

CCR 0994-23-02 WELL PAD

Light Mitigation Plan ECMC Rule 424. Lighting



Photo 1. Drilling at Laramie's 24-7 well pad (left) and completions & flowback operations at Laramie's 24-6A well pad (right).



**Laramie Energy, LLC
3199 D Rd. Bldg A2
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CCR 0994-23-02 Well Pad Lighting Mitigation Plan ECMC Rule 304.c.(3) and Rule 424



1. INTRODUCTION – ECMC RULE 304.c.(3) AND RULE 424

The CCR 0994-23-02 Light Mitigation Plan, consistent with the requirements for Colorado Energy and Carbon Management Commission’s (referred to hereinafter as ECMC or the Commission) Rule 304.c.(3) Light Mitigation Plan under 300 Series of the ECMC rules, was developed in accordance with ECMC Rule 424 Lighting and the Light Mitigation Plan Guidance (September 16, 2021).

2. CCR 0994-23-02 WELL PAD

Laramie Energy, LLC (Laramie) (Operator # 10433) is pursuing a Form 2A for an Oil and Gas Location Assessment permit in Mesa County, Colorado. The CCR 0994-23-02 well pad (CCR Pad) is a proposed, new location. Laramie is proposing to drill two (2) new horizontal wells at the CCR Pad in Section 23 of Township 9 South, Range 94 West, 6th P.M. The CCR Pad will develop fee and federal minerals.

OGDP Title: 2024 CCR 0994-23-02 OGDP

Location Name: CCR 0994-23-02

Location ID: New Location

Legal Description: NWNE of Section 23, Township 9 South, Range 94 West, 6th P.M.

Location Coordinates: Latitude: 39.268132°; Longitude: -107.847692°

Elevation: 7142 feet

County: Mesa

General Location: 6 mapped miles east of Collbran, Colorado.

Zone District: Agricultural, Forestry, Transitional District (AFT)

Surface Owner: Colorado Canyon Ranch LLC (CCR)

Nearest Public Crossroads: HWY 330 & 64 3-10 Road (Mesa County Public Roads)

Operations will be conducted in the following phases at the CCR Pad: construction, production equipment installation, drill rig mobilization, drilling, completions and flowback (including equipment mobilization, staging, and demobilization), production, interim reclamation, inspections, and final grading/reclamation of the site. Inspection activities will occur during the lifespan of the site. Laramie anticipates that the well pad will remain in production for approximately 30 years, based on the average lifespan of wells within the area. **Table 2** details the anticipated duration for each operational phase that will require lighting. Laramie anticipates continuous drilling, completions, and flowback operations in order to reduce the number of pre-production days needed to develop the proposed two (2) new horizontal wells.

The CCR Pad is located in a remote area with varying elevation and the surrounding topography consists of mountainous ridges and hills. The CCR Pad will be accessed from a newly constructed private access road and will be accessed from public road 64 3/10 Road. Laramie will maintain all portions of the new private access road. The nearest town, the Town of Collbran, is located approximately 6 mapped miles from the CCR Pad.



Table 1. Well Pad Dimensions

Pad Area	Acre Size	Square-Footage
Working Pad Surface	4.3	187,308
Area of Disturbance	7.5	326,700
Production Pad Surface	2.3	100,188

3. STATEMENT OF EXPERTISE – ECMC RULE 424.a.(1)

The Drilling Phase Lighting Site Plan and the Completions and Flowback Site Plan (**Appendices A and B**) were calculated and prepared by Kenosha. Kenosha has successfully completed multiple lighting designs for projects ranging from oil & gas development to commercial buildings. Brett Board, Electrical Engineer, has over 15 years of experience in lighting design; creating detailed lighting design drawings, technical specifications, photometric analysis, lighting studies, lighting surveys, and lighting energy audits. Brett is a professionally licensed engineer in 7 states, including CO.

4. LIGHT MITIGATION PLAN COMPONENTS – ECMC RULE 424.a.(2)

Laramie anticipated lighting will only be utilized during drilling, completions, and flowback activities. The stated activities will result in a total of 94 days of lighting.

Table 2. Operations Requiring Lighting

Activity Requiring Lighting	Time Interval (Days)
Drilling	46
Completions/Flowback	48
Total Days of Lighting	94

During these operational phases, personnel will be continuously present onsite. Laramie will minimize on-site lighting if personnel are not onsite.

