

# West Elk Mining Plan Modification Environmental Assessment



Prepared in cooperation with the  
US Department of the Interior Bureau of Land Management, US Department of Agriculture Forest  
Service, and Colorado Division of Reclamation, Mining and Safety

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Appendix A Plan to Address a Methane Flare System

Appendix B Lease, Lease Modification, and CDRMS Permit Stipulations

## Acronyms

amsl	above mean sea level
APCD	Air Pollution Control Division
ASLM	Assistant Secretary for Lands and Minerals (USDOI)
BLM	Bureau of Land Management (USDOI)
CAAQS	Colorado Ambient Air Quality Standards
CDRMS	Colorado Division of Reclamation, Mining, and Safety
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH <sub>4</sub>	Methane
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalents
CRA	Colorado Roadless Area
CRR	Colorado Roadless Rule
DOI	Department of the Interior (United States)
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
GMUG	Grand Mesa, Uncompahgre, and Gunnison National Forest (USFS)
gpm	gallons per minute
GWP	Global Warming Potential
HAPs	Hazardous Air Pollutants
IWG	Interagency Working Group
LAU	Lynx Analysis Unit
MCC	Mountain Coal Company
MLA	Mineral Leasing Act

## Acronyms

MPDD	Mining Plan Decision Document
MR	minor revision
MSHA	Mine Safety and Health Administration
MVB	Mine Ventilation Borehole
N <sub>2</sub> O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFS	National Forest System
NO <sub>x</sub>	Nitrogen Oxides
NSO	No Surface Occupancy
OSMRE	Office of Surface Mining Reclamation and Enforcement (USDOJ)
PM	Particulate Matter
PM <sub>10</sub>	PM with diameter less than 10 micrometers
PM <sub>2.5</sub>	PM with diameter less than 2.5 micrometers
PR	Permit Revision
PSD	Prevention of Significant Deterioration
ROD	Record of Decision
SCC	Social Cost of Carbon
SFEIS	Supplemental Final Environmental Impact Statement
SMCRA	Surface Mining Control and Reclamation Act
SO <sub>2</sub>	Sulfur Dioxide
tpy	tons per year
UEIA	US Energy Information Administration
USDA	US Department of Agriculture
USFS	US Forest Service (USDA)
USFWS	US Fish and Wildlife Service
VOC	Volatile Organic Compounds

## Chapter 1 Purpose and Need

### 1.1 Introduction

The US Department of the Interior (DOI), Office of Surface Mining Reclamation and Enforcement (OSMRE), Western Region Office, produced this environmental assessment (EA) to evaluate the impacts of a mining plan modification at the West Elk Mine, in Gunnison County, Colorado, near the town of Paonia (**Figure 1**). This EA has been prepared in cooperation with the US Forest Service (USFS) Paonia Ranger District, Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG); the Bureau of Land Management (BLM); and the Colorado Division of Reclamation, Mining, and Safety (CDRMS).

Mountain Coal Company, LLC (MCC), operator of the West Elk Mine, submitted a permit revision (PR-15) to the CDRMS, the regulatory authority for coal mines in Colorado, to revise Colorado Permit C-1980-007 to modify its currently approved mining plan. The mining plan modification proposed to add 1,720 federal coal acres to two federal coal leases, COC-1362 and COC-67232, which would include 54 acres of proposed surface disturbing activities to install mine ventilation boreholes (MVBs) and associated roadways, and a methane (CH<sub>4</sub>) emission control system which was submitted to the Mine Safety and Health Administration (MSHA) for approval (see **Appendix A**).

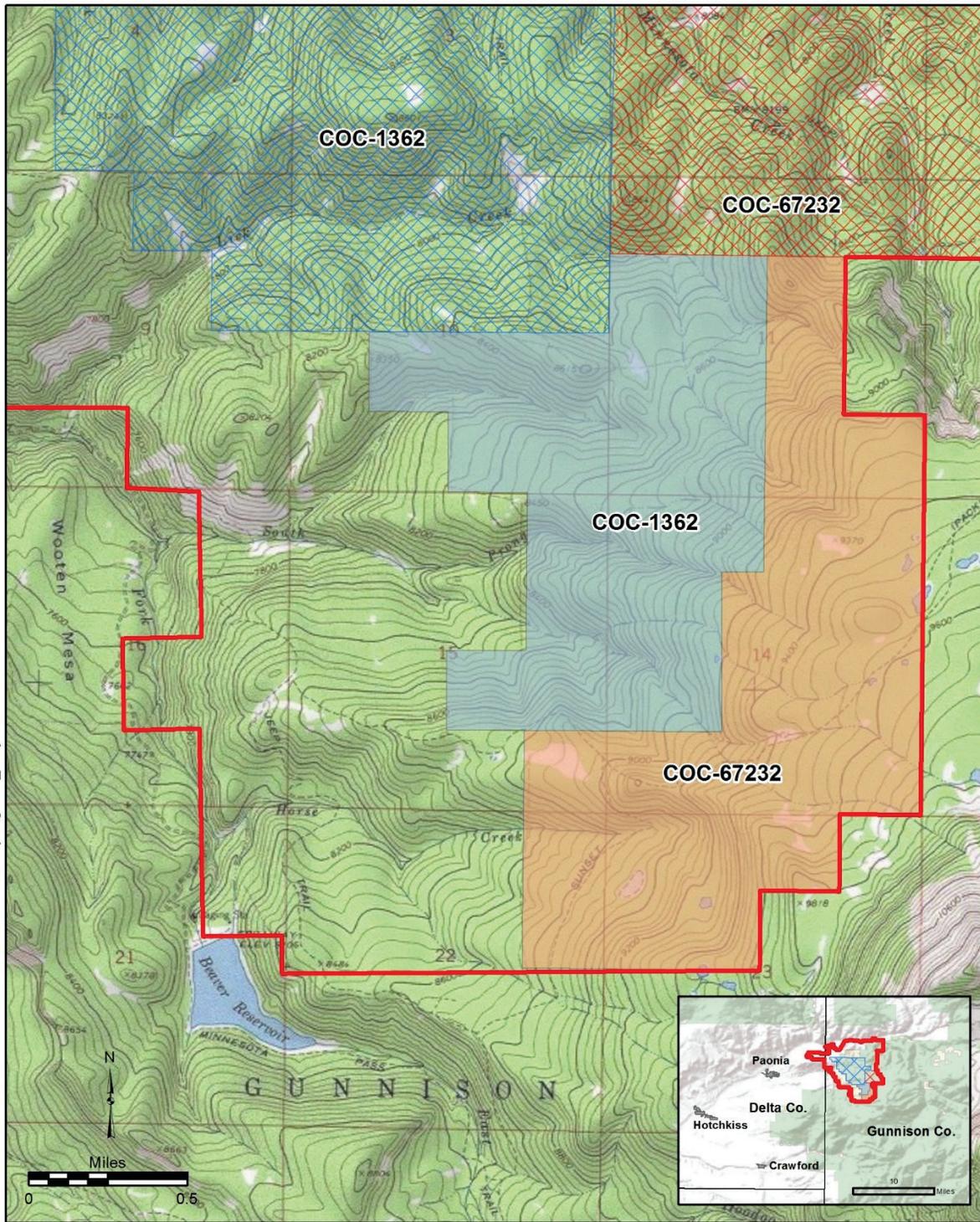
OSMRE is required to evaluate the permit revision before making a recommendation to the DOI Assistant Secretary for Lands and Minerals Management (ASLM) to approve, disapprove, or approve with conditions, the proposed mining plan modification. The ASLM will decide whether the mining plan modification is approved, disapproved, or approved with conditions. If the ASLM approves the Proposed Action, it would authorize the mining of approximately 10.1 million tons of coal in Federal lease modifications COC-1362 and COC-67232, extend the West Elk Mine life by about 2 years, include 51 acres of surface disturbance (revised from PR-15), and combust methane with the methane emission control system.

As a federal agency, OSMRE is subject to the National Environmental Policy Act of 1969 (NEPA) and must conduct an environmental review of the Proposed Action which includes PR-15 and the MSHA application. NEPA requires federal agencies to disclose the potential environmental impacts of projects they authorize and to determine whether the analyzed actions would significantly affect the environment. The term “significantly” is defined in 40 Code of Federal Regulations (CFR) 1508.27, which requires considerations of both context and intensity. If OSMRE determines that the project would have significant impacts based on the analysis in the EA, it would prepare an Environmental Impact Statement (EIS). If OSMRE determines that the potential impacts would not be significant, OSMRE would prepare a “Finding of No Significant Impacts” to document this finding, and, accordingly, would not prepare an EIS.

The impacts of the federal coal leases were analyzed in 2017 by the USFS in the Supplemental Final Environmental Impact Statement (SFEIS) for Federal Coal Lease Modifications COC-1362 and COC-67232 (including on-lease exploration plan) (USFS, 2017a). OSMRE and the BLM participated as cooperating agencies in the preparation of the SFEIS.

This EA is prepared in accordance with NEPA as amended and the President’s Council on Environmental Quality regulations for implementing NEPA (40 CFR 1500-1508); DOI regulations for implementation of NEPA (43 CFR Part 46); DOI Departmental Manual Part 516; and OSMRE guidance on implementing NEPA, including the OSMRE Handbook on Procedures for Implementing NEPA (OSMRE, 2019a).

Figure 1. Project Location



**Legend**

-  Permit Boundary
-  Federal Coal Lease COC-1362
-  Federal Coal Lease COC-67232
-  COC-1362 Lease Modification
-  COC-67232 Lease Modification

**Project Location  
West Elk Mining  
Plan Modification EA  
Gunnison County, Colorado**

## 1.2 Background

The West Elk Mine is an underground mine that uses longwall mining technology and has been operating since 1981, mostly beneath National Forest System lands.

The USFS, BLM, and OSMRE have conducted multiple environmental reviews for decisions related to the lease modifications including the USFS decision to consent to BLM lease modification, and decisions approving exploration and the mining plan modification. CDRMS approved the permit revision that included the lease modifications on November 14, 2018 (CDRMS, 2018). Some of these earlier approvals have been litigated, resulting in additional analysis and decisions, summarized below:

- 2009 MCC's parent company, Ark Land Company, LLC, requested modifications to increase the size of their federal coal leases.
- 2012 USFS and BLM conducted NEPA evaluations and approved the lease modifications (USFS, 2012a; USFS, 2012b; BLM, 2012).
- 2013 BLM conducted NEPA analysis on a coal exploration plan for the Sunset Trail Area (BLM, 2013a) and issued a decision (BLM, 2013b).
- 2014, judicial review vacated these three agency decisions (USFS consent, BLM leasing decisions and BLM exploration decision) and the Colorado Roadless Rule's North Fork Coal Mining Area exception.
- 2014 BLM cancelled the leases pursuant to the court order vacating the lease modifications.
- 2015 MCC and Ark Land, LLC resubmitted applications for lease modifications.
- 2017, USFS reinstated the coal mine exception to the Colorado Roadless Rule, 82 Fed. Reg. 9,973-74 (exception effective April 17, 2017). BLM and USFS initiated leasing part of the Sunset Roadless and issued a SFEIS (USFS, 2017a) and Record of Decision (ROD) (USFS, 2017b; BLM, 2017a).
- 2018, the ROD was again challenged, and the district court upheld the agency actions. The District Court decision was then appealed to the Tenth Circuit. This case is pending in the Tenth Circuit.
- 2018, MCC submitted an application for a permit revision (PR-15) to CDRMS and OSMRE determined that the activities proposed under PR-15 constituted a mining plan modification that would require a mining plan decision document (MPDD) and completed a NEPA adequacy review (OSMRE, 2018).
- 2019, as the two federal coal lease modifications included in PR-15 were analyzed in the 2017 SFEIS (USFS, 2017a) and OSMRE participated as a cooperating agency in the preparation of the SFEIS, OSMRE adopted the SFEIS and issued a ROD (OSMRE, 2019b) recommending approval of the mining plan modification.
- 2019, several groups challenged the MPDD in the U.S. District Court for the District of Colorado. On November 8, 2019 the court vacated the approved mining plan as well as OSMRE's recommendation of approval; and remanded the ROD back to OSMRE for further consideration. The court order rejected petitioners' challenge to OSMRE's assessment of the cumulative impacts of the decision on climate, but it found for petitioners on two other claims of error: first, that the

agency failed to properly consider an alternative requiring methane flaring as a condition of approving the mining plan modification; and second, that the agency failed to adequately consider effects on surface waters and fish in the vicinity of the mine.

- 2019, on November 19, MCC submitted a plan to flare methane to MSHA and CDRMS. CDRMS approved a minor permit revision (No. 439) for the mobile MVB flaring units.
- 2019, on November 21, BLM advised CDRMS of BLM's determination that the proposed minor revision (MR-439) to the mining plan would comply with the Mineral Leasing Act of 1920, as amended; all applicable requirements of both 43 CFR Subpart 3480; and the conditions and special stipulations of the federal leases involved. BLM also found that maximum economic recovery of the federal coal within the active federal leases COC-1362 and COC-67232 would be achieved (BLM, 2019).

Based on the District of Colorado's November 8, 2019 decision, OSMRE has prepared this EA to address deficiencies found by the court and further, in accordance with 40 CFR 1502.9[c][1], because of new circumstances identified regarding OSMRE's justification for excluding methane flaring from consideration as an alternative (see Section 1.5) and based on new information provided in the permit revision and additional information collected by OSMRE that is relevant to environmental concerns and has a bearing on the Proposed Action or its impacts. In accordance with 40 CFR 1502.9[c][2], OSMRE determined that the preparation of the EA would further the purposes of NEPA (42 U.S.C. 4321) by providing additional information on methane flaring options and analyzing potential impacts to air quality and climate change, water quantity, and wildlife and fish. The new or updated information includes a revised Ventilation Plan to address the addition of the methane emission control system, a revised Fire Management Plan (West Elk Mine, 2019b), and updated reports on existing hydrologic conditions and potential hydrologic impacts. The EA focuses on only those sections that the court identified as requiring updates and incorporates by reference the information from the SFEIS.

### **1.2.1 Previously Completed NEPA and Environmental Review Incorporated**

This EA is tiered to the descriptions and environmental analysis contained in the 2017 SFEIS (USFS, 2017a) including the 2010 Biological Assessment (USFS, 2010), which was found by the District of Colorado to have adequately analyzed potential environmental consequences of the Proposed Action and Alternatives based on information available to the USFS at the time the SFEIS was prepared. The SFEIS is incorporated by reference into this EA in accordance with 40 CFR 46.135 and available (along with associated documents) at: <https://www.fs.usda.gov/project/?project=32459>.

### **1.3 Regulatory Framework and Necessary Authorizations**

The extensive regulatory framework for management of coal leasing, mining, reclamation, and environmental protection are described in detail in Sections 1.6, 1.7, and 1.8 of the SFEIS (USFS, 2017a). The major regulations (statutes) relevant to OSMRE's evaluation of the Proposed Action are:

- Mineral Leasing Act of 1920 (MLA), as amended by the Federal Coal Leasing Amendments Act of 1975, which authorizes the leasing of coal reserves and conditions of the leasing;
- Energy Policy Act of 2005;

- Surface Mining Control and Reclamation Act of 1977 (SMCRA) (in conjunction with the CDRMS as the regulatory authority).

