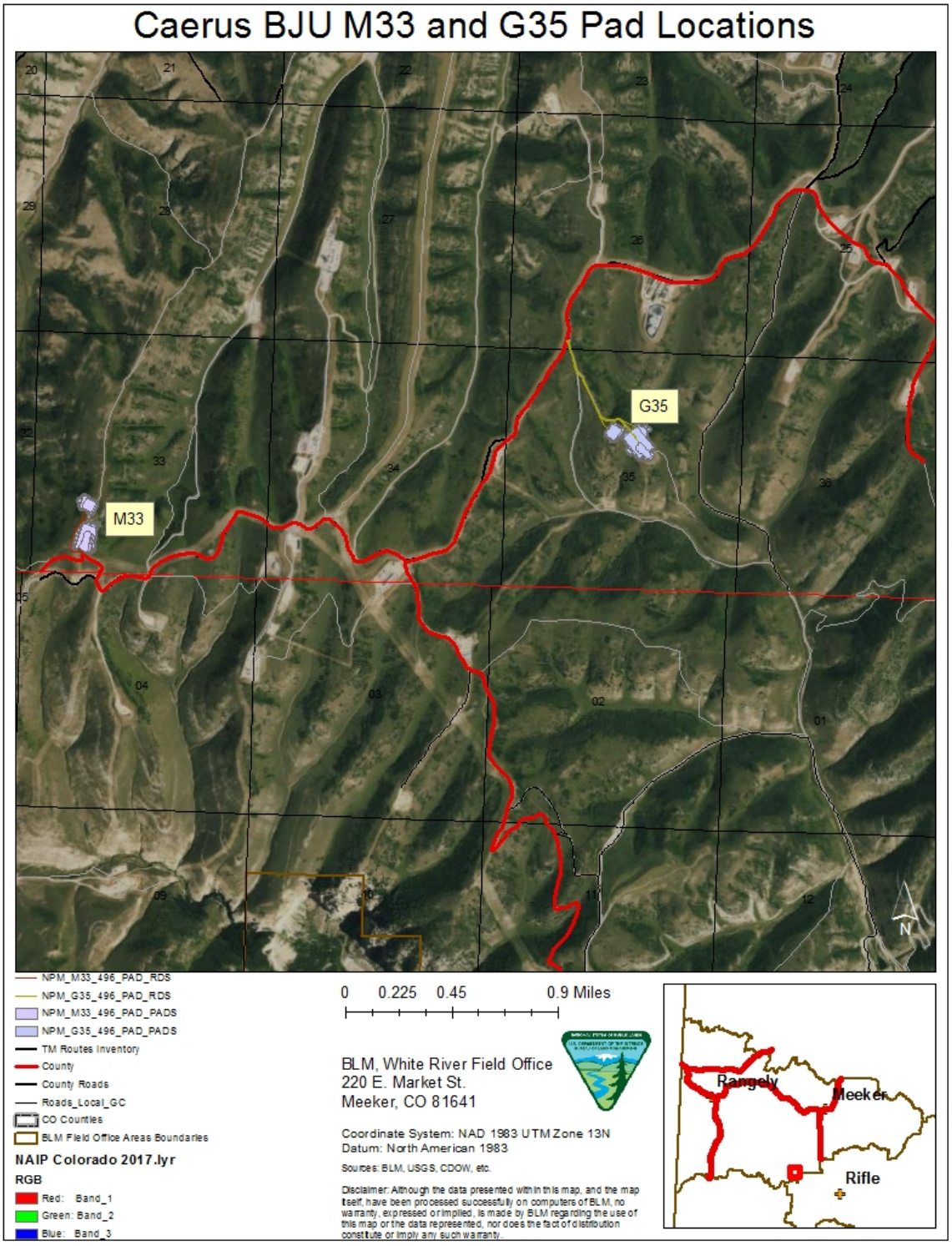


Figure 2. M33 Well Pad