5. PRE-PRODUCTION FACILITY LIGHTING PLAN – ECMC RULE 424.a.(2).A.

Pre-production activities will consist of initial grading, drill rig mobilization, drilling, completions, and flowback. Initial grading and drill rig mobilization will be completed during daylight hours. Pre-production lighting facility is detailed in Section 6 of the subject mitigation plan. Laramie anticipates continuous drilling, completions, and flowback operations in order to reduce the number of occupied pre-production days required to develop the proposed two (2) new horizontal wells.

5.1. ADEQUATE LIGHTING - ECMC RULE 424.a.(2).A.i.

Sufficient lighting will be utilized during pre-production activities to ensure the safety of all personnel within the Collbran operations area on any active operations locations. Safety procedures, including lighting, are detailed in Laramie Health and Safety Manual.

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**5.2. PRE-PRODUCTION LIGHTING SPECIFICS - ECMC RULE
424.a.(2).A.ii.**

Drilling activities will last for approximately 94 days. Helmerich and Payne, Inc. (H&P) provided lighting details for the drill rig that will operate at the CCR Pad. Lighting utilized during drilling activities is stationed on the drill rig; therefore, the lighting is centered within the site perimeter and lighting is cast outward. For safety reasons, lighting may extend slightly beyond the site perimeter. Where possible, lighting will be directed downward and inward to avoid excess lighting beyond perimeter. The total lumen during drilling phase is 632,146 lumens. The Drill Phase Lighting Site Plan and Diagram (**Appendix A**) was developed using photometric calculations to represent site-specific illumination levels for the CCR Pad.

Specifications on drill rig lighting fixtures detailing anticipated location on the drill rig, height, light angle, and type of light fixtures are also provided in the Drill Phase Lighting Site Plan and Diagram.

During completions and flowback activities (approximately 48 days), the site will be lit to provide adequate lighting for personnel. Continuous completions will reduce the number of occupied days for completions from 70 days to 48 days. All lighting for completions and flowback operations will be cast downward and inward towards the center of the site. Lighting will not extend past the perimeter of the area of disturbance. Portable lighting equipment will be utilized during this phase. The total lumen during completions and flowback operations is 188,200 lumens. The Completions and Flowback Phase Light Site Plan, depicting the location of lighting equipment and light equipment specifications are provided in **Appendix B**.

**5.3. TEMPORARY LIGHTING FOR SAFETY - ECMC RULE
424.a.(2).A.iii.**

In the event that temporary lighting is required, lighting will comply with standards stated in this Lighting Plan and ECMC Rules 424.b. – 424.f when allowable. In the event of an emergency, Laramie will place a priority on personal safety and will adhere to Rule 424.a.(2).A.i. to ensure the safety of those accessing and present at the site. Lighting safety standards are stated in Laramie Health and Safety Manual.

6. PRODUCTION FACILITY LIGHTING PLAN – ECMC RULE 424.a.(2).B.

Laramie does not anticipate the use or installation of lighting at the CCR Pad for the production phase. Production activities are conducted during daylight hours.

7. LIGHTING STANDARDS – ECMC RULE 424.b.

Drilling, completions, and flowback activities will require lighting. Lighting is not required during the production phase. Lighting standards will apply to all lighting usage, including temporary lighting.

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7.1. DIRECTION OF LIGHTING – ECMC RULE 424.b.(1).

During completions and flowback, lighting will be directed downward and inward. Lighting during the drilling will be casted outwards only on necessary points for safety considerations. Where possible, lighting will be directed downward and inward to avoid excess lighting beyond perimeter. Drill rig lighting will illuminate the entire drill rig, which is required for a safe working environment and adhering to ECMC Rule 424.a.(2).A.i.

7.2. LIGHTING BUFFERS - ECMC RULE 424.b.(2)

Laramie will utilize appropriate equipment to reduce light intensity outside the perimeter of the CCR Pad. For drilling activities, the lighting may cast slightly along and outside the perimeter of the proposed well site for safety. Since the site will be graded along the perimeter it is vital for personnel accessing the site during drilling operations to see the edge of the pad. The extent of lighting outside the perimeter of the well site is displayed in **Appendix A and B**. Light intensity outside the site is minimal and reduces within a short distance from the well site perimeter.