For existing approved mining plans that are proposed to be modified, as is the case here, OSMRE prepares a MPDD for a mining plan modification in support of its recommendation to the ASLM, who will decide whether or not to approve the mining plan modification and whether or not additional conditions are needed. Pursuant to 30 CFR 746.13, the OSMRE's recommendation shall be based on:

- The permit application package including PR-15 and MR-439;
- Information prepared in compliance with NEPA, including this EA;
- Documentation assuring compliance with the applicable requirements of federal laws, regulations, and executive orders other than NEPA;
- Comments and recommendations or concurrence of other federal agencies and the public;
- Findings and recommendations of the BLM with respect to the Resource Recovery and Protection Plan, federal lease requirements, and the MLA;
- Findings and recommendations of the CDRMS with respect to the mine permit application and the Colorado State program; and,
- The findings and recommendations of the OSMRE regarding additional requirements of 30 CFR Chapter VII, Subchapter D.

#### **1.4 Purpose and Need**

As described in 40 CFR §1502.13, the purpose and need statement briefly specifies the underlying purpose and need to which the agency is responding in proposing the alternatives including the Proposed Action.

OSMRE's purpose is to make a recommendation to the ASLM to approve, disapprove, or approve with conditions the proposed mining plan modification (for PR-15) as established by the MLA and the SMCRA and the methane mitigation emissions control system submitted to MSHA. OSMRE is required to evaluate MCC's permit revision before MCC may conduct underground mining and reclamation operations to expand the West Elk Mine on the two federal coal leases, COC-1362 and COC-67232.

This EA responds to the U.S. District Court's November 8, 2019 Order remanding the ROD back to OSMRE for further consideration of methane flaring and impacts to water and fish from the mining plan modification. The court also vacated OSMRE's recommendation to the ASLM and the ASLM's MPDD and enjoined operations at the mine related to that decision until OSMRE completes the additional analysis (see *WildEarth Guardians et al. v. Bernhardt* No. 19-CV-001920-RBJ, 2019 WL 5853870 (D. Colo. Nov. 8, 2019)). OSMRE is evaluating the implementation of the methane emission control system to combust methane gas from the MVBs consistent with the Order.

The need is to allow MCC the opportunity to exercise its valid existing rights granted under Federal Coal Leases, COC-1362 and COC-67232, to extract coal from their leased federal coal under the MLA.

#### **1.5 Issues**

In accordance with 40 CFR 1501.1 and 1506.3, OSMRE has identified the following environmental issues to further study to supplement the existing analysis completed in the SFEIS for the alternatives.

- Air Quality and Climate impacts related to greenhouse gas (GHG) emissions, and effects on the GHG emissions from flaring, described in Section 3.3;
- Water Quantity impacts related to perennial and intermittent streams, described in Section 3.4;
- Threatened and endangered species (including fish) impacts described in Section 3.5: and
- Migratory birds and birds of conservation concern impacts described in Section 3.6.

## Chapter 2 Proposed Action and Alternatives

### 2.1 Introduction

This chapter describes the alternatives considered and analyzed in detail; the Proposed Action (Alternative 1), the No Action (Alternative 2), and Alternative 3 (a variation of the Proposed Action). In addition, it identifies alternatives considered but eliminated from detailed analysis. This chapter also describes the current operations, which explains the continuation of activities under Alternatives 1, 2, and 3.

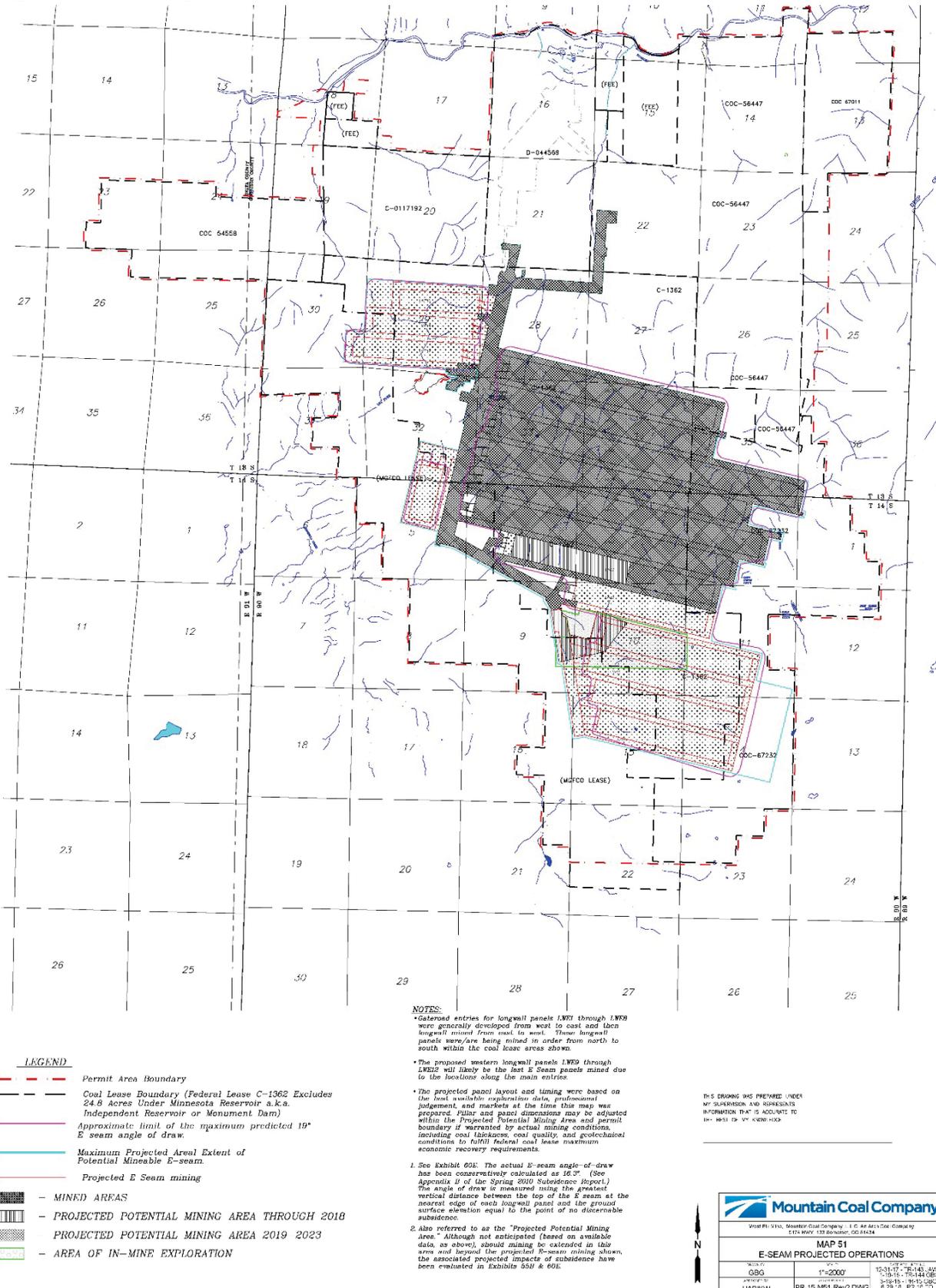
### 2.2 Existing Operations

The West Elk Mine has been in operation since 1981 and encompasses about 13,358.4 acres of federal coal leases and 6,496.5 acres of fee coal lands (USFS, 2017a), including the lease expansion areas. MCC is in the process of mining E-Seam reserves in previously permitted portions of COC-1362 and COC-67232 leases (**Figure 2**). Prior to the Judge's Order on November 8, 2019, MCC mined approximately 330,800 tons from the northern-most modified portion of lease COC-1362 from extended longwall panel E8 per the approved Technical Revision No. 143 (TR-143). Per approved Technical Revision No. 144 (TR-144), about 32,600 tons were mined from modified federal lease COC-1362 by development exploration of longwall panel SS1. No coal was mined from modified lease COC-67232 under either TR-143 or TR-144.

As described in the 2017 SFEIS (Sections 3.2 on pages 75 to 84), previously approved mining would continue including the activities related to mine ventilation such as installation of MVBs and their access roads in the parent lease areas of these modifications. Mining sequence will continue developing in a north to south/southeast manner across fee coal lands then developing and mining longwall blocks to the east across federal coal under National Forest System (NFS) lands. The currently approved operations include:

- Within a 1-mile area north of the project area (both developed and undeveloped), there are 58 approved Mine Ventilation Boreholes (MVB) on 46 drill pads.
- Within a 2-mile radius of the proposed lease modification area, 133 MVBs (126 on Forest, 7 on private land) are approved. Construction and drilling on the future E9 through E14 panels have not been completed. MCC would continue to develop the drill pads and MVBs on the E9 through E14 longwall panels in preparation for mining (SFEIS Section 3.2 on page 76).
- Reclamation associated with the E Seam MVB Project is following close behind development. West Elk Mine reports that all of the MVBs in panels E1 through E6 have been reclaimed except one in each panel that remains. Five MVBs remain available for flaring in panel E7, and 8 MVBs have been drilled in the E8 panel.
- Eleven exploration holes (6 north of and 5 west of the modification areas) are within ½ mile of the modification tracts; most were drilled in the 1990s to early 2000s. Some access roads are still visible. Post-mining reclamation success has returned lands to conditions consistent with Forest Plan Standards. Road closures and/or obliteration are preventing unauthorized vehicle use. Portions of old drill roads and some pads are currently being used for a mine methane ventilation project (SFEIS Section 3.2 on page 76).

Figure 2. Existing Approved Mine Plan



Longwall mining operations under the lease areas without the modification as described results in MCC running out of coal at the end of December 2019 when the currently approved longwall Federal coal is mined out. Following the end of all mining, MCC would implement the approved reclamation and closure plan.

### 2.3 Alternative 1: Proposed Action

The Proposed Action (Alternative 1) is to approve the mining plan modification (PR-15), which proposes to add 1,720 acres of federal coal (Federal lease modifications COC-1362 and COC-67232), to the currently approved mining plan at the existing West Elk Mine. MCC would conduct mining using underground longwall mining techniques producing approximately 4.5 million tons of coal per year. The action would authorize the mining of approximately 10,100,000 tons of coal and extend the life the West Elk Mine by approximately 2 years. Alternative 1 is similar to Alternative 3 selected as the Preferred Alternative in the 2017 SFEIS. As described in the SFEIS (Section 2.2.3 beginning on page 39), Alternative 3 modified existing Federal coal leases COC-1362 and COC- 67232 by adding 800 and 920 additional acres, respectively. The lease modifications assume underground mining in compliance with regulation. It is assumed that longwall mining practices would be used. Minor surface disturbance would occur on NFS lands as a result of subsidence (slight lowering of the land surface and possible temporary soil cracking along the outside edges of mined longwall panels) as the coal is removed. Other vegetation removal and soil disturbance would occur due to temporary road construction and well pad construction for drilling of MVBs which are required for safety of underground miners. Drilling MVBs without roads was considered in the SFEIS (Sections 2.3.1 and 2.3.2) and determined to be infeasible at this time (see **Appendix B** of the EA).

Based on Permit Revision PR-15 approved by CDRMS, the Proposed Action would include development of 43 MVBs within a two-mile radius of the proposed lease modification area (**Figure 3**). MCC has revised the number of MVBs to 39 since PR-15 was approved (**Figure 4**). Approved MVBs that have been or will be developed include well pads and access roads in the E1 through E12 longwall panels. Thirty-four MVB pads and 6.9 miles of road would be developed on Federal land and 5 MVB pads and about 1.5 miles of roads would be developed on MCC surface land. The construction of roads and MVBs would result in approximately 51 acres of surface disturbance.

The Proposed Action would also include a voluntary measure to combust methane gas from the MVBs as soon as technically feasible using one or two mobile flare units based on the MSHA application (West Elk Mine, 2019a) (see EA Section 2.3.2).

#### 2.3.1 Approved Activities Completed

Alternative 3 in the SFEIS included some activities that were completed before the District Court decision, and therefore these actions reflect the current conditions and are elements of the no action alternative. Completed activities include:

- Leasing (Section 2.2.3.1 of the SFEIS). BLM approved the lease modifications for COC-1362 and COC-67232 on December 1, 2017 after USFS consented to the lease modifications. As part of its consent, the USFS prescribed stipulations for the protection of non-mineral (i.e. surface) resources (see EA Section 2.3.3).