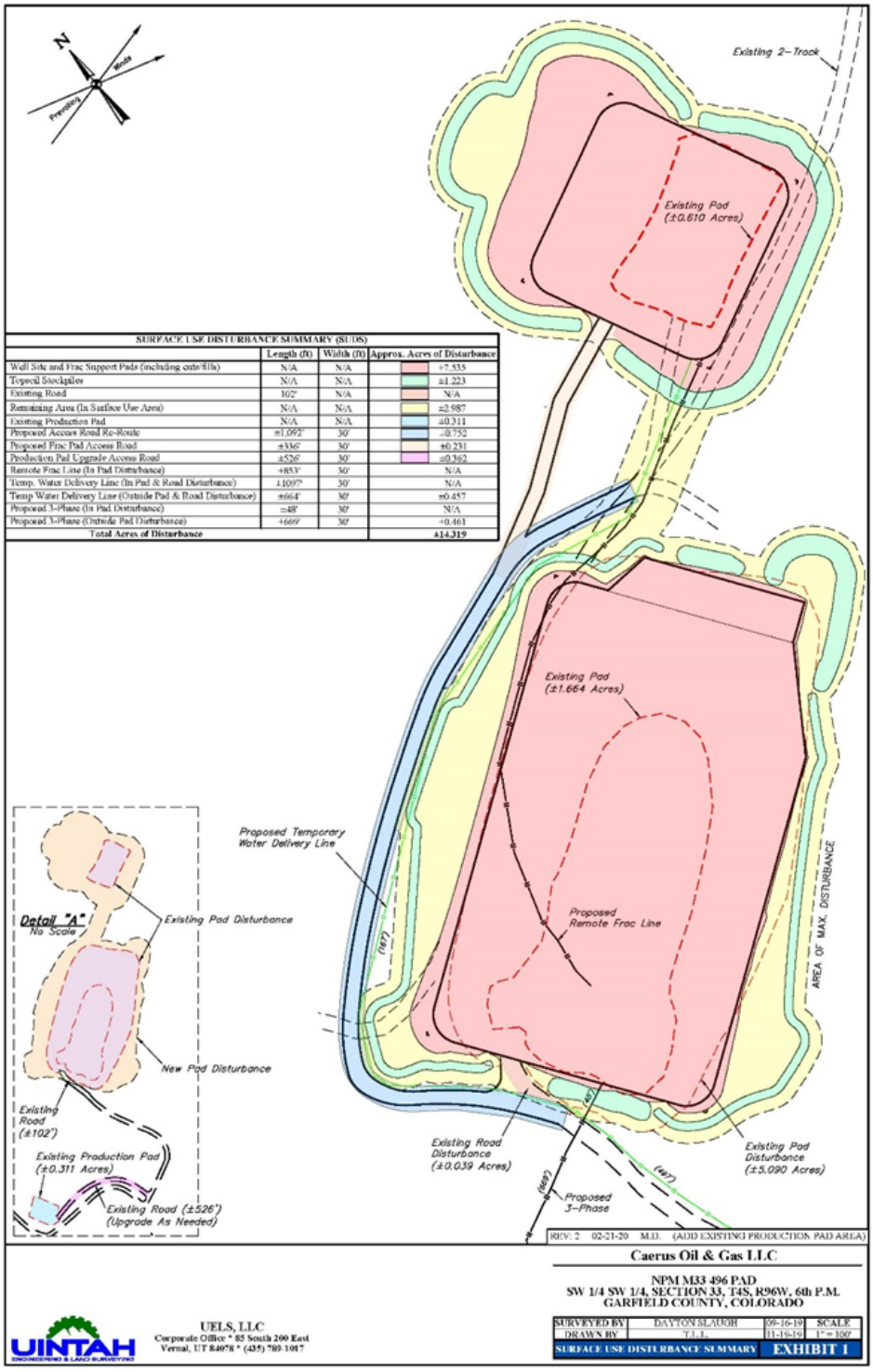
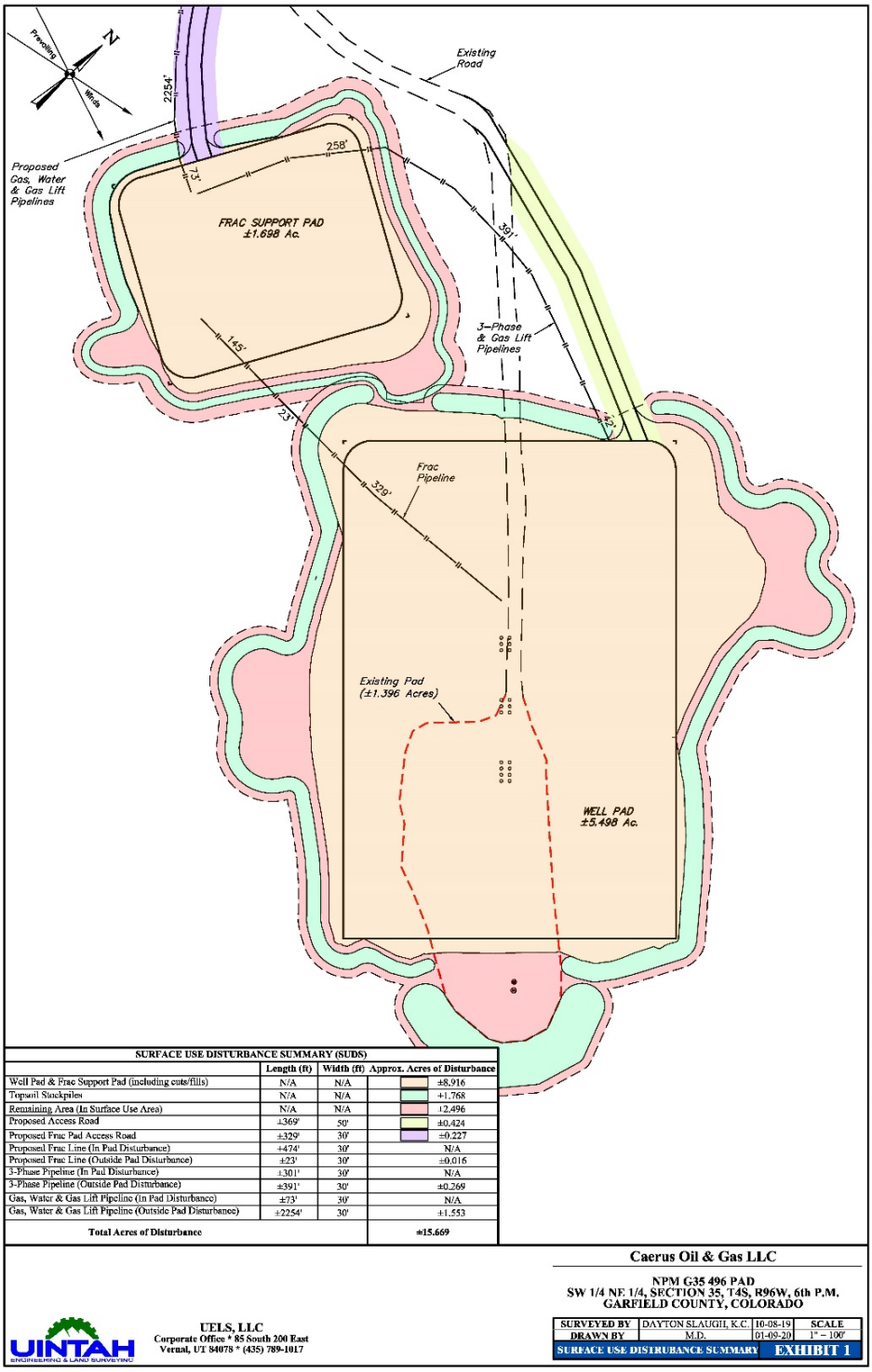