8. PRE-PRODUCTION FACILITY LIGHTING – ECMC RULE 424.c.

Laramie will require lighting for pre-production activities, including drilling, completions, and flowback phases.

8.1. SAFETY – ECMC RULE 424.c.(1).

Sufficient lighting will be utilized to ensure the safety of all personnel at the CCR Pad. Safety procedures, including lighting, are detailed in the Laramie Health and Safety Manual.

8.2. NOISE BARRIER – ECMC RULE 424.c.(2).

A noise barrier is not proposed for the well pad. The CCR Pad is surrounded by varying topography creating natural barriers to reduce potential impacts from pre-production lighting.

8.3. LIGHTING IMPACTS – ECMC RULE 424.c.(3)

• Impacts on Residential Occupancy - Rule 424.c.(3).A

There are two residential building units (RBUs) within 2,000 feet from the WPS and three (3) RBUs between 2,001 to 2,300 feet from the WPS. Lighting diminishes rapidly with distance and lights to prevent any impacts to motorists on public roads.

Based on Kenosha's calculations, Kenosha expects very little impact from the well pad lighting to the RBU's which are located approximately 1,872 feet west and 1,948 feet south of the pad. Based on the fixture locations, types, and orientations, the Light Site Plan model is showing zero (0) foot candles of illumination crossing a vertical plane at those distances.

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- **Impacts on Motorists - Rule 424.c.(3).B.**

There are two public roads within 2,000 feet of the WPS, both roads are Mesa County public roads. The proposed well pad is located approximately 1,560 feet (mapped distance) southeast of a public road 64 3/10 Road. Public road HWY 330 is located 1,600 feet south of the CCR Pad WPS. Based on the Light Site Plan, no light will shine on the public road nor will light impact motorists. Lighting diminishes rapidly with distance and lights will be situated to prevent any impacts to motorists on public roads.

- **Impacts on Wildlife - Rule 424.c.(3).C**

The CCR Pad is not located within a High Priority Habitat (HPH) but is adjacent (within 2,000 feet) to two (2) HPH. Four (4) HPH exists within one.

Table 4. High Priority Habitat within a One-Mile Radius

ECMC Rule	Species HPH	Distance from WPS to HPH at Nearest Point
1202.c(1).S.	Aquatic Sportfish Management Waters	66 Feet
1202.d.(2)	Elk Winter Concentration Habitat	613 Feet
1202.c(1).R.	Aquatic Native Species Conservation Waters	2049 Feet
	Aquatic Cutthroat Trout Designated Crucial Habitat	3147 Feet

Aquatic HPH (Aquatic Sportfish Management Waters, Aquatic Native Species Conservation Waters, Aquatic Cutthroat Trout Designated Crucial Habitat): It is unlikely that lighting would impact aquatic wildlife species due to the distance, vegetation, and topographic screening between the well pad and these habitat areas.

Elk Winter Concentration: There is the potential for lighting used during drilling and completions operations to impact elk during sensitive times of the year. It is anticipated that lighting will be used on the location for 94 days. The proposed pad is located in an area of existing oil and gas infrastructure where human activity is ongoing year-round. Elk in this area have become somewhat habituated to human presence and activities in the vicinity of the project area; however, the proposed project has the potential to increase activity during sensitive times of the year for elk. Lighting used on-site will be directed inward and downward and based on the lighting plan prepared. Minimal light will shine beyond the WPS perimeter. There are approximately 743.6 acres of mapped elk winter concentration habitat within 1-mile of the proposed well pad. Based on the availability of habitat in the surrounding area, it is anticipated that elk would relocate to other portions of the habitat during drilling and completion activities. All construction activities associated with the well pad would occur during daylight hours and during the late summer or early fall; therefore avoiding impacts to the HPH habitat for elk during sensitive times of the year.

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9. PRODUCTION PHASE LIGHTING – ECMC RULE 424.d.

Laramie does not anticipate the use of lighting during the production phase at the CCR Pad. Lighting will not be installed on the production pad surface. Historically, Laramie will not utilize lighting for production activities since personnel will access the site only during daylight hours. In the event of an emergency or foreseen event where the use of emergency lighting is required for safety, Laramie will adhere to lighting standards stated in 424.d.