Figure 3. Methane Ventilation Boreholes (MVB) and Pads

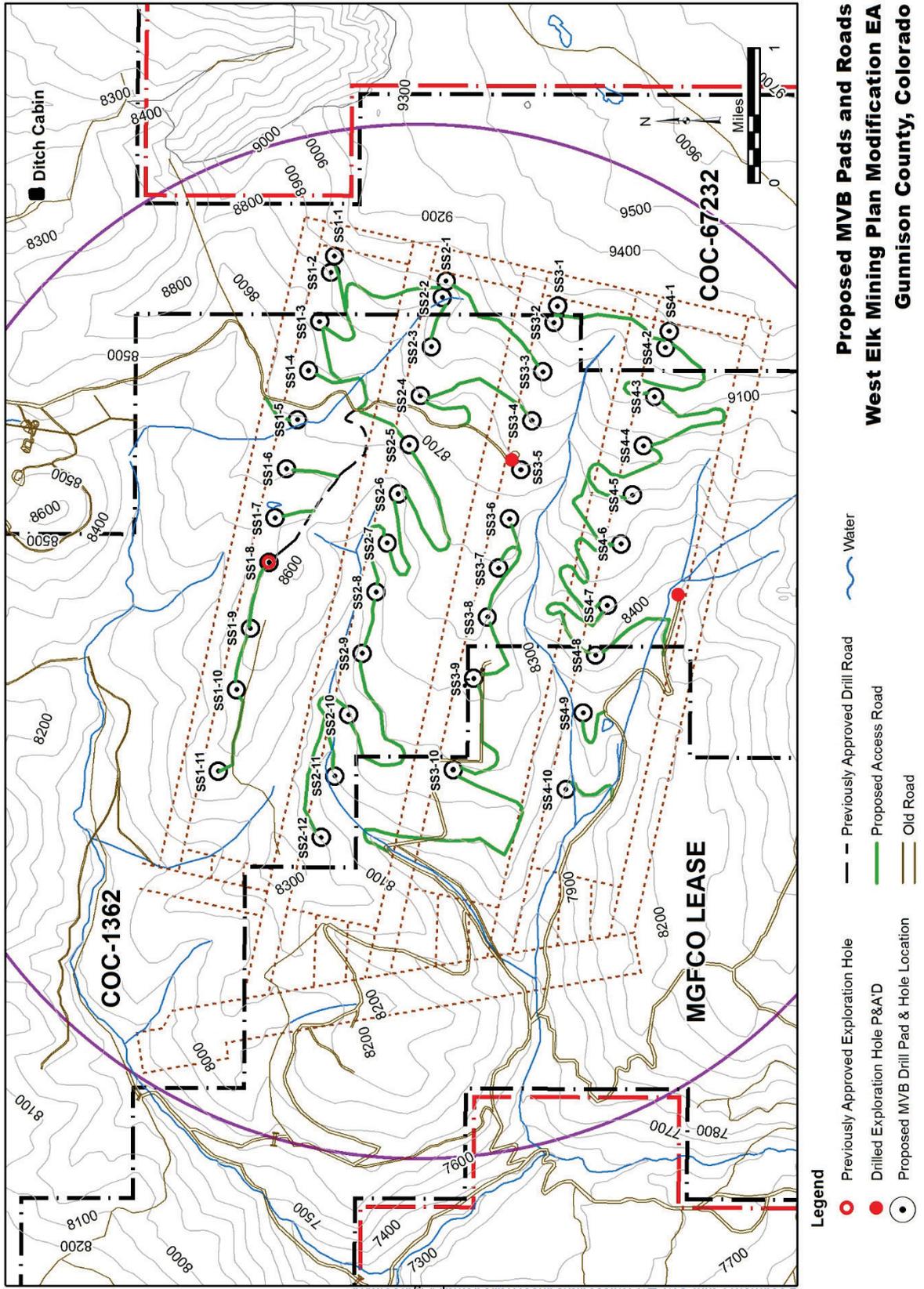
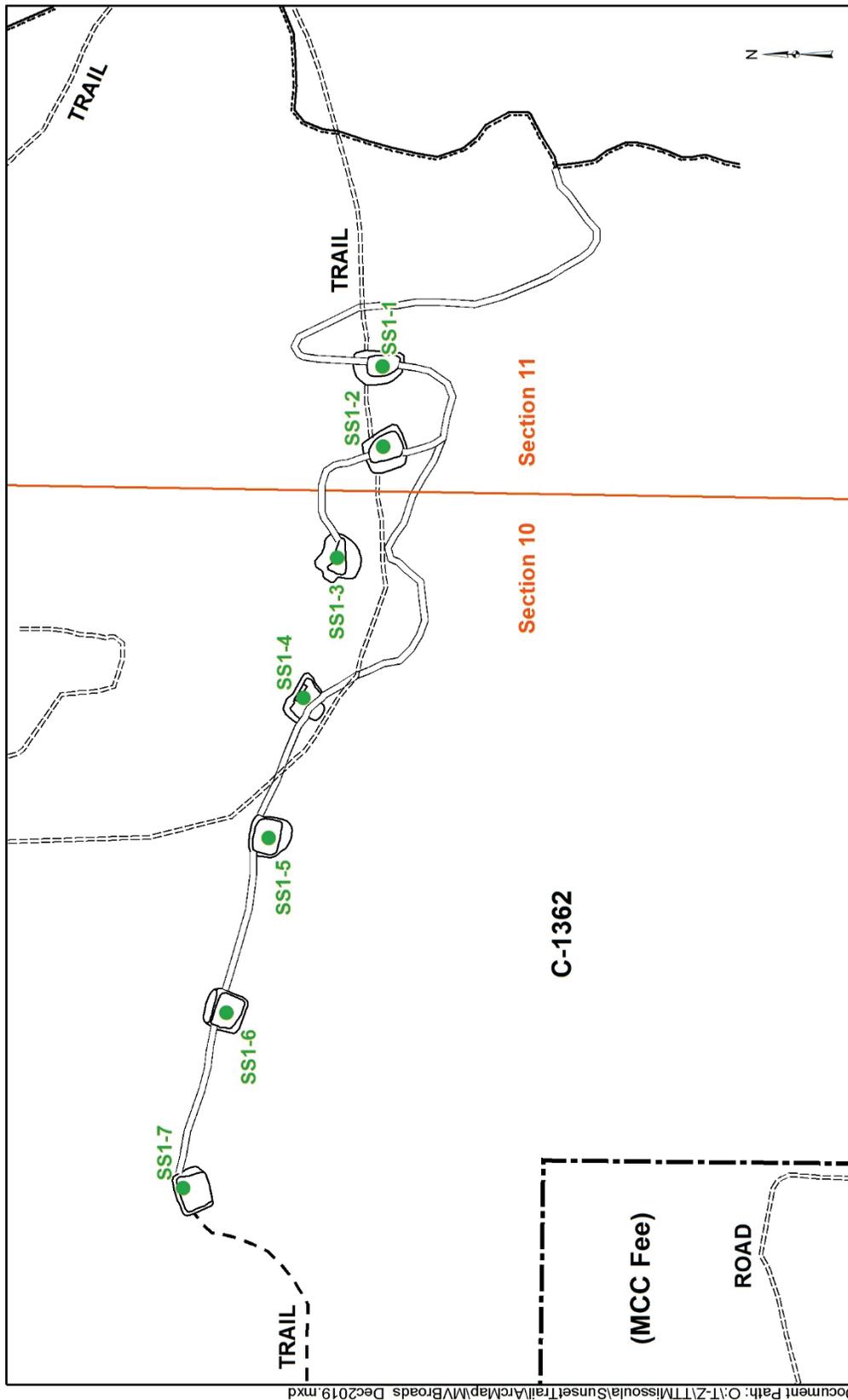


Figure 4. Minor Revisions for SS1 MVB and Road Map



**SS1 Panel MVB Roads and Pads As-Builts**  
**West Elk Mining Plan Modification EA**  
**Gunnison County, Colorado**

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Based on figure drafted by Mountain Coal Company, 12/5/2019

- Exploration (Section 2.2.3.2 of the SFEIS) (first and second field season exploration drilling, pre-drilling activities, road construction, drill site construction, modifications to surveillance for water levels, drill hole abandonment, access). Table 2-3 of the SFEIS identified the sites, locations, temporary access road lengths, and estimated disturbed acreage of the 10 exploration sites proposed was 22.7 acres (includes 0.32 acres on parent lease for access road). The exploration area coincides with existing modified coal leases COC-1362 and COC-67232. Exploration activities were scheduled to be completed within two field seasons. Exploration activities were conducted in 2018 and included a total of 3.2 miles of road, of which 1.3 miles was on private property, and pads for three exploration holes which disturbed about 1.21 acres, consistent with the 2017 SFEIS. No further exploration within the federal lease modification areas is planned.

### 2.3.1 Methane Emission Control System

A “Plan to Address a Methane Flare System” has been submitted by MCC to the MSHA. MCC reduced the number of MBVs in SS1 through a minor revision (No. 435) to CDRMS which was approved on June 25, 2019. The minor revision reduced the MBVs from 11 MBVs to 7 MBVs on SS1 panel (see **Figure 4**) and reduced the total acres of disturbance from 54 to 51. It is now expected that a total of 39 MBVs will be installed in accordance with West Elk Mine’s currently approved ventilation plan as panels are developed. Under the proposed revised ventilation plan submitted to MSHA, a mobile flare (trailer with equipment) would be placed at an individual MVB. If approved by MSHA, one to two mobile flares would be moved with the mobile exhauster units from MVB to MVB as the longwall mines from east to west in each longwall panel (see **Figure 3**). One flare will continue to combust methane as the mining moves to the next area where the second flare will operate. The northern-most longwall panel (LWSS1) would be mined first and progress to the south from longwall panel LWSS1 to longwall panel of the panel LWSS4. Two mobile flares may be operating at one time. Each mobile unit would be operated for about one month or less, depending on the rate of longwall mining. An exhauster and flare may also be run on an adjacent panel if needed to reduce methane levels in the main mine ventilation circuit. MCC would implement flaring as soon as technically feasible.

An operator responsible for the mobile flare unit would manually light a propane pilot light then activate the extraction system. Methane would be extracted using the exhauster currently in place or by a centrifugal blower system. The pilot light would ignite the flare. Electrical equipment on the flare trailer would monitor and record the methane concentration, along with the temperature, flow rate, quantity extracted, quantity flared, system operating time, and alarm conditions. Electrical equipment would be powered by a diesel generator or connected to the power grid, if available.

The flare would be shut off automatically if the methane concentration dropped below 30 percent, if the flare is less than 1400 degrees Fahrenheit for more than 10 minutes or if it is over 2000 degrees Fahrenheit. The methane would then be discharged from the free vent stack on the exhauster or the vertical ventilation borehole until the flare is manually restarted. The data logging and communication system would remotely alert the operator, who would then travel to the flaring trailer and reignite the flare when conditions improve.

MCC anticipates that the flare would operate 95 percent of the time that the exhauster operates. A flare would not be running if the methane concentration is not at a level high enough to operate the exhauster pump (at least 25 percent methane), which would lead to incomplete combustion, or while

the mobile flare is being moved from one MVB to the next. Also, no MVB exhausters and/or flares are needed to be run for one to three weeks when longwall equipment is being moved to a new longwall panel, depending on how long it takes to ramp up the longwall mining in the new panel. Moving to a new longwall panel would occur about every 9 to 10 months.

In December 2019, MCC submitted a revised flare plan to the MSHA, the agency tasked with ensuring conditions are safe for miners. MSHA is currently reviewing the methane emission control system proposed plan to include mobile mine ventilation flaring units. In order for the mobile flare units to be used by MCC, MSHA must approve MCC's application. Safety precautions identified in the plan include:

- Locating the trailer and diesel generator at least 30 feet from the MVB,
- Locating the flare stack at least 50 feet from the free vent stack,
- Removing dry trees and brush within 25 feet of the flare stack,
- Fencing and gates,
- Grounding of the trailer and diesel generator,
- An automatic fire suppression system on the diesel generator,
- Warning signs, and
- Proper equipment maintenance.

### **2.3.2 Lease Stipulations**

The lease modifications approved in 2017 included stipulations (see Table 2-1 of the SFEIS beginning on page 23). **Appendix B** lists the USFS, BLM, and CDRMS stipulations that apply to the lease modification and permit and where they originated.

### **2.3.3 Fire Prevention and Protection Plan**

Per lease Stipulations, West Elk Mine has submitted the following Fire Prevention and Protection Plan, modified for the flaring (#14), for the mine ventilation flaring to the USFS and received approval (West Elk Mine, 2019b). Measures from the plan to protect the National Forest from fire related to the methane flaring include:

1. Operator will do everything reasonable within its power and shall require its employees, contractors, and employees of contractors to do everything reasonable within their power, both independently and upon request of the USFS to prevent and suppress fires on or near the lands to be occupied under this plan. In case of fire suppressed by MCC, the operator shall report its occurrence to the USFS immediately. In order to complete this contact, the USFS Montrose Dispatch at (970) 249-1010 or the USFS Paonia Ranger District office at (970) 527-4131, will be called and otherwise notified.
2. Operator is responsible to ensure that each employee, subcontractor, or any other individual or company working on the project site is aware of the provisions of this fire prevention and protection plan, is familiar with the location and proper use of firefighting equipment, and conducts themselves in a fire-safe manner.

3. No material shall be disposed of by burning in open fires during the closed season established by law or regulation, or during periods of high to extreme fire danger, without a written permit from the USFS. Additional restrictions may apply depending on Forest conditions (i.e., Stage 1, 2, and 3 restrictions).
4. Exhaust systems of vehicles shall have an acceptable muffler and shall be in proper working condition. Chain saws and similar small motorized equipment shall be equipped with spark arresters, if required by the USFS.
5. Fire extinguishers shall be provided as follows: Type ABC: One 20-pound per pickup, and one 20-pound per each drill rig and truck over 1 ton gross vehicle weight. One 20-pound per dozer, motor patrol, scraper, or other earth-moving equipment while in operation.
6. MCC shall provide a fire box trailer complete with 4 axes, 4 long-handled shovels, 4 picks, and 4 5-gallon containers of emergency water.
7. Vehicles and earthmoving equipment will be parked only in disturbed areas.
8. Smoking will be allowed only in enclosed vehicles and enclosed cabs of earthmoving equipment on NFS lands.
9. The MVB drilling operations will have available a water tank of not less than 300-gallon capacity with a pump capable of pumping 20 gallons per minute at 100 pounds per square inch and not less than 300 feet of hose.
10. Welding activities include; electric arc welding, arc or gas-cutting or heating, gas welding, grinding of metal, use of any flammable gas, carbon or hydrocarbon fuel for heating or forging metal. No welding shall be conducted on NFS lands without the Operator's completed Hot Work Permit.
11. Operator's personnel will attend the fueling of tractors or other equipment. Personnel will exercise extreme caution and will watch for fire starts and be ready to take immediate fire suppression action. Personnel will carry a shovel and have a 20-pound fire extinguisher (full and in good operating condition) immediately available. Personnel will be in good physical condition and able to fight fires. Personnel have had training in basic fire fighting and shall immediately contact the USFS Montrose Dispatch or the USFS Paonia Ranger District office if a fire is discovered.
12. Operations may be suspended if inspection by a USFS officer reveals non-compliance with the provisions of this fire prevention and protection plan.
13. MCC shall, on an as-needed basis, contract helicopter or other necessary services that will supply access to the MVBs should normal access be cut-off by either smoke or fire.
14. The mobile flare unit connected to the mobile MVB exhauster system will be stabilized with outriggers and will be located at least 25 feet from the edge of the cleared MVB pad and/or dry trees and brush will be removed that same distance.

### 2.3.4 Possible Mitigation Measures

A potential mitigation measure for the Proposed Action would be based on the air quality and climate change analysis in Section 3.3 of this EA to make the voluntary measure from MCC to flare methane a mandatory requirement. This would require MCC to use the portable methane flare on all MVBs developed over the four panels included in PR-15 within the lease modifications. If extraordinary circumstances occur including (but not limited to): mechanical issues with the portable flare or lower concentrations of methane or impacts to worker or environmental safety, the mitigation measure would not be imposed. OSMRE could exercise this mitigation measure and could make a recommendation to the ASLM to approve the MPDD with conditions, which would have to be implemented before mining begins. However, MCC has already taken steps to implement flaring at West Elk Mine through the submittal of an application to MSHA and moving through the process to get an air permit from Colorado Department of Public Health and Environment (CDPHE).

If flaring is mandated, MCC would not be eligible for carbon credits under the California Air Resource Board Mine Methane Capture Compliance Offset Protocol (Air Resources Board, 2014). Without the carbon credits the use of the portable methane flares would no longer be economically feasible for MCC. Therefore, if OSMRE exercised this mitigation measure and made flaring mandatory MCC would likely cease mining operations after currently approved reserves are mined out and continue with reclamation.

On December 9, 2019, OSMRE received a concurrence letter from USFS which added the following measures to the existing lease stipulations from the 2017 SFEIS (see Appendix B for existing lease stipulations).

1. Inclusion of the Fire Prevention and Protection Plan (see above).
2. Inclusion of perch deflecting devices on mobile flare units to protect birds.

## 2.4 Alternative 2: No Action

The No Action Alternative (Alternative 2) would be for the OSMRE to recommend not approving the MPDD. No additional surface disturbance, mining or methane release from additional mining would occur in the lease modification areas. The SFEIS predicted mining would cease in approximately 2.7 years (from April 2017). MCC has indicated the No Action would result in the West Elk Mine running out of minable coal in December 2019.

The current ventilation plan that would continue until the end of December 2019 in the lease areas uses MVBs above longwall panels to exhaust methane when it reaches specified concentrations, similar to the description in the Proposed Action, without the mobile flare. Typically, one MVB ventilates the panel after longwall mining passes under it and the rubblized zone (caved area or gob) forms behind the borehole, releasing the methane trapped in the native rock materials. An exhaustor pump unit (powered by methane) operates to remove methane on the MVB until the longwall passes under the next borehole and the gases build up enough to keep the exhaustor on this new MBV running. At this point, the exhaustor on the last MVB is shut-off and the methane allowed to build-up in the rubblized zone to an inert level required in MCC's MSHA-approved plan, to well-above the 5 percent to 15 percent explosive range of methane.