Figure 3. G35 Well Pad



APPENDIX B. LEASE STIPULATIONS

The following leases are associated with the Big Jimmy Unit (COC074105X) which was established in 2010:

Table B1. Stipulations and Lease Notices on the COC61138 Lease (1/1/1998)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion, NE Sec. 34, T4S, R96W
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	Portion, NE Sec. 34, N2 Sec. 35, SE Sec. 36, T4S, R96W

Table B2. Stipulations and Lease Notices on the COC65555 Lease (12/1/2001)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-CSU-01	Controlled Surface Use Stipulation	Protect fragile on slopes greater than 35 percent and saline soils	Portion, E2 Sec 28, S2 Sec 29, Lot 5,6, E2SW, SE Sec 30, Lot 1-3, 5,6, E2, E2NW, NESW Sec 31, All Sec 32, T4S, R96W
SR-NSO-01	No Surface Occupancy Stipulation	Protect landslide areas	Portion, W2NE Sec 28, NWSW, S2SE Sec 29, T4S, R96W
WR-NSO-04	No Surface Occupancy Stipulation	Protect Sage Grouse Leks	Portion, N2NE Sec 28, Lot 5, S2SE Sec 31, T4S, R96W
WR-NSO-09	No Surface Occupancy Stipulation	Protect sensitive plants and remnant vegetation associations.	Portion, N2NE, SWNE Sec 31, T4S, R96W
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion, SW Sec 27, S2NE, E2SE Sec 28, S2 Sec 29, Lot 5,6, E2SW, SE Sec 30, Lot 1-3, 6, NE, E2NW, NESW, N2SE and All Sec 32, T4S, R96W
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	Portion, SW Sec 27, SE Sec 28, S2S2 Sec 29, Lot 6, SESW,

			S2SE Sec 30, Lot 1-3, 5, 6, E2, E2NW, NESW Sec 31 and All Sec 32
N/A	Endangered Species Act Stipulation	Protect any species or its habitat, where such species is listed or proposed to be listed, now or hereafter, pursuant to the Endangered Species Act.	All

Table B3. Stipulations and Lease Notices on the COC65556 Lease (12/1/2001)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-CSU-01	Controlled Surface Use Stipulation	Protect fragile on slopes greater than 35 percent and saline soils	Portion, All Sec 33, T4S, R96W
WR-NSO-09	No Surface Occupancy Stipulation	Protect sensitive plants and remnant vegetation associations.	Portion, Lot 3, 4, Sec 35, T4S, R96W
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion, All, Sec 33, Lot 1-4, NW, N2S2, Sec 34, Lot 1, NWSW, Sec 35, T4S, R96W
WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	All
N/A	Endangered Species Act Stipulation	Protect any species or its habitat, where such species is listed or proposed to be listed, now or hereafter, pursuant to the Endangered Species Act.	All