9.1. SAFETY DURING PRODUCTION – ECMC RULE 424.d.(1)

Sufficient lighting will be utilized to ensure the safety of all personnel within the Collbran operations area. Production activities are conducted during daylight hours and will not require lighting. In the event of an emergency or foreseen event that may require lighting, Laramie will adhere to lighting standards stated in the CCR Light Mitigation Plan and Health and Safety Manual.

9.2. PRODUCTION LIGHTING ZONE – ECMC RULE 424.d.(2)

Production activities are conducted during daylight hours and will not require lighting. In the event of an emergency or foreseen event, Laramie will adhere to lighting standards stated in the CCR Pad Light Mitigation Plan. All emergency lighting will be directed towards the center of the pad and down-cast.

9.3. LOCAL ZONING – ECMC RULE 424.d.(3)

The CCR Pad is located in Mesa County, Colorado. Mesa County defines the subject parcel as Agricultural, Forestry, Transitional (AFT) zone district. Adjacent parcels to the subject parcel are zoned AFT. Existing uses of the surrounding area are natural resources extraction, national forest lands, and agricultural.

10. LIGHTING DURING NON-STAFFED HOURS – ECMC RULE 424.e.

Lights will only be utilized during drilling, completions, and flowback activities. The stated activities will result in a total of 94 days of lighting. During these operational phases, personnel will be present onsite. Continuous on-site lighting when personnel are not present will not be used. Only in the event of an emergency will temporary lighting be utilized during the production phase and only when personnel are present.

11. CUMULATIVE IMPACT - ECMC RULE 424.f.

Cumulative light impacts are not anticipated as the well pad location is surrounded by varying topography and mountain ridges. Lighting will not be installed for production operations and all lighting used will be short-term.

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11.1. LIGHTING BMPS - ECMC RULE 424.b.(3)

Laramie will implement the following best management practices for lighting at the CCR Pad. Lighting will be required for drilling, completions, and flowback activities. Production activities are conducted during daylight hours and will not require lighting.

BEST MANAGEMENT PRACTICES	
Laramie will use low-glare or no-glare lighting and will conduct lighting inspections to confirm lighting fixtures are orientated correctly.	
Working areas within the working pad surface (WPS) will be adequately lit to aid in safe working conditions during all low-light working times (e.g., night-time, dusk, dawn, overcast). Lighting shall conform with all OSHA, IESNA, and ANSI standards.	
No direct light shall shine beyond the boundaries of the WPS, especially onto public roads, adjacent properties, and/or high priority habitats. All lighting shall conform with all ECMC and county standards.	
All redundant, unused, or not-needed light will be turned off.	
For non-working or shut-down days where no personnel are on-site or in working areas, non-essential temporary lighting will be turned off. If no personnel are on-site and essential temporary lighting is needed, the essential temporary lighting will be inspected every 24 hours.	
Equipment shall be operated and/or orientated in such a manner that lights affixed to equipment do not shine above the horizontal plane passing through the center point of the light source or shine beyond the boundary of the WPS.	
Any lighting damaged and/or improperly directed or angled will be promptly fixed and/or corrected to conform to this lighting plan.	
For work-place safety concerns, no direct or reflected direct light shall shine towards the entrance of the WPS.	
During completions, all temporary light plants capable of adjustment will be angled downward and inward towards working areas on the WPS. Lights will be approximately 20 feet and direct downwards onto the pad surface.	

LIST OF APPENDICES	
Appendix A	Drilling Phase Lighting Site Plan and Diagram
Appendix B	Completions Phase Lighting Site Plan and Diagram