## 2.5 Alternative 3

Alternative 3 is similar to Alternative 1 (Proposed Action), except the voluntary flaring to reduce methane release is excluded. Alternative 3 is similar to the Alternative 3 considered in the SFEIS (Section 2.2.3 of the SFEIS). The lease stipulations discussed in Section 2.3.3 would apply, but the methane emission control system discussed in Section 2.3.2 and #14 of the Fire Prevention and Protection Plan discussed in Section 2.3.4 would not apply.

The mining plan modification would add 1,720 acres of federal coal acres, to the currently approved mining plan at the West Elk Mine. The mining would be conducted using underground longwall mining techniques producing approximately 4.5 million tons of coal per year. The action would authorize the mining of approximately 10,100,000 tons of coal, extending the life the West Elk Mine by about 2 years.

Methane would be released from the mine and exhausted into the atmosphere as described in the No Action Alternative (Section 2.4). This alternative remains viable if MSHA does not approve the flaring plan due to safety concerns and continues to meet OSMRE's purpose and need.

## 2.6 Alternatives Considered but Not Studied in Detail

This section summarizes other alternatives OSMRE considered for the mining plan modifications at the West Elk Mine but dismissed them from further consideration. When an alternative is considered but not analyzed in detail, NEPA requires a brief description and explanation as to why they were eliminated from detailed study (40 CFR 1502.14). An alternative may be eliminated from detailed study if:

- It is ineffective (does not respond to the purpose and need for the proposed action);
- It is technically or economically infeasible (considering whether implementation of the alternative is likely, given past and current practice and technology);
- It is inconsistent with the basic policy objectives for the management of the area;
- Its implementation is remote or speculative;
- It is substantially similar in design to an alternative that is analyzed; or
- It would result in substantially similar impacts or more adverse impacts to an alternative that is analyzed.

### 2.6.1 Methane Flaring Alternatives

Evaluation of any alternatives for managing the methane released from the West Elk Mine requires the following considerations:

- Miner safety and mine safety regulations;
- Methane concentrations; and
- Estimates of expected gas ventilation rate for the lease modifications.

Unlike neighboring mines (e.g. Oxbow), where gob methane is being collected from an inactive mine, West Elk Mine cannot ventilate more methane than is necessary, as doing so has potential to compromise the safety of the mine and its miners (Tetra Tech, 2018).

No other flaring options were identified that would meet the purpose and need and provide better environmental or safety protections over the voluntary methane flaring included in the Proposed Action.

### **2.6.1.1 Enclosed Flares at Fixed Locations**

West Elk Mine vents methane out of its individual MVBs for 1 to 2 months before the long wall reaches the MVB, and venting continues for several months after the long wall progresses past the active venting MVB. Over the course of mining a long wall panel, multiple MVBs are installed, operated, and then plugged to help vent the mine. The number of MVBs actively venting varies depending on the gob gas characteristics, and mining rate. At West Elk Mine there are typically two active MVBs in use at any given time. Using a fixed flare to control the methane from active MVBs would require a system of pipelines to transport gas from the active MVBs to the fixed flare location(s). Equipment would be needed at each MVB to collect the gas and place it in the pipeline. The pipeline would then need to be moved or a new pipeline constructed every 1 to 2 months as the longwall proceeds. As burying the pipeline for such a short-term use would create additional ground disturbance and the need for reclamation following use, the pipeline would most likely be temporarily placed on the surface between MVBs. Locating the pipeline on the surface would expose it to weather and nefarious activity that could cause the pipeline to be damaged and leak methane, a potentially hazardous situation.

This alternative was not considered in detail because the environmental and public safety impacts would be greater than those of the mobile flaring option in the proposed action. Maintenance and monitoring activities for the pipeline and equipment would be greater and equipment at each MVB would still be needed, producing no additional environmental protections. It is unlikely that a fixed flare would increase the amount of methane that would be combusted, given the exhausters would likely be the same, and there is more potential for methane to be lost from the pipeline than the mobile flares proposed.

### **2.6.1.2 Open “Candlestick” Flares**

The proposed action includes an enclosed ground flare. Another option would be to use a flare that is above ground and open (known as a candlestick flare). Open candlestick flares are cheaper than the enclosed flare and could presumably be mounted on a trailer to be mobile or used at a fixed location.

An open flare is subject to dramatically decreased methane combustion efficiency in windy conditions. The efficiency of open flares cannot be monitored as accurately as enclosed flares (United Nations, 2016).

This alternative is not considered in detail because the environmental impacts would be much greater than those of the enclosed flare options. Open flares are visible and would have additional visual quality impacts (United Nations, 2016). An open flame in the National Forest would have significant potential for wildfire ignition which could have devastating secondary impacts such as extreme cost of fire suppression (a liability to the mining company), potential risk to life and property, impacts from wildfire on vegetation, water quality, wildlife, air quality, GHG emissions, and visual impacts for decades.

### **2.6.1.3 Controlling Methane from the Ventilation System Alternatives**

The coal mine methane expected to be liberated during the longwall mining process at the West Elk Mine is emitted through either the ventilation air shafts, which maintains the air quality in the mine by forcing fresh air through the underground mine then out a ventilation shaft; or the MVBs, which extract methane from the area that has collapsed after longwall coal extraction, called the gob area.

Currently, approximately 70 percent of the total coal mine methane emitted comes from the ventilation air shafts, and approximately 30 percent is from the MVBs. The ventilation air has a very low, concentration of methane (less than 0.11 percent methane on average since 2014) and a much higher air volume (about 1,665 million cubic feet per day). The MVB air has higher concentrations of methane (averaging around 57 percent), but a much lower volume (1.3 million cubic feet per day).

Flaring technology is better suited for gas streams with higher concentrations of combustible constituents, as is the case for the MVBs, but it is not appropriate for gas streams with methane concentrations below 25 to 30 percent and hence not appropriate for controlling the dilute concentrations of methane emitted through the ventilation air shafts. Thermal oxidation is better suited for controlling emissions from a high volume, low concentration gas stream. OSMRE considered an alternative that would use regenerative thermal oxidation to control the methane from the forced air ventilation system; either by oxidizing the methane in the ventilation air stream directly, or by first using the MVB gas to enrich the ventilation shaft air stream methane concentrations before directing it through an oxidation system. This alternative was not studied in detail because of technical constraints, as well as safety and environmental impacts.

Regenerative thermal oxidation is the only commercially operational technology capable of using coal mine ventilation air as a primary fuel when the methane concentrations are below 1.5 percent. Even then, in order to sustain the oxidizer's operation, the methane air concentrations need to be at least 0.25 percent. Since the existing West Elk Mine ventilation air shaft methane concentrations are less than 0.11 percent, the ventilation air stream would have to be supplemented to reach at least 0.25 percent methane. Conceivably, the ventilation air could be enriched with methane by collecting and transporting the gas from the MVBs to where the ventilation air is emitted. See the discussion under the "Enclosed Flares at Fixed Locations" alternative discussion above.

Evaluations (Tetra Tech, 2018) have demonstrated that it is not technically feasible to collect all the MVB methane, pipe it down to the mine entrance and blend the MVB flow with the ventilation shaft air to achieve a combined methane concentration level high enough to sustain oxidizer operations. There is not enough volume of MVB flow to enrich the concentrations to 0.25 percent. At best, it may be possible to increase the combined air concentrations to about 0.16 methane, well below the minimum 0.25 percent needed for sustaining the oxidizer operation. The West Elk Mine would need to collect 5 to 6 times more gas from the MVB system than is anticipated in order to raise the combined gas concentrations to 0.25.

Achieving 5 to 6 times more MVB gas production would require West Elk Mine to operate the MVBs in a manner designed to maximize methane collection from the gob. This would be a significant departure from how the mine is ventilated currently. It is likely enough methane would not be available. At West Elk Mine the MVBs are used only "as needed" to keep excess methane generated in the gob from reaching the in-mine ventilation circuits. Intentionally venting the MVBs more aggressively to collect more methane, beyond the minimum amount required, can draw in oxygen from the underground ventilated atmosphere into the gob areas, increasing the potential for spontaneous combustion. West Elk Mine is constrained in their ability to ventilate more methane from the MVBs than is necessary, lest they compromise the safety of the mine and their miners. Therefore, this alternative would not be technically feasible due to the potential mine safety impacts.

## 2.6.2 Other Alternatives Considered but Dismissed

### 2.6.2.1 Prohibit Construction of Roads in the Lease Areas

An alternative which prohibited construction of roads in the lease areas was considered but eliminated from further study in the SFEIS (USFS, 2017a) as Alternative 2. The alternative was eliminated from further study because it followed the provisions of the 2001 Colorado Roadless Rule. USFS determined that without the ability to construct temporary roads to access the lease modification areas there would be impacts to worker safety. In addition to worker safety impacts, this alternative was eliminated from further study because the 2001 Colorado Roadless Rule is no longer in effect and was replaced with 2012 Colorado Roadless Rule. Section 2.3.1 of the SFEIS details why this alternative was eliminated.

This Alternative would not meet OSMRE's Purpose and Need described in Section 1.4 of the EA and would prevent MCC from exercising rights to its valid Federal Coal Leases.

### 2.6.2.2 Lease only COC-1362

Under this alternative, USFS and BLM would have consented/leased the proposed modification to COC-1362 only, while not consenting to proposed modification to lease COC-67232. This alternative was fully considered in this analysis in the SFEIS (as Alternative 4). The analysis compared: reasonably foreseeable surface disturbance; amount of expected coal to be recovered; and extension of mine life of the Alternatives. The SFEIS analyzed the effects of post-lease surface activities under the 2012 Colorado Roadless Rule including temporary road construction in the Sunset Colorado Roadless Area. The on-lease exploration activities would remain similar to the Proposed Action except roads would stop at the lease modification boundary (**Table 1**).

**Table 1. Summary of Reasonably Foreseeable Actions by Alternative**

Action	Proposed Action	Lease Only COC-1362	Difference
Estimated Foreseeable Surface Disturbance (acres)	72	66	-6
Estimated Coal (tons)	10,100,000	9,265,000	-835,000
Estimated Foreseeable Extension of Mine Life (years)	1.6	1.4	-0.2

Considering the relatively small environmental footprint difference between Alternatives 3 and this alternative, and the temporary nature of the expected post-lease disturbance and past reclamation success at the West Elk Mine, this alternative would have substantially similar impacts as the Proposed Action and Alternative 3.

This alternative would not meet OSMRE's Purpose and Need as described in Section 1.4 of the EA and would prevent MCC from exercising its existing valid Federal Coal Leases issued by the BLM and consented to by USFS.

## 2.6.3 Other Alternatives Specific to this Analysis

Alternatives specific to this analysis that were considered, but that would not be analyzed in detail, are discussed in Section 2.3 of the SFEIS along with rationale for dismissal and included:

- Helicopter drill MVBs in roadless area
- MVBs using horizontal boreholes or directional drilling technology
  - Directionally Drill MVBs from Outside Roadless

- Use Horizontal Boreholes or Longhole Horizontal Boreholes
- Consideration of other mining methods
- Mitigate the potential GHG emissions of the project by requiring MCC to use MVB to combust methane in ventilation air
- Mitigate the potential GHG emissions of the project by requiring MCC to purchase carbon credits or do off-set mitigations
- Mitigate the potential GHG emissions of the project by requiring MCC to use other potential methane mitigation measures
  - Methane Capture to Power On-Site Heaters
  - MVB Emissions Capture
  - MVB Capture, Electricity Production
  - MVB Capture, Sale Gas
  - Flaring (MVB Emissions) (see above)
  - Thermal Oxidation (ventilation and MVB Emissions)
- Prevent all future disturbances from road construction, methane drainage well pads and the like in Roadless Areas
- Shrink the boundaries of the lease to conform to the area where the coal will be mined underground
- Protect values of the area by using this set of stipulations for the Proposed Action
  - No Surface Occupancy (NSO) stipulations prohibiting road and MVB well pad construction within ¼ mile of the hiking route known as “Sunset Trail,” which traverses the lease modification, to protect recreational values.
  - NSO stipulations prohibiting road and MVB well pad construction for all areas within ¼ mile of: (a) all lynx denning habitat; (b) all lynx winter foraging habitat; and (c) all lynx foraging habitat which is adjacent to lynx denning habitat.
  - NSO stipulations prohibiting road and MVB well pad construction for all areas within ¼ mile of a water influence zone.
  - NSO stipulations prohibiting road and MVB well pad construction for all areas within ½ mile of the West Elk Wilderness boundary, to protect roadless, wildlife, scenic, and other values.
  - NSO stipulations prohibiting road and MVB well pad construction within ¼ mile of any old growth forest to prevent fragmentation.
  - Until the Forest Plan is amended to address new information about the threat of climate change, the GMUG should protect existing mature forest through an NSO stipulation.
  - NSO stipulations prohibiting road and MVB well pad construction within ½ mile of any raptor nest site.

- NSO stipulations prohibiting road and MVB well pad construction on slopes greater than 40% to protect soils and prevent erosion.
- For Exploration, use helicopters to transport drill rig
- For Exploration, do not consider redundant access
- For Exploration, analyze only the holes proposed to be drilled during the first field season.

## 2.7 Alternatives Comparison

**Table 2** summarizes the activities and impacts of the alternatives considered in detail in the EA.

**Table 2. Alternative Comparison**

Feature	Proposed Action	No Action	Alternative 3
<b>Underground mining</b>	Removal of 10,100,000 tons of coal for 2 years	Removal of no coal and mine closure end of 2019	Same as Proposed Action
<b>Methane management</b>	Voluntary methane flaring using mobile flares	No methane flaring	No methane flaring
Issue	Proposed Action	No Action	Alternative 3
<b>Air Quality and Climate – Methane emissions (tons per year)</b>	15,679	0	26,050
<b>Air Quality and Climate – CO<sub>2</sub> emissions (tons per year)</b>	52,527	0	37,462
<b>Air Quality and Climate – 100-year CO<sub>2</sub>e emissions (tons per year)</b>	616,015	0	975,451
<b>Air Quality and Climate – 20-year CO<sub>2</sub>e emissions (tons per year)</b>	1,416,859	0	2,303,981
<b>Water Quantity</b>	Reduction in flow in some springs are expected to be long-term but minor because of the small flow volumes and possible seasonal flows from subsidence cracks.  Water depletion of ~4.5 acre-feet from the NFS from drilling  No impact from the methane flares.	No mining-induced effects	Same as Proposed Action.
<b>Water Quality</b>	No impact on stream or spring water quality	No impacts	Same as Proposed Action

Feature	Proposed Action	No Action	Alternative 3
<b>Fish and Wildlife – Impacts on Threatened and Endangered Species</b>	No additional impact from mobile flares. Subsidence of surface topography and the installation of MVBs and roads, totaling 1,221 acres of lynx habitat within the Lynx Analysis Unit.	No changes in current habitat or population conditions of Canada lynx.	Subsidence of surface topography and the installation of MVBs and roads, totaling 1,221 acres of lynx habitat within the Lynx Analysis Unit.
	Impacts on the 4 Colorado River fish are depletions of 4.5 acre-feet of water from drilling	No effect on the 4 Colorado River fish, no water depletions.	Same as Proposed Action
<b>Fish and Wildlife – Impacts on Migratory Birds, Birds of Conservation Concern, and Raptors</b>	Potential injury or fatality if birds attempt to perch on the flare stack when operating (1 to 2 months). Short-term alteration of habitat from clearing vegetation around flares.  Some alteration of up to 75 acres of bird habitat in the short-term from the installation of the MVBs and roads on individual migratory birds, especially passerines and other birds that uses aspen, spruce-fir, and oak for nesting.  No long-term direct or indirect effects.	No change in current habitat or population conditions.	Habitat effects are the same as Alternative 1.  No effects from flaring.