Table B4. Stipulations and Lease Notices on the COC69557 Lease (12/1/2001)

Exhibit Number	Type of Exhibit (Stipulation or Lease Notice)	General Purpose	Applies to All or a Portion of the Lease
OS-A	Lease Notice	Oil Shale Stipulation	All
WR-NSO-09	No Surface Occupancy Stipulation	Protect sensitive plants and remnant vegetation associations.	Portion, Lots 3, 4, Sec 35, T4S, R96W
WR-TL-06	Timing Limitation Stipulation	Protect Sage-Grouse nesting habitat associated with individual Leks	Portion, All, Sec 33, Lot 1-4 and NW, N2S2 Sec 34, Lot 1 and NWSW Sec 35, T4S, R96W

WR-TL-09	Timing Limitation Stipulation	Protect deer and elk summer range	All
N/A	Endangered Species Act Stipulation	Protect any species or its habitat, where such species is listed or proposed to be listed, now or hereafter, pursuant to the Endangered Species Act.	All

APPENDIX C. DESIGN FEATURES FROM SURFACE USE PLAN OF OPERATION

The entire Surface Use Plan of Operations (SUPO) is incorporated into the Proposed Action and is available for review at the WRFO. Key items relevant to the issues associated with the Proposed Action include:

1. Access roads and surface disturbing activities will conform to standards outlined in the 2007 version of BLM and USFS "Surface Operating Standards for Oil and Gas Exploration and Development – The Gold Book."

2. All equipment and vehicles will be confined to the access road, pad and areas specified in the APD. CAERUS will be responsible for continuous inspection and maintenance of the access road and will conform to a schedule of preventive maintenance, which at a minimum, provides for the following corrective measures on a biannual basis. (Problem areas will be corrected as needed.)
    - Road surface grading.
    - Relief ditch, culvert cleaning and cattle guard cleaning.
    - Erosion control measures for cut and fill slopes and all other disturbed areas.
    - Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
    - Road and slope stabilization measures as required. The road shall be maintained to the standards required for the construction of the road until final abandonment and rehabilitation takes place.
3. A dike will be constructed completely around any production facilities which contain fluids (i.e. production tanks, produced water tanks, etc.) These dikes will be constructed of compacted subsoil, be impervious, hold 110% of the capacity of the largest tank, and be independent of the back cut.

4. All tank containments will be lined with a minimum 24 mil impermeable liner.

5. Run off and sediment Best Management Practices will be implemented and maintained per Caerus Piceance LLC Stormwater Management Plan (CDPHE Certification #COR037689) which includes Structural Controls (e.g sediment traps, diversions, and silt fences) and Non-structural Controls (e.g. revegetation, mulching, and surface roughening)

6. Re-vegetation is accomplished as soon as practical following the preparation of a site for final stabilization.

7. Seeding will be done when seasonal or weather conditions are most favorable. Whenever possible, seeding is timed to take advantage of moisture, such as early spring or late fall.

8. Reclamation of disturbed areas no longer needed for drilling/completion operation will be accomplished by grading, leveling and seeding as recommended by the Bureau of Land Management.

9. Once all topsoil has been distributed across the site, the location is then seeded with recommended seed mix by drill seeding methods or broadcast seeding. All reclaimed areas except areas needed for production will be seeded.

10. On terrain where drill seeding is appropriate, seed may be planted using a drill equipped with a depth regulator to ensure proper depth of planting. Drilling will be used where topography and soil conditions allow operation of equipment to meet the seeding requirements of the species being planted while steeper

11. Unless otherwise directed by the landowner or a jurisdictional authority, rocks, cut vegetation, and other surface material temporarily stockpiled during construction are redistributed as backfill on the project area and blended into the natural landscape. The segregated topsoil is then spread evenly across the reclaimed areas. Due to the amount of soil moved around the site during reclamation, perimeter sediment controls such as wattles or diversion ditches will need to be implemented if not present already.

12. Green completions to reduce venting of natural gas to atmosphere during new well completions.

13. Temporary surface water delivery lines to reduce truck traffic.

14. All areas needed for production will be graveled. The pad boundary will be fenced per surface owner request.

15. Drill cuttings generated during drilling of the proposed well will be managed on the pad surface in a cutting's management area. The area will be sufficiently bermed to provide run-on protection and run-off controls. The moisture content will be as low as practicable to prevent accumulations of liquids greater than a de minimis amount. Any liquid removed the solids will be reused as part of the drilling process. Both surface interval and production interval drill cuttings will be segregated and sampled for the pertinent suite of COGCC Table 910-1 analytes, such that the different cuttings can be managed appropriately (if necessary). Those cuttings analytically demonstrating conformance with applicable COGCC Table 910-1 standards will be beneficially reused as part of the pad reclamation efforts. Cuttings analytically above COGCC Table 910-1 standards will be remediated on-site to below pertinent thresholds and then beneficially reused as part of the pad reclamation.