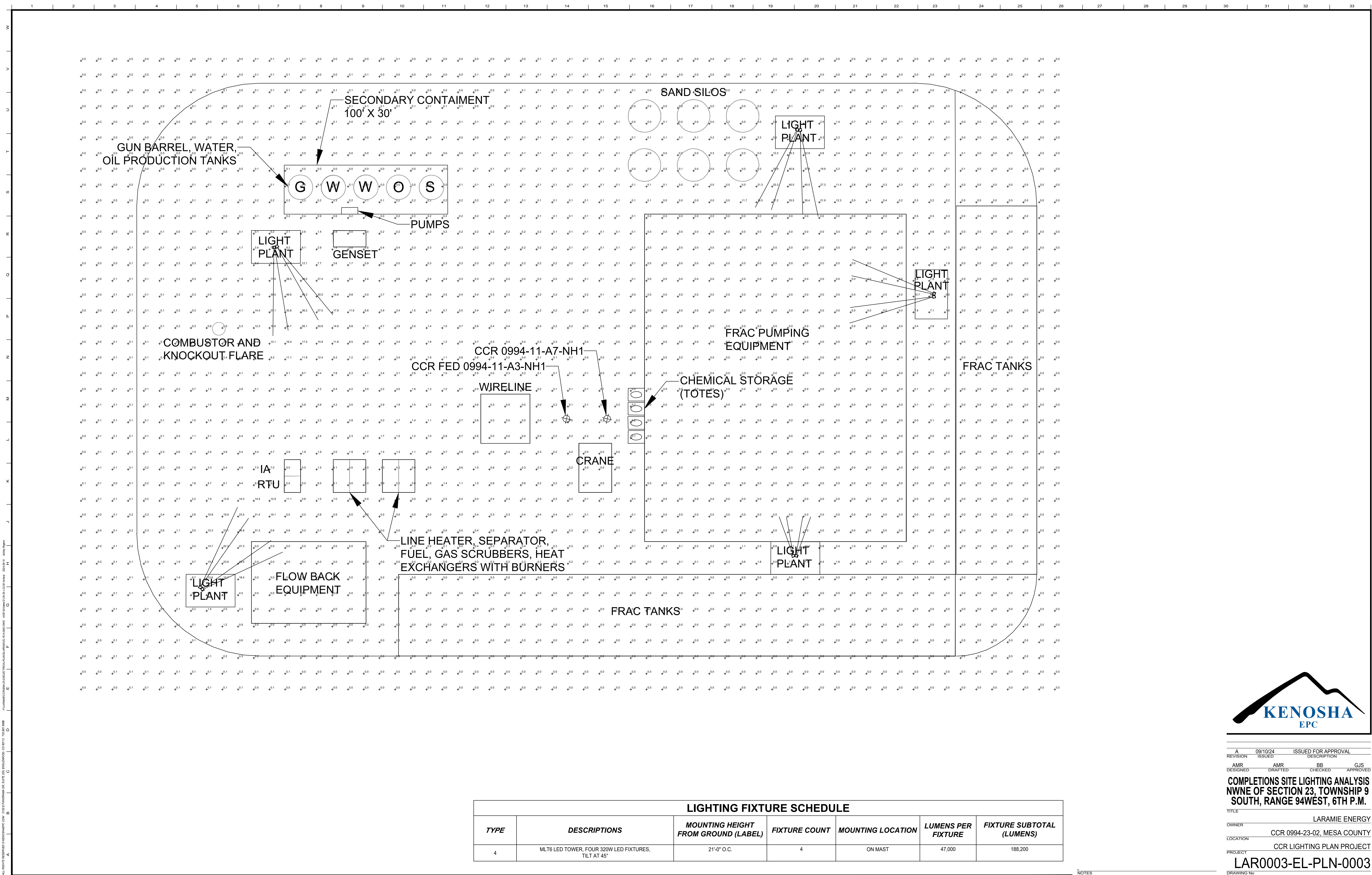
Appendix A

Drilling Phase Lighting Site Plan



Appendix B

Completions and Flowback Phase Site Plan



A 09/10/24 ISSUED FOR APPROVAL
 REVISION ISSUED DESCRIPTION
 AMR DESIGNED AMR DRAFTED BB CHECKED GJS APPROVED
COMPLETIONS SITE LIGHTING ANALYSIS
NWNE OF SECTION 23, TOWNSHIP 9
SOUTH, RANGE 94WEST, 6TH P.M.
 TITLE LARAMIE ENERGY
 OWNER CCR 0994-23-02, MESA COUNTY
 LOCATION CCR LIGHTING PLAN PROJECT
 PROJECT LAR0003-EL-PLN-0003
 DRAWING No

LIGHTING FIXTURE SCHEDULE						
TYPE	DESCRIPTIONS	MOUNTING HEIGHT FROM GROUND (LABEL)	FIXTURE COUNT	MOUNTING LOCATION	LUMENS PER FIXTURE	FIXTURE SUBTOTAL (LUMENS)
4	MLT6 LED TOWER, FOUR 320W LED FIXTURES, TILT AT 45°	21'-0" O.C.	4	ON MAST	47,000	188,200

NOTES