## Chapter 3 Affected Environment and Environmental Consequences

### 3.1 Introduction

This chapter describes the existing conditions and presents the potential direct, indirect, and cumulative impacts from implementation of the Proposed Action and Alternatives. The scope of this EA is limited to the issues discussed in Section 1.5 and discloses impacts related to those issues. Within this section, the terms “effects” and “impacts” are used interchangeably. Each resource analysis discusses direct, indirect, and cumulative effects. Direct effects are those that would occur at the same time and place as the project. Indirect effects are caused by the alternatives, but that occur later or at a greater distance from the actions. Cumulative effects are those impacts which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Impacts are described by level of significance:

- No Impact: No discernible or measurable impacts.
- Negligible Impact: Impacts in the lower limit of detection of an impact that could cause an insignificant change or stress to an environmental resource or use.
- Minor Impact: Impacts that potentially could be detectable but slight.
- Moderate: Impacts that potentially could cause some change or stress to an environmental resource, but the impact levels are not considered major.
- Major: Impacts that potentially could cause significant depletion, change, or stress to resources or stress within the social, cultural, and economic realm.

Another factor in the significance is the timeframe when impacts would occur. The impacts identified as short-term would be expected to last throughout the development, mining, and active reclamation periods. Impacts identified as long-term would last beyond the reclamation period.

Cumulative impacts can result from individually minor but collectively significant actions taking place over time (40 CFR 1508.7). Naturally occurring events are not considered actions, for example, a wildland fire is not an action; however, the effects of fire suppression or rehabilitation are actions that would be considered. Cumulative impact analysis areas are defined for each resource, depending on the extent of potential indirect impacts and are defined in each resource section.

The following resources have been eliminated from detailed analysis in this EA because the resource was adequately analyzed in the SFEIS (USFS, 2017a). **Table 3** lists the resources incorporated by reference, the SFEIS section that is incorporated, a summary of the impacts on those resources from approval of the MPDD and a description of why the impacts were not analyzed in detail in this EA. The No Action impacts would be the same as those evaluated for the No Action in the SFEIS. The impacts from Alternative 3 in the EA would be the same as the impacts evaluated in Alternative 3 in the SFEIS. **Table 3** notes where and why the impacts from the Proposed Action evaluated in the EA would be the same as Alternative 3 evaluated in the SFEIS and are incorporated by reference into this EA.

**Table 3. Resources Incorporated by Reference**

Resource	SFEIS Section	Summary from SFEIS - Alternative 3 (Roadless)	Justification
Topographic & Physiographic Environment	Section 3.5 Pg. 130	Subsequent mining may result in surface subsidence of up to 8 feet and 1,077 acres (includes ~357 acres on private and adjacent parent leases).	Impacts from the proposed action and alternatives in the EA would be the same as the impacts described in the SFEIS.
Geology	Section 3.6 Pg. 135	Subsidence may aggravate existing geologic hazards, create surface cracks, and cause localized seismic events. Lease stipulations should minimize effects. Mining of coal would reduce future recoverability of oil and gas resources.	The quantity of coal mined in Alternative 1 and 3 in the EA is equal to the quantity analyzed in the SFEIS. Voluntary flaring to reduce methane release does not impact the geology.
Soils	Section 3.7 Pg. 143	Cracks and other self-healing surface expressions of subsidence. Approximately 72 acres may see some soil loss and reduced productivity due to post-lease surface disturbance. Lease stipulations and best management practices should minimize effects. Additionally, approximately 63 acres of soils may be disturbed on parent leases and adjacent private lands because of the COC-1362 lease.	No additional soil disturbance would occur from Alternative 1 than was evaluated in Alternative 3 the SFEIS. The mobile flares would be placed on previously disturbed areas.
Vegetation	Section 3.9 Pg. 168	Subsidence is expected to have minimal disturbance on vegetation. Post-lease surface disturbance is expected to remove vegetation from up to 72 acres. Reclamation requirements will ensure that appropriate species are used to revegetate the area and return it to productivity. Additionally, approximately 63 acres of vegetation may be removed on parent leases and adjacent private lands because of the COC-1362 lease modification.	Vegetation removed during drill pad construction was evaluated in the SFEIS. Because the mobile flares would be placed on this previously disturbed area there would not be any additional impacts to vegetation. The size of the drill pads analyzed will accommodate the requirements to clear dead vegetation from near the flare.
Forest Service Sensitive Wildlife Species	Section 3.11 Pg. 194	American marten, pygmy shrew, northern goshawk, boreal owl, olive-sided flycatcher, flammulated owl, Hoary bat, Monarch butterfly, western bumble bee, American three-toed woodpecker, northern leopard frog, and purple martin- “may adversely impact individuals, but is not likely to result in a loss of viability in the planning area nor cause a trend toward federal listing.”	The impacts on USFS sensitive species would be the same as described in the SFEIS except birds, which are analyzed in Section 3.6 of the EA.
Forest Service Sensitive Plants	Section 3.12 Pg. 216	Colorado tansy aster-no effect. Rocky Mountain thistle-not known to date in lease modification area, but habitat may be enhanced from disturbance	Per the SFEIS there is only one sensitive plant species that would likely occur at or near the proposed action and no occurrences of this

Resource	SFEIS Section	Summary from SFEIS - Alternative 3 (Roadless)	Justification
		associated with post-lease development.	species have been documented in the project area and it is unlikely to occur in the project area. The project area evaluated in the SFEIS is the same as the Alternative 1 project area.
Forest Service Management Indicator Species	Section 3.13 Pg. 218	Elk, Merriam's wild turkey, and red-naped sapsucker-negative effects are of short duration and magnitude and do not result in a forest-wide decrease in trends or deter from meeting the MIS objectives in the Forest Plan. (Other MIS species are addressed as Sensitive Species).	The 1982 Planning Rule 36 CFR 219.19(a)(6) related to Management Indicator Species requires the USFS to produce a unique list of species to represent Forest communities or ecosystems. No new species have been added to this list since the SFEIS was published.
Range Resources	Section 3.15 Pg. 229	<p>Post-lease development may result in short-term forage loss, subsidence (1,077 acres) damage to stock ponds, altered fences, filled-in cattle guards, grazing management/ distribution problems, cattle drift onto private land, and noxious weeds. Following best management practices and coordination with Range Conservationist/ permittees when post lease development will minimize these effects.</p> <p>Forage will be removed in the short-term from about 72 acres, but conversion to forbs will enhance grazing once reclaimed. Additional 63 acres of predominantly oakbrush and aspen may be removed from parent leases and adjacent private lands due to lease modification.</p>	The surface disturbance for the Alternative 1 is the same as Alternative 3 in the SFEIS therefore there are no additional impacts.
Recreation	Section 3.16 Pg. 233	No change to recreation opportunities available. Subsidence cracks may form on a non-motorized, non-system trail but would be expected to be minor. Post-leasing development may improve access on NFS Road 710 and cause big game to temporarily move out of the area.	Alternative 1 is the same as Alternative 3 evaluated in the SFEIS with the exception of the voluntary use of mobile flares which would have no additional impacts on recreation.
Transportation System	Section 3.17 Pg. 239	<p>No subsidence-related damage to system roads would occur from mining coal in the lease modifications.</p> <p>Post-lease development traffic on NFS Roads 711 and 710 in the lease would be consistent with current activities.</p> <p>New post-lease roads would not be open to the public consistent with recent Travel Management Plan.</p>	The project area evaluated in the SFEIS is the same as the Alternative 1 project area therefore the road systems in the vicinity of the project area were sufficiently evaluated in the SFEIS.

Resource	SFEIS Section	Summary from SFEIS - Alternative 3 (Roadless)	Justification
Roadless	Section 3.18 Pg. 243	Roadless character and values will be managed consistent with Colorado Roadless Rule. Short- term impacts to Sunset CRA will occur, but return to baseline conditions (i.e., roadless) after well pad and temporary road reclamation. Post-lease activities may disturb up to 72 acres on lease modifications within Sunset roadless and an additional ~28 acres on parent leases in Sunset CRA.	The SFEIS evaluated the 3 Colorado Roadless Areas affected by the project. The project area evaluated in the SFEIS is the same as the Alternative 1 project area and there are no additional Colorado Roadless Areas affected.
Heritage Resources	Section 3.19 Pg. 262	No potential to affect cultural resources. On-the-ground surveys will be needed for site-specific ground-disturbing activities and is enforced by the Forest Service standard lease stipulation.  Surveys for exploration have been completed with no potential to affect cultural resources.	The SFEIS evaluated the Heritage Resources within the lease modification area is the same as the Proposed Action project area. OSMRE is re-initiating Section 106 consultation under the National Historic Preservation Act with Colorado State Historic Preservation Office for the Proposed Action including the mobile methane flares; however, OSMRE does not anticipate any additional impacts not previously analyzed under the SFEIS.
Visuals	Section 3.20 Pg. 263	No major impacts to visual resources are expected from subsidence or subsidence-related events. Post-leasing development is not likely to be seen from public travelways, but topographic and vegetative screening will also prevent visual intrusion.	The project area for visual resources analyzed in the SFEIS is the same as the Proposed Action project area.
Socioeconomic s	Section 3.21 Pg. 271	The mining sector and associated rents, royalties, and payments to states/ counties would be extended in proportion to the quantity of federal coal mined. Operations would be extended approximately 1.4 years directly (and 2.7 years cumulatively which includes fee reserves).  A total of \$255.8 million in royalty revenue would be collected by the Federal government over the 10.9 years of coal production, which is \$69.2 million more than what would be collected under the No Action Alternative.	The SFEIS evaluated Socioeconomic resources for Alternative 3 which is similar to Alternative 1 in this EA, with the exception of voluntary flaring. The mine life extension would, however be 2 years, instead of the 2.7 years.

Source: Table 2-6 Comparison of Alternatives. Alternative 3 pages 66-73 (USFS, 2017a).

## **3.2 Past Present and Reasonably Foreseeable Actions**

The past, present, and reasonably foreseeable actions are described in detail in the 2017 SFEIS (USFS, 2017a) in Sections 3.2 and 3.3 on pages 75 to 93 and the reasonably foreseeable mine plan for Alternative 3 is detailed in the 2017 SFEIS (USFS, 2017a) in Sections 3.3.2 on pages 90 to 91.

## **3.3 Air Quality and Climate**

### **3.3.1 Affected Environment**

The directly affected area for the air quality analysis is described in Section 3.3.1.1 below. Indirect effects associated with coal transport and combustion occur at numerous locations. The exact rail transportation routes are not known due to the various coal consumers and potential routes that could be used. The Cumulative Effects study area is consistent with the area analyzed in the Colorado Air Resources Management Modeling Study (BLM, 2017b).

The SFEIS describes the existing air quality and climate conditions in Section 3.4.1 beginning on page 93. Air quality is determined by the quantity of pollutants released near and up wind of the region and is highly dependent on the chemical and physical properties of the pollutants as well as the area's terrain and weather. A brief summary of these determining factors is in Sections 3.3.1.2 through 3.3.1.7 below.

#### **3.3.1.1 Airshed for Analysis**

The affected area for the air quality analysis of the direct effects of the Proposed Action includes northern Delta and Gunnison counties, although most direct air quality impacts would be limited to the vicinity of the mine within the North Fork Valley.

All geographical regions in the U.S. are assigned an air quality priority Class (I, II, or III) which describes how much degradation to the existing air quality is permitted within the area under the Prevention of Significant Deterioration (PSD) permitting rules. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value, and essentially allow very little degradation in air quality, while Class II areas allow for reasonable industrial/economic expansion. There are currently no Class III areas defined in the U.S.

The project area is in a Class II area as codified in the Colorado State PSD permitting rules. The closest Class I areas to the mine are the Black Canyon of the Gunnison National Park, roughly 24 miles away to the west, and the West Elk Wilderness which is about 6 miles to the east from the mine (USFS, 2017a).

#### **3.3.1.2 Regulatory Requirements**

Regulatory requirements include both state and federal ambient air quality standards. The Clean Air Act also regulates air pollution in classes which are governed by the PSD regulations (40 CFR 52.21).

The SFEIS describes regulatory requirements for the Proposed Action in detail, including the National Ambient Air Quality Standards (NAAQS) (Section 3.4.1.1 page 93), hazardous air pollutants (Section 3.4.1.1 page 97), greenhouse gasses (Section 3.4.1.3), airshed classifications and Prevention of Significant Deterioration (PSD) (Section 3.4.1.5), and emissions source classifications (Section 3.4.1.5).

#### **3.3.1.3 Hazardous Air Pollutants**

The majority of the HAPs emitted from the West Elk Mine are the result of the off-road heavy equipment. The major source threshold for HAPs is 10 tons per year (tpy) of any one HAP or 25 tpy of aggregate HAPs (40 CFR 63.2). The largest component of HAPs emissions from these diesel engines is

typically benzene compounds. These pollutants are not expected to be emitted in quantities greater than 0.1 tpy (based on typical emissions factors), and thus analysis of HAPs will not be discussed further in this EA.

### 3.3.1.4 Regional Air Quality

Regional air quality monitoring data was evaluated in the SFEIS (Section 3.4.1.1 page 97) and **Table 4** shows recent ambient air quality monitor data for potential pollutants of concern from monitors located in or near the affected area. The primary pollutants of concern for the Proposed Action are fugitive particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and greenhouse gasses (GHGs) (as determined from the emissions inventory presented below and based upon CDPHE issued permits for the facility). The area monitors also show that ozone (O<sub>3</sub>) levels are relatively close to the 2015 EPA standard. The O<sub>3</sub> NAAQS is the 4<sup>th</sup> high averaged over 3 years. The highest 3-year average is 65.3 parts per billion for both the Gunnison and Mesa sites from 2016 to 2018, which is approximately 93 percent of the standard. The data shows that air quality within the region is generally considered good, and the area is currently in attainment status for all criteria pollutants. The monitoring data excludes exceptional events. The database contains ambient air pollution data collected by USEPA, state, local, and tribal air pollution control agencies, and from various federal land managers from thousands of monitors (USEPA, 2019). Monitoring data is limited, and all pollutants are not monitored at all monitoring locations, and thus data for a pollutant may not be available for all portions of the affected environment. The 2011 and 2014 National Emissions Inventory Data for Delta and Gunnison counties is in Section 3.4.1.3 of the SFEIS on page 99.

**Table 4. Regional Ambient Air Quality Monitoring Results**

Pollutant	Averaging Time	County	2014	2015	2016	2017	2018	Percent of NAAQS
PM <sub>10</sub>	24-hour (µg/m <sup>3</sup> )	Delta	49	54	73	53	47	37%
		Gunnison	97	76	72	89	60	53%
		Mesa	45	34	35	44	38	26%
PM <sub>2.5</sub>	Annual (µg/m <sup>3</sup> )	Mesa	7.4	6.8	6.4	5.7	5.9	54%
O <sub>3</sub>	24-hour (µg/m <sup>3</sup> )	Mesa	21	21	21	16	16	54%
	8-hr (ppm)	Gunnison	0.063	0.068	0.062	0.065	0.069	93%
		Mesa	0.062	0.065	0.063	0.064	0.069	92%
CO	8-hr (ppm)	Mesa	0.9	0.9	1	0.9	0.8	10%
	1-hr (ppm)	Mesa	1.7	1.4	1.8	1.2	1.1	4%

Source: (USEPA, 2019)

Notes: µg/m<sup>3</sup> = micrograms per cubic meter, PM<sub>2.5</sub> = particulate matter emissions that are less than of 2.5 microns in diameter; PM<sub>10</sub> = particulate matter emissions that are less than 10 microns in diameter.