16. The cuttings management area will be reclaimed in accordance with the 900 and 1000 COGCC Rules.

17. During completion operations produced water will be confined to flow back tanks for a period not to exceed ninety days after initial production. The produced water will then be recycled and used on future completion operations.

APPENDIX D. STANDARD CONDITIONS OF APPROVAL (FEDERAL SURFACE AND SPLIT-ESTATE)

D.1. General

1. The Operator will submit a Sundry Notice a minimum of 48-hours prior to commencing construction and/or reclamation work.
2. Notify Craig Interagency Dispatch (970-826-5037) in the event of any fire.
    a. The reporting party will inform the dispatch center of fire location, size, status, smoke color, aspect, fuel type, and provide their contact information.
    b. The reporting party, or a representative of, should remain nearby, in a safe location, in order to make contact with incoming fire resources to expedite actions taken towards an appropriate management response.
    c. The applicant and contractors will not engage in any fire suppression activities outside the approved project area. Accidental ignitions caused by welding, cutting, grinding, etc. will be suppressed by the applicant only if employee safety is not endangered and if the fire can be safely contained using hand tools and portable hand pumps. If chemical fire extinguishers are used the applicant must notify incoming fire resources on extinguisher type and the location of use.
    d. Natural ignitions caused by lightning will be managed by Federal fire personnel. If a natural ignition occurs within the approved project area, the fire may be initially contained by the applicant only if employee safety is not endangered. The use of heavy equipment for fire suppression is prohibited, unless authorized by the Field Office Manager.

D.2. Wildlife

3. In the event a producing well is established, all new production equipment which has open-vent exhaust systems, such as heater treaters, separators, dehydration units, and flare stacks, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the exhaust stacks.
4. The operator will prevent access to facilities that store or are expected to store fluids which may pose a risk to such birds and bats (e.g., toxicity, compromised insulation, drowning). Features that prevent access to such fluids must be in place and functional within 24 hours of installation and will remain effective until such features are removed or incapable of storing fluids. Deterrence methods may include netting or other alternative methods that effectively prevent use and that meet BLM approval. All lethal and non-lethal events that involve migratory birds will be reported to the BLM Authorized Officer immediately.
5. Open trenches should be inspected daily to reduce the potential for wildlife, livestock, or horses to become trapped should they fall into a trench. If an animal has fallen into the trench, the Authorized Officer will be notified immediately.

6. Water Use**.** The purpose of this COA is to assist the BLM with ensuring that water depletions associated with Federal oil and gas development activities are adequately covered by the U.S. Fish and Wildlife Service (FWS) Programmatic Biological Opinion for the four endangered Colorado River fishes.

   The Operator will provide the volumes of fresh water and reused/recycled water used during project development. The river sub-basin of origin (i.e., Colorado, Dolores, Green, Gunnison, White, and Yampa) will be identified for fresh water. The volumes per well will be identified by each development phase (construction, drilling, and completion) and by activity (e.g., dust abatement, pipeline hydrostatic testing, drilling, and completion operations). The water volumes will be identified in an attachment to the BLM Form 3160-4, "Well Completion or Recompletion Report and Log" (completion report) submitted to the BLM Field Office. All volumes are to be reported in barrels per well.

   For reporting the water used during construction, submit the total water used for construction with the first completion report. Completion reports submitted subsequent to the first completion report will have the water-use that was not included in the previous completion reports.

Well Name/No.:			**API No.:**		
County:			**Well Pad:**		
Operator:					
Water Source (River Sub-Basin)					
Purpose	**Water Use (barrels)**				
	Construction	**Drilling**		**Completion**	
	Fresh	**Fresh**	**Reused/ Recycled**	**Fresh**	**Reused/ Recycled**
Dust Abatement (Road/Pipeline/Pad)					
Pipeline Hydrostatic Testing					
Cementing					
Mud					
Acid Wash/ Hydraulic Fracturing					

D.3. Paleontological Resources

7. Any excavations into the underlying rock formation have the potential to impact scientifically noteworthy fossil resources and must be monitored by a permitted paleontologist. The monitoring paleontologist must be present before the start of excavations that may impact the underlying rock.
8. The operator/holder is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for disturbing or collecting

vertebrate fossils, collecting large amounts of petrified wood (over 25lbs./day, up to 250lbs./year), or collecting fossils for commercial purposes on public lands.