Where multiple monitors for single pollutant exist within the same county, the monitor with the highest values is presented to the reader for the purposes of this analysis. Percent NAAQS is the average of the available 5-year monitoring history.

### 3.3.1.5 Existing Emission Sources

Emissions sources are regulated according to their type and classification and generally fall into two broad categories, stationary and mobile. Stationary sources are in a fixed location, are non-moving and fall into two categories, point sources and fugitive emissions. Point source pollutants are released through vents or stacks and fugitive emissions are emissions that do not pass through a vent or a stack.

Major sources are stationary sources that emit, or have the potential to emit, a regulated air pollutant in quantities above a defined threshold. Stationary sources that are not major are considered minor or area sources. The West Elk Mine is classified as a synthetic minor source and has been issued Air Pollution Control Division (APCD) permits for its surface facility operations (summarized in **Table 5**).

**Table 5. West Elk Emissions (Maximum TPY)**

Source	Permit	PM10	PM2.5	VOC	NO <sub>x</sub>	CO	SO <sub>x</sub>
Multiple – Point <sup>1</sup>	09GU1382	60.3	---	---	---	---	---
Multiple – Fugitive <sup>1</sup>	09GU1382	27.9	---	---	---	---	---
Emergency Generator <sup>2</sup>	10GU1130	0.72	0.72	1.79	12.36	15.23	0.33
Rock Dust Silo <sup>3</sup>	13GU1462	0.06	0.06	---	---	---	---
Emergency Generator <sup>4</sup>	13GU1463	0.005	0.005	0.12	0.12	0.09	0.005
Emergency Engine <sup>5</sup>	14GU0697.XP	1.53	1.48	1.86	21.14	9.89	0.33
Emergency Generator <sup>6</sup>	16GU0031.XA	0.27	0.27	0.3	3.7	0.82	0.0037
Fuel Tanks <sup>7</sup>	93GU886.XA	---	---	1.99	---	---	---
Totals		79.7	1.1	4.7	20.0	16.2	0.06

Source: (CDPHE, 2019)

1 Emissions based on 11/13/2014 APEN Update.

2 Emissions based on 1/22/2015 APEN Update.

3 Emissions based on 1/9/2018 APEN Update.

4 Emissions based on 2/15/2013 APEN Revision.

5 Emissions based on 1/9/2018 APEN Update.

6 Emissions based on 11/3/2015 APEN.

7 VOC data is based on maximum APEN exemption amount of 2 tons per year.

PM is the highest emitted criteria pollutant from stationary sources at the West Elk Mine. Sources of PM include various coal handling equipment such as conveyors and transfers, coal storage silos and feeders, coal storage and refuse piles, coal mine ventilation shafts, a coal preparation plant, coal hauling operations, an emergency generator, and miscellaneous exempt sources (such as heating equipment and fuel storage tanks). The APCD permits limit emissions of PM by setting various process limitations. The mine's primary permit, 09GU1382 (CDPHE APCD, 2010), limits the total amount of material handled (coal and refuse) to 8.5 million tons per year, the total quantity of refuse material from the coal preparation plant and reclaim tower is limited to 1 million tons per year, truck hauling from the ROM stockpile to off-site locations is limited to 0.5 million tons per year, and the amount of coal that can be processed by the coal preparation plant is limited to 4.5 tons of coal per year. The primary permit also has set limits for the sizes of coal stockpiles and the hours of operation of maintenance activities on the main stockpiles, silo stockpiles, and refuse piles., and. This permit contains a fugitive dust control plan requirement which applies to all of the coal processing, handling, and management activities. The fugitive dust control plan includes applying water to active stockpiles (including any areas subject to vehicular activity), treating unpaved haul roads with chemical stabilizers and watering as needed, and keeping total disturbed areas at any one time to a minimum. The permit for the Rock Dust Silo, 13GU1462 (CDPHE APCD, 2016), limits the rock dust to 25,000 tpy.

The CDRMS Mining and Reclamation plan requires general air pollution control measures to comply with the applicable APCD permits and to minimize or eliminate fugitive particulate matter, which include applying water to any active unpaved roadways, parking areas, refuse disposal area, and could include

compacting and spraying of coal stockpiles when necessary. Additionally, the regularly travelled gravel roads on the mine site are treated at least once a year with magnesium chloride for dust suppression.

Drilling technology used to drill MVBs the diameter and depth needed for MVBs also requires construction of drill pads and the use of heavy equipment. MVBs are on the landscape an average of 2-3 years with an active life of 1 to 3 months, then decommissioned, and the land surface is reclaimed and returned to pre-mining land use.

### 3.3.1.6 Climate

The primary natural and synthetic GHGs in the Earth's atmosphere are water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and fluorinated gases. GHGs allow heat from the sun to pass through the upper atmosphere and warm the earth by blocking some of the heat that is radiated from the earth back into space. As GHG concentrations increase in our atmosphere they impact the global climate by further decreasing the amount of heat that is allowed to escape back into space. Many GHGs are naturally occurring in the environment; however, human activity has contributed to increased concentrations of these gases in the atmosphere. CO<sub>2</sub> is emitted from the combustion of fossil fuels (i.e., oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Methane results from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Methane is also emitted during the production and transport of coal, natural gas, and oil. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Fluorinated gases, while not abundant in the atmosphere, are powerful GHGs that are emitted from a variety of industrial processes and are often used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons, hydrochloroflourocarbons, and halons).

All the different GHGs have various capacities to trap heat in the atmosphere, which are known as global warming potentials (GWPs). GWPs can be expressed for several different time horizons to fully account for the gases ability to absorb infrared radiation (heat) over their atmospheric lifetime. This EA uses both the 20-year and the 100-year time interval to evaluate both the short term and long-term impacts. CO<sub>2</sub> has a GWP of 1, and so for the purposes of analysis a GHGs GWP is generally standardized to a CO<sub>2</sub> equivalent (CO<sub>2</sub>e), or the equivalent amount of CO<sub>2</sub> mass the GHG would represent. Methane has a current 100-year GWP estimated to be between 28 (gas alone) and 36 (with climate feedbacks), and a 20-year GWP between 84 (gas alone) and 87 (with climate feedbacks) (USEPA, 2017). CH<sub>4</sub> emitted today remains in the atmosphere for about a decade on average, which is why the 20-year time interval is appropriate for evaluating short term impacts. Nitrous Oxide (N<sub>2</sub>O) has a GWP 265–298 times that of CO<sub>2</sub> for a 100-year timescale. N<sub>2</sub>O emitted today remains in the atmosphere for more than 100 years, thus the 100-year GWP is appropriate for evaluating short term impacts for N<sub>2</sub>O.

NAAQS do not exist for GHGs. In its Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act (FR EPA-HQ-OAR-2009-0171), the Environmental Protection Agency (EPA) determined that GHGs are air pollutants subject to regulation under the Clean Air Act. GHGs' status as pollutants are due to the added long-term impacts they have on the climate because of their increased concentrations in the earth's atmosphere. Ongoing scientific research has identified that anthropogenic GHG emissions impact the global climate. Industrialization and the burning of fossil fuels have contributed to increased concentrations of GHGs in the atmosphere. GHGs are produced from both the direct process of coal mining as well as from the combustion of the mined

coal. The amount of GHG emissions associated with both processes varies greatly based on mining techniques and combustion methodologies used.

The EPA has promulgated rules to regulate GHG emissions and the industries responsible under the Mandatory Reporting Rule (74 FR 56260, 40 CFR 98) and the Tailoring Rule (70 FR 31514, 40 CFR 51, 52, 70, 71). Under the EPA's GHG Mandatory Reporting Rule, coal mines subject to the rule are required to report emissions annually in accordance with the requirements of Subpart FF. Subpart FF is applicable only to underground coal mines and is not applicable to surface coal mines. Under the provisions of the Tailoring Rule (and a subsequent Supreme Court decision), a facility would be subject to PSD permitting if it has the potential to emit GHGs in excess of 100,000 tpy of CO<sub>2</sub>e and the facility exceeded the PSD major source threshold for a criteria pollutant. For existing facilities this review would take place during any subsequent modifications to the facility.

The current and historic climate attributes of the North Fork Valley and state of Colorado are described in detail in Section 3.4.1.6 of the SFEIS beginning on page 103.

### **3.3.2 Alternative 1: Proposed Action**

#### **3.3.2.1 Direct Effects**

The proposed lease modifications would result in a continuation of the existing activity currently occurring at the mine location for an additional 2 years and will not increase the intensity of operations above the levels in **Table 6**. Additional mobile emission sources would include 2 mobile flares, their associated flare pilots, and the diesel generators used to power the methane flares. There are also three existing permitted stationary sources that were not evaluated in the SFEIS include two emergency generators (permits 13GU1463 and 16GU0031.XA) and one emergency engine (14GU0697.XP).

The emissions for existing permitted sources have been updated, the emissions for stationary point and fugitive sources (permit 09GU1382) and mobile underground and surface emissions have been updated to reflect mining of 10.1 million tons over two years. Emissions for the Rock Dust Silo are based on the 25000 tpy processing limit and emissions for emergency permit and heaters were not updated because the emissions are dependent on hours of operation and not mining production rate.

The Marshall County Mine in West Virginia is currently the only active coal mine in the US known to OSMRE as using flaring technology to control methane emissions from MVBs. The emissions from the flares at the West Elk Mine are based on flare manufacturing data supplied by MCC and are similar in design to the flares at the Marshall County Mine. The size of the diesel generators necessary to power the flares are anticipated to be between 22 and 144 kw. The emissions were calculated using EPAs Potential to Emit Calculator for Engines (EPA, 2016) using the 144-kw generator size. The pilot light will only operate to ignite and reignite the flare as needed, and emissions are considered to be negligible.

The majority of the PM emissions for the West Elk Mine are dependent upon coal mining production rate, therefore the total annual emissions for the proposed action are less than the particulate matter emissions evaluated for Alternative 3 in the SFEIS. In section 3.4.2.1 of the SFEIS beginning on page 105 it was determined that the area around the mine can be expected to remain within ambient air quality standards for PM<sub>10</sub> therefore there are no additional air impacts from PM<sub>10</sub> emissions for the proposed action.

**Table 6. West Elk Emissions 2-Year Scenario (Maximum TPY)**

Source	Permit	PM <sub>10</sub>	PM <sub>2.5</sub>	VOC	NO <sub>x</sub>	CO	SO <sub>x</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	100-year CO <sub>2</sub> e	20-year CO <sub>2</sub> e
Multiple – Point <sup>1</sup>	09GU1382	54.33	--	--	--	--	--	--	--	--	--	--
Multiple – Fugitive <sup>1</sup>	09GU1382	23	--	--	--	--	--	--	--	--	--	--
Emergency Generator <sup>2</sup>	10GU1130	0.72	0.72	1.79	12.36	15.23	0.33	--	--	--	--	--
Rock Dust Silo <sup>3</sup>	13GU1462	0.06	0.06	--	--	--	--	--	--	--	--	--
Emergency Generator <sup>4</sup>	13GU1463	0.005	0.005	0.12	0.12	0.09	0.005	--	--	--	--	--
Emergency Engine <sup>5</sup>	14GU0697.XP	1.53	1.48	1.86	21.14	9.89	0.33	--	--	--	--	--
Emergency Generator <sup>6</sup>	16GU0031.XA	0.27	0.27	0.3	3.7	0.82	0.0037	--	--	--	--	--
Fuel Tanks <sup>7</sup>	93GU886.XA	--	--	1.99	--	--	--	--	--	--	--	--
Mobile - Underground	NA	8.07	7.83	12.37	56.73	47.76	0.77	3,586	0.19	0.03	3,602	3,611
Mobile - Surface	NA	1.19	1.15	1.45	16.42	7.68	0.26	1,195	0.02	0.01	1,198	1,199
Misc. Heaters <sup>3</sup>	NA	2.04	2.05	1.47	27.49	22.08	0.67	32,682	0.61	0.58	32,887	32,908
VAM	NA	--	--	--	--	--	--	--	15566	--	560,376	1,354,242
Mobile - Flares (2)	NA	--	--	--	10.1 <sub>9</sub>	26.81	--	15,056	112.04	0.29	17,952	24,899
Flare Generator (2)	NA	0.06	0.06	0.53	1.11	9.73	0.02	--	--	--	--	--
Total		91.28	13.63	21.87	149.26	140.09	2.38	52,527	15,679	0.91	616,015	1,416,859

AERMOD was used to model the maximum potential near-field impacts for the nearby Bull Mountain Unit (an oil and gas project) (BLM, 2016). Based on this modeling, NO<sub>x</sub> emissions from the mine would be below the deposition data analysis threshold and would not significantly impact the West Elk Wilderness Area.

The total NO<sub>x</sub> emissions in **Table 6** are comparable with the Bull Mountain FEIS Alternative B total production NO<sub>x</sub> emissions of 190 tpy. The AERMOD results are shown in **Table 7**. The maximum predicted concentration of NO<sub>2</sub> when added to the background concentration are less than the applicable NAAQS and Colorado Ambient Air Quality Standards (CAAQS) and direct modeled concentrations are below the applicable PSD Class II increments for NO<sub>2</sub>. Based on this incremental comparison there would be no additional direct air impacts from NO<sub>2</sub> emissions associated with the Proposed Action.

**Table 7. Modeling Results for Bull Mountain Unit Alternative B Production Activities**

Pollutant	Averaging Period	Maximum Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total PM <sub>10</sub> Impact (µg/m <sup>3</sup> )	NAAQS/CAAQS (µg/m <sup>3</sup> )	PSD Class II Increment (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-Hour	159.1	21	180.1	188	--
	Annual	38.6	1.9	40.5	100	25
CO	1-Hour	775.4	1150	1,925.4	40,000	--
	8-Hour	481.1	1150	1,631.1	10,000	--

Source: Table 4-15 Bull Mountain Unit FEIS (BLM, 2016)

The total CO emissions (development and production) modeled for Alternative B in the Bull Mountain FEIS (BLM, 2016) were 130 tpy, the results for development activities are shown in **Table 8** and production activities are shown in **Table 7**. When maximum modeled concentrations from the modeled scenarios are added to representative background concentrations, total ambient air concentrations are less than the applicable NAAQS and CAAQS, no PSD increments have been established for this pollutant. Although the CO emissions for the proposed action are higher than 130 tpy, the combined direct modeled concentrations for the 1-Hour and 8-Hour averaging period are 10 percent and 33 percent of the NAAQS respectively. Therefore, the direct air impacts from CO emissions associated with the Proposed Action are anticipated to be negligible.