9. If any paleontological resources are discovered as a result of operations under this authorization, the operator/holder or any of his agents must stop work immediately at that site, immediately contact the Authorized Officer, and make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Work may not resume at that location until approved by the Authorized Officer. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (a) following the Paleontology Coordinator's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (b) following the Paleontology Coordinator's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

D.4. Cultural Resources

10. The applicant is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.

11. If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the Authorized Officer. The applicant will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the appropriate mitigation option within 48 hours of the discovery. The applicant, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.

12. Pursuant to 43 CFR 10.4(g), the applicant must notify the Authorized Officer, by telephone and written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the Authorized Officer. Colorado Statute CRS 24-80-1302 must be adhered to upon the identification of suspected human skeletal remains and associated funerary items on Colorado State and private lands. The applicant will immediately notify the coroner of the county wherein the remains are located as well as the sheriff, police chief, or land managing agency official.

D.5. Invasive, Noxious, and Non-Native Species

13. All vehicles and construction equipment will be cleaned using compressed air or high-pressure water spraying equipment prior to use to reduce the potential for introduction of invasive, noxious weeds or other undesirable non-native species. The wash/blow down

will concentrate on tracks, feet, or tires and on the undercarriage, with special emphasis on axles, frame, cross members, motor mounts, and on underneath steps, running boards, and front bumper/brush guard assemblies. Operator will dispose of solid wastes collected from the cleaning station.

14. All seed, straw, mulch, or other vegetative material to be used on BLM lands will comply with United States Department of Agriculture (USDA) state noxious weed seed requirements and must be certified by a qualified Federal, State, or county office as free of noxious weeds. Any seed lot with test results showing presence of State of Colorado A or B list species will be rejected in its entirety and a new tested lot will be used instead.
15. All sites will be monitored and treated for noxious weeds for the life of the project until Final Abandonment has been approved by the BLM. Monitoring will be conducted annually during the growing season to determine the presence of any State-listed noxious weeds. Noxious weeds that have been identified during monitoring will be promptly treated and controlled.
16. Pesticide Use Proposals (PUPs) must be submitted to and approved by the BLM before applying herbicides on BLM lands. The PUP will include target weed species, the herbicides to be used, application rates and timeframes, estimated acres to be treated, as well as maps depicting the areas to be treated and known locations of weeds. The WRFO recommends that all PUPs be submitted no later than March 1st of the year anticipating herbicide application.
17. Use of off-highway vehicles (OHVs) for access to weed treatment areas along the pipeline, power line, and reclaimed roads will be considered on a case-by-case basis (provide that access is limited and will not create visible tracks) and will require prior written approval from the Authorized Officer.

D.6. Waste

18. When drilling to set the surface casing, drilling fluid will be composed only of fresh water, bentonite, and/or a benign lost circulation material that does not pose a risk of harm to human health or the environment (e.g., cedar bark, shredded cane stalks, mineral fiber and hair, mica flakes, ground and sized limestone or marble, wood, nut hulls, corncobs, or cotton hulls).
19. All substances that pose a risk of harm to human health or the environment will be stored in appropriate containers. Fluids that pose a risk of harm to human health or the environment, including but not limited to oil, condensate, and/or produced water, must be stored in appropriate containers and in secondary containment systems at 110 percent of the largest vessel’s capacity. Secondary fluid containment systems, including but not limited to tank batteries must be lined with a minimum 24 mil impermeable liner.
20. As a reasonable and prudent lessee/operator in the oil and gas industry, acting in good faith, all lessees/operators and right-of-way holders will report all emissions or releases that may pose a risk of harm to human health or the environment, regardless of a substance’s status as exempt or nonexempt and regardless of fault, to the BLM WRFO by phone at 970-878-3800 or by email to BLM_CO_WR_NRS@blm.gov.

21. As a reasonable and prudent lessees/operator and/or right-of-way holder in the oil and gas industry, acting in good faith, all lessees/operators and right-of-way holders will provide for the immediate clean-up and testing of air, water (surface and/or ground) and soils contaminated by the emission or release of any substance that may pose a risk of harm to human health or the environment, regardless of that substance's status as exempt or non-exempt. Where the lessee/operator or right-of-way holder fails, refuses or neglects to provide for the immediate clean-up and testing of air, water (surface and/or ground) and soils contaminated by the emission or release of any quantity of a substance that poses a risk of harm to human health or the environment, the BLM WRFO may take measures to clean-up and test air, water (surface and/or ground) and soils at the lessee/operator's expense. Such action will not relieve the lessee/operator of any liability or responsibility.

D.7. Range Management

22. The operator must coordinate with the livestock grazing permittee Piceance Creek Ranch, Ltd. authorized to graze livestock within the project area a minimum of 72 hours prior to drilling activities associated with this permit. Livestock grazing permittee contact information may be found at www.blm.gov/ras/ or by contacting the appropriate BLM Field Office. The operator will provide the grazing permittee the location, nature, and extent of the anticipated activity being completed.