**Table 8. Modeling Results for Bull Mountain Unit Alternative B Development Activities**

Pollutant	Averaging Period	Maximum Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total PM <sub>10</sub> Impact (µg/m <sup>3</sup> )	NAAQS/CAAQS (µg/m <sup>3</sup> )
CO	1-Hour	775.1	1150	1,925.1	40,000
	8-Hour	480.9	1150	1,630.9	10,000

Source: Table 4-14 Bull Mountain Unit FEIS (BLM, 2016)

Flaring of coal mine methane converts the methane to carbon dioxide (CO<sub>2</sub>). Total emissions for the Proposed Action and Alternative 3 in this EA are compared in **Table 9** and show that voluntary flaring of methane from the MVBs would result a carbon dioxide equivalency emissions decrease of 58 percent based on the 100-year global warming potential coefficient and 63 percent based on the 20-year global warming potential.

**Table 9. West Elk Mine Emissions Comparison 2-Year Scenario (Maximum TPY)**

Pollutant	Proposed Action (Flaring)	Alternative 3 (Venting)	% Change (Alternative 3 – Alternative 1)
PM <sub>10</sub>	91.28	91.22	0%
PM <sub>2.5</sub>	13.63	13.57	0%
VOC	21.87	21.34	2%
NO <sub>x</sub>	149.26	137.97	8%
CO	140.09	103.55	26%
SO <sub>x</sub>	2.38	2.36	1%
CO <sub>2</sub>	52,527	37,462	29%
CH <sub>4</sub>	15,679	26,050	-66%
N <sub>2</sub> O	0.91	0.63	31%
100-year CO <sub>2e</sub>	616,015	975,451	-58%
20-year CO <sub>2e</sub>	1,416,859	2,303,981	-63%

### 3.3.2.2 Indirect Effect

The indirect effects of coal transport from the region are analyzed and disclosed in Section 3.4.2.2 of the SFEIS beginning on page 109. Indirect effects associated with coal transport and combustion of the coal occur at numerous locations. Transportation of coal by train would result in emissions of pollutants such as CO, SO<sub>2</sub>, NO<sub>x</sub>, PM, and VOCs. According to the US Energy Information Administration, the electric power sector accounted for about 92.6 percent of the total U.S. coal consumed in 2018 (EIA, 2018). Therefore, it can be reasonably assumed that the coal from the West Elk Mine would be shipped to and consumed by a coal-fired power plant, however, it is not possible to determine in advance where this coal will be consumed because it is unknown where the coal will be delivered until the quarter before it gets delivered.

Emissions from transportation by train was evaluated in the SFEIS and concluded that impacts on local or regional air quality would not exceed those already authorized and would be in compliance with all applicable standards regulating their operations. The GHG emissions from coal combustion would contribute to potential climate change impacts.

Based on the enclosed flare and the prevention measures identified in Section 2.3.4, during the 2 years of operating the flares, it is unlikely that there will be any potential for wildland fire ignitions to increase and there would be no subsequent additional impacts on air quality or GHG emissions from wildland fire due to the flaring.

### 3.3.3 Alternative 2: No Action

Under the no action alternative, the OSMRE would recommend not approving the MPDD. No additional mining or methane release would occur in the lease modification areas.

### 3.3.3.1 Direct Effects

Because there would be no mining and no venting or flaring there would not be any air emissions and there would not be any direct impacts after reclamation.

### 3.3.3.2 Indirect Effect

Because there would be no mining and no venting or flaring there would not be any air emissions and there would not be any indirect impacts after reclamation.

## 3.3.4 Alternative 3

### 3.3.4.1 Direct Effects

Except for the GHG emissions, the direct impacts for Alternative 3 will be the same as the impacts for the Proposed Action shown by the emissions comparison in **Table 9**. The area around the mine would be expected to remain within ambient air quality standards for PM<sub>10</sub>, NO<sub>x</sub>, and CO, and no other criteria pollutant emissions associated with the mine's stationary sources would be considered to have the potential to significantly degrade area air quality.

Methane from the MVBs will be vented directly to the atmosphere. The actual methane emissions from MVBs over the past 5 years and the carbon dioxide equivalency emissions can be seen in **Table 10** below. Based on the 5-year average carbon dioxide equivalency emissions would be 201,797 tpy using the 100-year global warming potential coefficient and 487,676 using the 25-year global warming potential coefficient. When compared to the emissions at lowest flaring efficiency of 95% for the proposed action, the carbon dioxide equivalency emissions are approximately 5 and 7 times higher for the 100-year and 25-year global warming potential coefficients respectively.

**Table 10. West Elk MVB Emissions (Actual TPY)**

Year	CH <sub>4</sub> <sup>1</sup>	100-year CO <sub>2</sub> e <sup>2</sup>	20-year CO <sub>2</sub> e <sup>3</sup>
2014	10,667	384,029	928,069
2015	7,487	269,521	651,342
2016	5,110	183,972	444,598
2017	2,680	96,482	233,166
2018 (thru Aug)	2,083	74,982	181,206
Average	5,605	201,797	487,676

1 Total MVB Methane converted to tons (Tetra Tech, 2018)

2 100-year GWP = 36 (USEPA, 2017)

3 20-year GWP = 87 (USEPA, 2017)

### 3.3.4.2 Indirect Effect

Indirect effects would be the same as for the Proposed Action (Alternative 1).

## 3.3.5 Cumulative Impacts

The SFEIS includes a cumulative Colorado Air Resources Management Modeling Study (CARMMS) analysis in Section 3.4.5.1 beginning on page 133. Further discussions of potential cumulative effects were provided in Section 3.4.5 of the SFEIS and are incorporated herein to this analysis.

### 3.4 Water (Quality and Quantity)

Section 3.8.1 of the SFEIS discusses the affected environment of the study area required to address impacts from the proposed lease modifications and subsequent mining, including identification of local drainages and the areas expected to be directly affected by subsidence. Discussion and analysis of Sections 3.8.1 through 3.8.4 of the 2017 SFEIS are accepted for this analysis except where specified, modified or discussed in the sections below. Information presented below is based on additional data, clarification of data, or additional information obtained since publication of the SFEIS. Primarily this update to the water resources affected environment and impact analysis is largely based on information provided in Exhibit 71 of the permit (HydroGeo, 2016) which provided hydrologic characterization of the proposed lease areas and proposed changes in the monitoring plans for the West Elk Mine. The Exhibit was prepared to support Technical Revision 139 of the CDRMS permit and is based on hydrologic monitoring stations established in 2018 and data reported (HydroGeology Solutions, Inc., 2019).

#### 3.4.1 Affected Environment

Water resources are discussed in the SFEIS in Section 3.8. The analysis area for water is depicted on **Figure 5**. For reference, a general summary of these descriptions is provided for surface water in Section 3.4.1.1 and for groundwater, including seeps, in Section 3.4.1.2.

##### 3.4.1.1 Surface Water

The proposed project area and proposed lease modification areas occur within the North Fork of the Gunnison River basin (USFS, 2017a). The primary drainage affected would be the East Fork of Minnesota Creek whose tributaries drain west from the proposed lease modifications, and Deep Creek which drains northeast from the lease modification areas. Both Minnesota Creek and Deep Creek flow to the North Fork of the Gunnison River which joins the mainstem of the Gunnison River downstream of Hotchkiss.

For clarity and for the purposes of this EA, the regulatory definition of ephemeral, intermittent, and perennial stream from CDRMS's Regulations of the Colorado Mined Land Reclamation Board for Coal Mining Section 1.04 are used as follows:

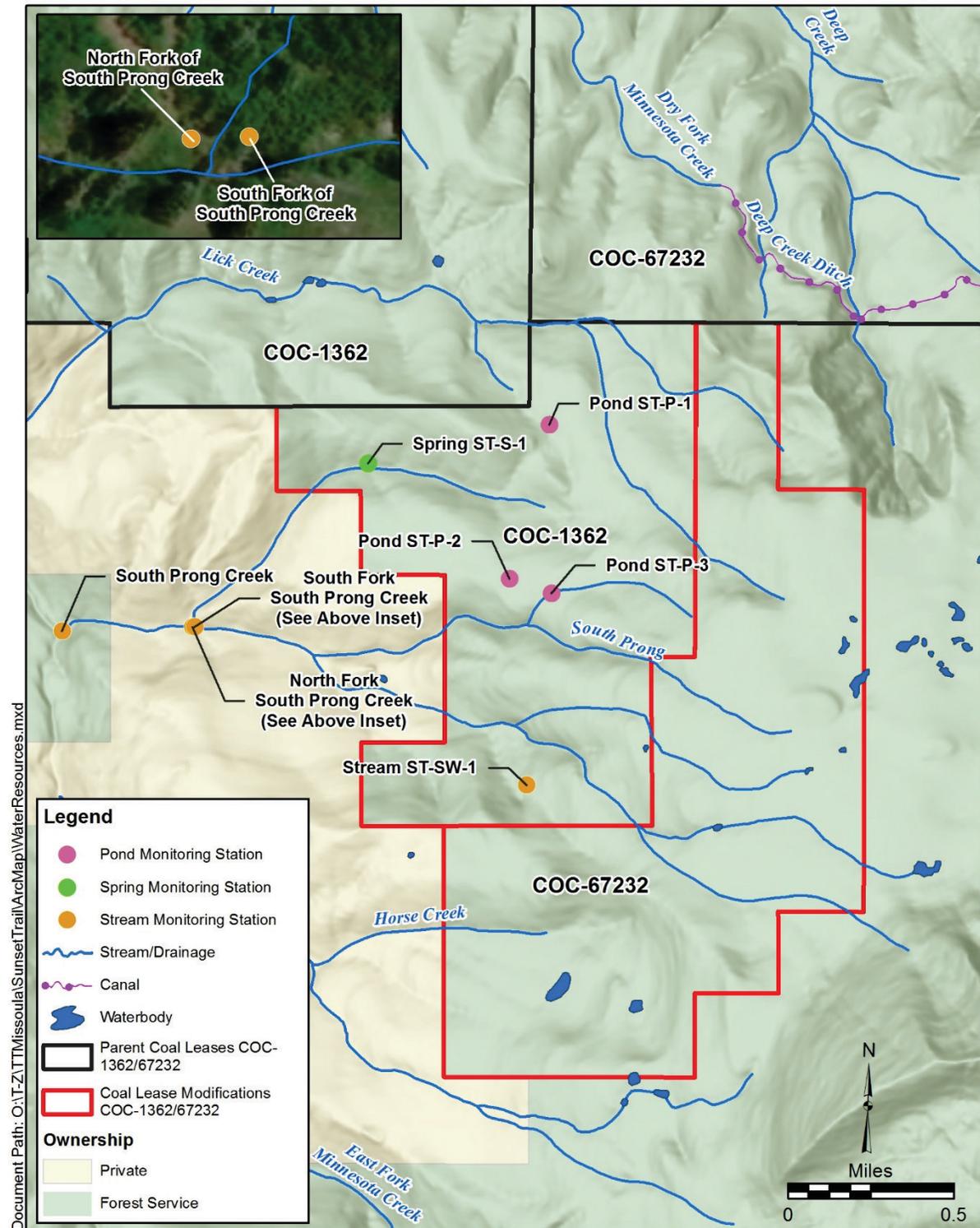
(42) "Ephemeral stream" means a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow or ice, and which has a channel bottom that is always above the local water table.

(69) "Intermittent stream" means a stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground water discharge.

(84) "Perennial stream" means a stream or part of a stream that flows continuously during all of the calendar year as a result of ground water discharge or surface runoff. The term does not include intermittent stream or ephemeral stream.

The SFEIS identified and quantified lengths of perennial and intermittent stream reaches, which drain the proposed lease modification areas on Figure 3-20. This figure appeared to show limited perennial stream reaches occurring on South Prong Creek and Horse Creek extending into the lease modification areas. Based on Exhibits 71 and 71A, South Prong Creek and its tributaries in the area of the proposed lease modifications are narrow with very steep gradients with some reaches of perennial flow.

**Figure 5. Water Resources**



**West Elk Mining Plan Modification EA  
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In July of 2018, MCC established four surface water monitoring stations in this drainage (HydroGeology Solutions, Inc., 2019). Two stream stations, one at the mouth of the north fork of South Prong Creek, and one at the mouth of the south fork of South Prong Creek will be monitored for flow and water quality six times per year for at least five years (**Figure 5**). Both of these stream stations are west of the proposed lease boundary. An additional station (Stream ST-SW-1) located on an unnamed tributary to South Prong Creek will also be monitored instantaneously six times per year. This stream is located within the COC-1362 lease area. The six instantaneous monitoring dates occur from April through September and are designed to document the rising limb, the peak flow period, and the falling limb of the annual runoff hydrograph and potential changes in water quality associated with these flow regimes. Winter conditions limit access to these sites and monitoring will not occur. After five years, these stations will be monitored three times per year for flow, pH and specific conductivity (total dissolved solids), and once per year for water quality analytes.

In September 2018, a flume for continuous flow monitoring was installed at a fourth stream monitoring station on South Prong Creek downstream of the confluence of the north and south fork tributaries. This station is west of the proposed lease modification boundary (HydroGeology Solutions, Inc., 2019). A description of the four stream monitoring stations is provided in **Table 12** and the station locations are depicted on **Figure 5**.

MCC reported continuous flow from the flume at the South Prong Creek monitoring station from September 9, 2018 through September 30, 2018 (HydroGeology Solutions, Inc., 2019). The average flow during this period was 0.27 cubic feet per second (cfs) (121 gallons per minute [gpm]) with a minimum flow of 0.18 cfs (81 gpm) and a maximum flow of 0.43 cfs (193 gpm). Data have not been reported for the 2019 water year which ended September 30, 2019. Continuous monitoring will establish characteristic annual flow regimes and could be used to monitor potential impacts to this creek from future mining and subsidence upstream.

**Table 11. Summary of Stream Monitoring Stations**

Station Name	Location Description	Latitude (NAD 83)	Longitude (NAD 83)
South Prong Creek	Upstream of Confluence with Minnesota Creek	38.839794	-107.451729
North Fork of South Prong Creek	0.5 miles upstream of South Prong Creek Station	38.839970	-107.444520
South Fork of South Prong Creek	0.5 miles upstream of South Prong Creek Station	38.839974	-107.444393
Stream ST-SW-1	Unnamed Tributary to South Prong Creek 1.5 miles upstream of South Prong Creek Station	38.833121	-107.426038

Source: (HydroGeology Solutions, Inc., 2019)

MCC reported instantaneous flow data from the south fork tributary station of South Prong Creek of 0.52 cfs (237 gpm), 0.22 cfs (101 gpm), and 0.26 cfs (118 gpm) for July 19, 2018, August 30, 2018, and September 25, 2018, respectively (HydroGeology Solutions, Inc., 2019). Stream flows were reported at station ST-SW-1 of 0.02 cfs (7.75 gpm), 0.02 cfs (8.75 gpm), and 0.03 cfs (12.98 gpm) on these same sampling dates. Flow for the north fork station of South Prong Creek was reported as “dry” for these sampling dates. Future instantaneous flow measurements on these tributaries will assist in documenting annual flow regimes in these channels during ice free periods. An evaluation of monthly total precipitation for these dates from a meteorological station immediately north of Paonia, CO shows that precipitation during the summer and fall of 2018 were near long-term averages for these months.

The limited monitoring on the south fork tributary station and at station ST-SW-1 shows that flow exists during ice-free periods. Based on the low flow volumes reported in the fall of 2018, the channel descriptions provided, and the narrow steep gradients of these and other drainages in the area (HydroGeo, 2016), it is unlikely that continuous flow in these channels is maintained during the winter and it would consequently qualify as an intermittent stream.

No hydrologic monitoring stations have been established on Horse Creek and a description of the Horse Creek channel has not been provided in any project reports that were reviewed for this analysis.