23. Any range improvement projects such as fences, water developments, cattleguards, gates, or other livestock handling/distribution facilities that are damaged or destroyed either directly or indirectly as a result of implementation of the Proposed Action will be promptly repaired or replaced by the applicant to restore pre-disturbance functionality. If the operator damages any range improvement project(s) the operator will notify the Authorized Officer and identify the actions taken to repair the feature(s).

D.8. Reclamation Procedures

- ***Interim Reclamation***

24. All long-term above-ground structures will be painted and maintained Shale Green from the BLM "Supplemental Environmental Colors" chart to blend with the natural color of the landscape background.

25. To reduce erosion and reduce the risk of weed establishment, interim reclamation will be initiated when either there are no drilling activities expected on the pad for the next six months or there has been no activity on the pad within the last six months, regardless of whether or not there are outstanding approved APDs.

26. In order to inspect and operate the well or complete workover operations, it may be necessary to drive, park, and operate equipment on restored, interim vegetation within the previously disturbed area. Damage to soils and interim vegetation will be repaired and reclaimed following use. To prevent soil compaction, under some situations, such as the presence of moist, clay soils, the vegetation and topsoil will be removed prior to workover operations and restored and reclaimed following workover operations.

- ***Final Reclamation***

27. Final abandonment of pipelines and flow lines will involve flushing, capping, and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed in the foreseeable future due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the Authorized Officer.

- ***Monitoring and Final Abandonment Approval***

28. All seed tags will be submitted via Sundry Notice (SN) to the designated Natural Resource Specialist within 14 calendar days from the time the seeding activities have ended. The SN will include the purpose of the seeding activity (i.e., seeding well pad, cut and fill slopes, seeding pipeline corridor, etc.). In addition, the SN will include the pipeline, well(s) or well pad number associated with the seeding activity, if applicable, the name of the contractor that performed the work, his/her phone number, the method used to apply the seed (e.g., broadcast, hydro-seeded, drilled), whether the seeding activity represents interim or final reclamation, the total acres seeded, an attached map that clearly identifies all disturbed areas that were seeded, and the date the seed was applied.
29. Each year by January 1st, Caerus Piceance, LLC will submit a Reclamation Status Report to the WRFO via the most current BLM approved data management system that includes the pipeline name and/or well number, API number, legal description, UTM coordinates, project description (e.g., well pad, pipeline, etc.), reclamation status (e.g., interim or final), whether the well pad and/or pipeline has been re-vegetated and/or re-contoured, date seeded, photos of the reclaimed site, acres seeded, seeding method (e.g., broadcast, drilled, hydro-seeded, etc.), and contact information for the person responsible for developing the report. The report will include maps showing each point (), polygon (e.g., well pad), and/or polyline (e.g., road, pipeline) feature that was included in the report. The data must be submitted in UTM Zone 13N, NAD 83, in units of meters. In addition, scanned copies of seed tags that accompanied the seed bags will be included with the report. Internal and external review of the WRFO Reclamation Status Report and the process used to acquire the necessary information will be conducted annually, and new information or changes in the reporting process will be incorporated into the report.
30. The holder/operator will be responsible for ensuring that all disturbance GIS and reclamation data will be submitted via White River Data Management System (WRDMS) which can be accessed at https://my.usgs.gov/wrfo/

D.9. Reclamation Performance Standards

- ***Interim Reclamation Standard***

31. Disturbed areas not needed for long-term production operations or vehicle travel have been recontoured, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community sufficient to minimize visual impacts, provide forage, stabilize soils, and impede the invasion of noxious weeds.

- ***Final Reclamation Standard***

32. The operator must meet the following reclamation success criteria, and these standards apply to both interim and final reclamation:
    a. Self-sustaining desirable vegetative groundcover consistent with the site Desired Plant Community (DPC) (as defined by the range site, WRFO Assessment, Inventory, and Monitoring (AIM) protocol site data (BLM TN 440), ecological site or an associated approved reference site) is adequately established, as described below, on disturbed surfaces to stabilize soils through the life of the project.
    b. Vegetation with 80 percent similarity of desired foliar cover, bare ground, and shrub and/or forb density in relation to the identified DPC. Vegetative cover values for woodland or shrubland sites are based on the capability of those sites in an herbaceous state.
    c. The resulting plant community must have composition of at least five desirable plant species, and no one species may exceed 70 percent relative cover to ensure that site species diversity is achieved. Desirable species may include native species from the surrounding site, species listed in the range/ecological site description, AIM data, reference site, or species from the BLM approved seed mix. If non-prescribed or unauthorized plant species (e.g., yellow sweetclover, *Melilotus officinalis*) appear in the reclamation site, BLM may require their removal.
    d. Bare ground does not exceed the AIM data, range site description, or if not described, bare ground will not exceed that of a representative undisturbed DPC meeting the Colorado Public Land Health Standards.
    e. Reclamation sites affected by cheat grass and or other invasive annuals will be qualified based on the condition of the site (i.e., the relative vegetative cover) prior to disturbance.
        i. If the Project site contains less than 25 percent relative cover of undesirable species, interim and final reclamation will be considered acceptable when relative cover of undesirable species on the project site does not exceed 5percent.
        ii. If the project site contains 25 percent to 50 percent relative cover of undesirable species, interim and final reclamation will be considered acceptable when relative cover to of undesirable species on the project site does not exceed 10 percent.
        iii. If the project site contains more than 50 percent relative cover of undesirable species on the project site does not exceed the level defined by site-specific criteria established in the reclamation plan for that site.

APPENDIX E. SITE-SPECIFIC MITIGATION (CONDITIONS OF APPROVAL)

1. At the discretion of the landowner, the BLM recommends that Caerus Piceance, LLC would reseed reclamation areas at the first appropriate seeding window (September 1st – March 31st) following disturbance using Standard BLM seed mix #6 outlined in the table below. Seed mixture rates are Pure Live Seed (PLS) pounds per acre. Drill seeding is the preferred method of application and drill seeding depth shall be no greater than ½ inch. If drill seeding cannot be accomplished, seed should be broadcast at double the rate used for drill seeding and harrowed or raked into the soil.

Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
UP Plateau	Sandberg bluegrass	*Poa secunda ssp. sandbergii*	0.5
San Luis	slender wheatgrass	*Elymus trachycaulus ssp. trachycaulus*	2
Sherman	big bluegrass	*Poa secunda ssp. ampla*	1
Bromar	mountain brome	*Bromus marginatus*	2
Maple Grove	Lewis flax	*Linum lewisii*	1
Bandera	Rocky Mountain penstemon	*Penstemon strictus*	0.5
Alternates:			
Canbar	Canby bluegrass	*Poa secunda ssp. canbyi*	0.5
	balsamroot	*Balsamorhiza sagittata*	3

2. GRSG-TL-46e: No surface disturbing or disruptive activities are authorized within 4 miles from active leks during lekking, nesting, and early brood-rearing from March 1 to July 15 to minimize disturbance, displacement, or mortality to greater sage-grouse.

   Criteria*:

   - Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat

   - An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation

   - An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines.

To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.

3. Caerus will minimize the temporary noise levels of well operations during drilling, completions, re-completions, workovers, or similar activities to a maximum permissible noise level of 70 decibels or less measured 350 feet (4 feet above ground level) from the source to reduce disturbance to greater sage-grouse.

4. To prevent long term impacts associated with noise, sound producing equipment (such as compressors or pump jacks) must be equipped with a hospital grade muffler or similar device which limits sound emissions to 55 decibels or less measured 350 feet (4 feet above ground level) from the source.

5. WR-TL-15: Surface-disturbing and disruptive activities will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest (from February 1 through August 1).

   Exception: An exception to the TL can be granted if an environmental analysis of the proposed action indicates that nature or conduct of the activity could be conditioned so as not to interfere with adult attendance and visitation of the nest site, jeopardize survival of the eggs or nestlings, or otherwise impair the utility of nest for current or subsequent nesting activity or occupancy. The Authorized Officer may also grant an exception if the nest is unattended or remains unoccupied by May 15 of the project year. An exception may be granted to these dates by the Authorized Officer, consistent with policies derived from federal administration of the Migratory Bird Treaty Act.

   a. WR-TL-15: On the G35 location, surface-disturbing and disruptive activities will not be allowed within 0.25 miles of active nest sites of those raptors that are not considered special-status during the period from nest territory establishment to dispersal of young from nest (from February 1 through August 1). The current survey is valid until June 1, 2021.

   b. WR-TL-15: No active nests were located near the M33 location and an exception to this stipulation is granted until June 1, 2021, at which time the timing limitation will be applied or a new biological survey must be conducted to consider another Exception to the TL.

6. WR-TL-13: No surface disturbing activities (including construction, drilling, completion, and intensive maintenance activities) from May 15 through August 15 would be permitted in order to reduce the disturbance of big game animals on summer winter range. Exceptions and modifications to this Condition of Approval may be considered as expressed in WR-TL-13 in the WRFO Oil and Gas RMPA ROD (2015).

7. A full reclamation bond specific to the site (in accordance with MD MR-14 [GRSG RMPA 2015]) is required for the well pads and access roads. This bond will be necessary

prior to the construction of the G35 and/or M33 well pads and access roads. Therefore, operator must submit an estimated cost to fully reclaim the location within 30-days of the APDs' approval. Once the estimate is received, the BLM will review the information and provide the operator with the necessary bond amount to ensure bonds are sufficient. The bond is required to cover all overhead and contracting costs anticipated to be incurred by the BLM to result in full restoration of the lands to the condition it was found prior to disturbance.