**Figure 2** illustrates that the proposed long wall panels associated with the Proposed Action will not extend underneath the area occupied by Horse Creek. In evaluating potential mining induced impacts to stream channel parameters, MCC did not identify the Horse Creek basin as an area that could currently be affected by mining subsidence (Wright Water Engineers, Inc., 2018). This evaluation was based on expected panel development and exploration conducted through 2018 (Wright Water Engineers, Inc., 2018). Considering the watershed size, stream characteristics, geologic material, and aspect are substantively similar to what is exhibited in the adjacent South Prong Creek tributaries; it is likely that Horse Creek is an intermittent stream as defined by the CDRMS coal rules.

### 3.4.1.2 Groundwater, Seeps, Springs and Stock Ponds

A summary of the groundwater resources that could be affected by the proposed lease modifications and subsequent proposed mine project were described in Section 3.8.1.6 of the SFEIS. A summary of that discussion is provided as follows. Shallow groundwater resources in the proposed lease modification areas are limited due to geologic controls. The relatively steep terrain and stream profiles of drainages result in relatively thin alluvial/colluvial deposits which are confined in the bottom of drainages. Most groundwater that is expressed in seeps or springs is associated with these shallow alluvial/colluvial systems and is not hydrologically connected with deeper bedrock aquifers (USFS, 2017a). There is not an approved definition for ephemeral, intermittent, or perennial springs in CDRMS's approved coal rules or in Title 30 of the Code of Federal Regulations. Extrapolating the definition utilized for streams, ephemeral springs would not exist because a spring is exclusively associated with the discharge of groundwater. Stock ponds are filled by natural surface water runoff or are fed by local seeps or springs (HydroGeo, 2016).

A spring/seep survey of the Sunset Trails area was completed in 2011, and added to the PAP as Exhibit 19E with the approval of PR-15. MCC established one spring monitoring station and three stock pond monitoring stations in the proposed lease modification areas (HydroGeology Solutions, Inc., 2019) (**Table 13** and **Figure 5**). MCC has not reported the installation of alluvial/colluvial monitoring wells in the proposed lease modification areas.

**Table 12. Summary of Spring and Ponds Monitoring Stations**

Station Name	Location Description	Latitude (NAD 83)	Longitude (NAD 83)
Spring ST-S-1	1 mile upstream of the North Fork of South Prong Creek Station	38.847033	-107.434802
Pond ST-P-1	Headwaters of Unnamed Tributary to Lick Creek	38.848707	-107.424765
Pond ST-P-2	Upland area to the north of South Prong Creek	38.842051	-107.426975
Pond ST-P-3	Upland area to the north of South Prong Creek	38.841420	-107.424671

Source: (HydroGeology Solutions, Inc., 2019)

Similar to the surface water monitoring stations, Spring ST-S-1 will be monitored for flow and water quality six times per year from April through September for at least five years. The three stock pond stations will be monitored for depth and water quality for these same six sampling events.

MCC reported instantaneous flow from Spring ST-S-1 of 0.2 gpm on July 19, 2018 and “seep” (zero gpm) for the August 29, 2018 and September 25, 2018 sampling dates (HydroGeology Solutions, Inc., 2019). The water depth in Pond ST-P-1 was reported as 2 feet on August 29, 2018 and 0.91 feet on September 25, 2018. No data were reported for the July 19, 2018 sampling date. Pond ST-P-2 was reported as “dry” for all three sampling dates. Pond ST-P-3 was reported as “damp” for the July 29, 2018 and August 29, 2018 sampling dates. This pond was reported as “dry” on September 25, 2018. Data have not been reported for the 2019 water year which ended September 30, 2019. Monitoring of these stations is ongoing and future instantaneous flow measurements on Spring ST-S-1 and the three stock ponds will assist in documenting annual flow regimes and water quality during ice-free periods and would be used to monitor potential impacts to these water resources from future mining and subsidence.

### **3.4.1.3 Water Quality**

Water quality in the North Fork of the Gunnison River is considered suitable for a variety of uses with relatively low concentrations of total dissolved solids, nitrate, nitrite, and metals (USFS, 2017a). Water is considered of the calcium-bicarbonate type. Water quality monitoring for the West Elk Mine has shown little variation by season except for a general increase in total suspended solids and sediment load associated with spring runoff (USFS, 2017a). Impacts to the overall water quality of the North Fork and Gunnison River from previous and current mining activities have been minor or negligible (USFS, 2017a).

Reported water quality for the 4 stream stations, 3 pond stations, and the spring station that were established in July 2018 show similar water quality that has been reported for other West Elk Mine monitoring stations. Water quality is of the calcium-bicarbonate type and is generally low in total dissolved solids and conductivity, nitrate and nitrite, and metals (HydroGeology Solutions, Inc., 2019). Monitoring of these stations is ongoing and future water quality measurements on these monitoring stations would be used to monitor potential water impacts from future mining and subsidence.

## **3.4.2 Alternative 1: Proposed Action**

### **3.4.2.1 Direct and Indirect Effects**

#### **Subsidence**

Impacts from subsidence as a result of the proposed alternative are discussed in detail in Section 3.3.1.2 of the SFEIS (USFS, 2017a). Primary impacts on water resources are changes in topography (via minor lowering of the land surface) and the potential propagation of tension fractures into colluvium, alluvium, and weathered bedrock. Projected subsidence associated with authorizing the lease modifications and subsequent mining under the proposed action is expected to affect a maximum of about 1,077 acres, including approximately 618 acres on lease modification COC-1362 and approximately 103 acres on lease modification COC-67232, as well as approximately 357 acres of adjacent private lands and federal lands made accessible via the lease modifications (USFS, 2017a).

Past observations at the West Elk Mine have shown that impacts associated with surface tension cracks from subsidence are more prevalent on ridges and steeper slopes with outcrop areas that are generally associated with brittle bedrock (USFS, 2017a). Subsidence cracks that develop in alluvium or colluvium tend to self-heal due to sloughing and natural filling by soil material. Subsidence could affect surface

water channels and basins and increase rates of erosion from changes in topography and erosion of channel substrates via cutting or lateral movement because of localized changes in the channel gradient. Soil erosion within drainage basins and channel substrates and resultant sediment loading may be increased until ground movements and a change in the local topography associated with subsidence stabilizes. These impacts would be considered minor and short-term, lasting a few years after the subsidence occurred. Channel gradient and substrate changes would be considered permanent but would have minimal long-term impact on channel geomorphology and function (Wright Water Engineers, Inc., 2018). These impacts would not be expected to affect the overall hydrologic balance of the North Fork or Gunnison River watershed; no indirect impacts would be expected (Wright Water Engineers, Inc., 2018). However, under the existing Subsidence Control Plan associated with the CMDRS permit, MCC would design and apply mitigation efforts, as needed, if stream channels are impacted by subsidence to ensure that flow continues in the channel.

Subsidence and the propagation of fracture cracks have the potential to affect spring and seep flow in the lease modification areas. As discussed, most groundwater that is expressed as seeps or springs are associated with shallow alluvial/colluvial systems that are not hydrologically connected with deeper bedrock aquifers. While changes in topography may alter spring locations a few feet either vertically, horizontally, or both, long-term changes in spring flow would not be expected if the shallow aquifer (alluvium/colluvium) would be minor.

Flows in many area springs has been reduced due to drought conditions since 2000 (USFS, 2017a; HydroGeology Solutions, Inc., 2019). However, observation of spring flow hydrographs from previously mined areas at the West Elk Mine suggest that the flow in some springs have been directly affected by mining and subsidence (HydroGeology Solutions, Inc., 2019), rather than climate. This suggests that the alluvium or colluvium associated with these springs has been substantially affected by mining and subsidence. Similar impacts could occur to some springs in the proposed lease modification area. These impacts would be expected to be long-term but minor because of the small flow volumes and possible seasonal flows. Impacts would likely be local to specific springs that are directly disrupted by subsidence cracks and do not recover or heal over time. No indirect impacts to the overall water balance of the watershed would be expected. As previously noted, MCC has established a monitoring station (Spring ST-S-1) which exhibited intermittent flows in 2018.

Subsidence could affect stock water ponds if cracks directly affect a localized feeder ditch or spring. As discussed in Section 3.8.3.1 of the SFEIS, effects would likely be mitigated by the self-healing characteristics of the underlying soil or alluvium. These impacts would be minor and short-term. Damage to stock ponds or their related drainages could be readily repaired (USFS, 2017a).

Impacts on stream or spring water quality are not expected from mining activities or subsidence in the proposed lease modification areas. Historic monitoring of spring and surface water quality in active mining areas has shown some slightly elevated concentrations of dissolved solids and suspended solids but these values have been attributed to seasonal variations in climate and drought conditions and not related to mining (HydroGeology Solutions, Inc., 2019).

Section 3.8.1.7 of the SFEIS noted some potential impacts on groundwater quality based on effects observed from other mines in the region. However, only minor changes to observed groundwater quality has been historically observed at the West Elk Mine. These changes were noted as likely caused by increased sedimentation in the wells and not associated with mining activities (HydroGeology

Solutions, Inc., 2019). For this reason, no impacts on groundwater quality would be expected from mining activities and subsidence in the proposed lease modification areas.

### **Methane Emission Control System**

The addition of the voluntary flaring of methane to the proposed action does not change potential impacts on water resources due to land disturbance from those described in the 2017 SFEIS. The proposed methane flare system (truck trailer) would be located at least 30 feet from the MVB and the flare stack would be located at least 50 feet from the free vent stack. The assumption of 1 acre of disturbance for the drill pad and MVB in the SFEIS was conservative so no further analysis will be required and there would be no additional disturbance impacts.

If a diesel generator and fuel is stored on site, there is a potential for minor fuel spills; however, methods of containment and mitigation of spills would be outlined in the Spill Prevention Containment and Countermeasures Plan for the West Elk Mine. An update to this plan may be required by CDRMS as a part of final permitting. No discernable impacts to water resources would be expected from potential spills of petroleum-based products.

Section 3.8.3.1 in the SFEIS characterized the water usage for drilling as a water depletion from the National Forest for mining that would be minor (~4.5 acre-feet) and short-term.

## **3.4.3 Alternative 2: No Action**

### **3.4.3.1 Direct & Indirect Effects**

Under the No Action alternative, there would be no mining-induced effects on water resources in the modifications area. Current ongoing activities in the watershed as well as natural variation in spring, seep, and stream flow would continue to occur based on climatic variations and other USFS management activities. The no action alternative would not cause disturbances that would affect surface water, seeps and springs or groundwater.

## **3.4.4 Alternative 3**

### **3.4.4.1 Direct and Indirect Effects**

Under Alternative 3, impacts to water resources would be the same as those described for the Proposed Action. The Reasonably Foreseeable Mining Alternative described in the SFEIS indicated that MVBs would need to be established over the life of mining. Not all MVBs would be constructed at the same time so construction of drill pads and associated access roads would occur, be used, and reclaimed throughout the mine life. As described for the proposed action, implementation of the mobile methane flare system would not increase the area of disturbance and potential impacts to water resources from runoff and erosional processes above those previously analyzed in the SFEIS.

As in the Proposed Action, drilling the MVBs would result in a water depletion from NFS for mining that would be relatively minor (~4.5 acre-feet) and short-term.

## **3.4.5 Cumulative Impacts**

Leasing and the subsequent mining of coal in the proposed lease modification areas would extend the life of the West Elk Mine by 2 years. Mining and associated subsidence would increase the regional area (total acreage) of potential and realized impacts to water resources as described in Section 3.4.2.1. However, the SFEIS (Section 3.8.5, page 164), indicates that current mining activities at the West Elk

Mine have historically had no discernable effects to stream morphology, erosion rates, or suspended sediment loads. Subsidence induced impacts to the quantity and quality of water resources have historically been minimal (HydroGeology Solutions, Inc., 2019). Further discussions of potential cumulative effects of the proposed action were provided in Section 3.8.5 of the SFEIS and are incorporated herein to this analysis.

### **3.5 Threatened and Endangered Species**

This analysis relies on the SFEIS, previous consultations with the USFWS and existing reports and documentations. OSMRE obtained a list of threatened and endangered species that may occur in the proposed project location, and/or may be affected by the proposed project on February 25, 2019 (USDI, 2019). There were no changes to the species originally evaluated for this project. On December 9, 2019, USFWS confirmed that the consultation is current and no further consultation was necessary (USFWS, 2019). A description of those species can be found in the SFEIS, Section 3.10. There is still only one federally listed species that has the potential to be found in the project area, the Canada lynx. There are four Colorado River fish that occur downstream in the watershed: Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. Fish surveys conducted by the USFS in November 2019 determined that there were no fish present in South Prong Creek and that the habitat would not support overwintering fish (Woody, 2019). Greenback cutthroat trout (*Oncorhynchus clarkia stomias*) is identified on the IPAC lists. There is no critical habitat identified for greenback cutthroat and no suitable habitat (perennial streams for over-wintering) within the action area.

None of these fish exist in the project area; however, they do occur downstream and designated critical habitat does occur off-site in the lower Gunnison River and the Colorado River.

#### **3.5.1 Affected Environment**

There is no change to the affected area previously analyzed for Canada lynx - the Mount Gunnison Lynx Analysis Unit. A full description of the affected environment and environmental baseline can be found in Section 3.10.1.2 of the SFEIS, including listing status, forest plan direction, acres of suitable habitat (Table 3-26), breeding habitat, tolerance of human activities, risks, core areas, critical habitat, and habitat conditions. The affected environment for the Colorado River fish includes the project area as well as the Gunnison and Colorado Rivers downstream.

#### **3.5.2 Alternative 1: Proposed Action**

##### **3.5.2.1 Direct Effects and Indirect Effects**

The addition of voluntary flaring of methane to the Alternative 3 analyzed in the SFEIS would not change any of the surface impacts analyzed in Section 3.10.1.4. Flaring of methane would not have any known impacts on Canada lynx. The direct and indirect effects of the Proposed Action include both the subsidence of surface topography and the installation of MVBs and roads, totaling 1,221 acres of lynx habitat within the Lynx Analysis Unit (LAU). Because the lease modification was approved with the following stipulation for Canada lynx "Winter access will be limited to designated routes," (Section 2.2.2.1 of the SFEIS), winter access (snowmobile) for operation and maintenance of the methane emissions control system (potential need to ignite the flare) has been addressed. The direct and indirect effects are described on pages 189-191 of the SFEIS. The addition of voluntary flaring would not result in any additional effects.

For the four Colorado River fish, the proposed action analyzed in the SFEIS (Appendix A, Criterion 9, page 542), implementation of the proposed action in this analysis is expected to result in depletions of 4.5 acre-feet of water (SFEIS, Table 2-6, page 68). These impacts would only occur during the drilling of the MVBs and are expected to be short-term. The addition of voluntary flaring would not result in any additional effects.

### **3.5.3 Alternative 2: No Action**

#### **3.5.3.1 Direct Effects and Indirect Effects**

There is no change to the analysis of direct and indirect effects of the no action alternative on the Canada lynx. In summary, the direct and indirect effects of the no action alternative would not change current habitat or population conditions of the Canada lynx in the short term. Long-term changes would continue to be dependent on existing conditions, current succession of vegetation types, and other actions within the project area. The full analysis can be found in Section 3.10.1.3 of the SFEIS.

There is no change to the analysis of direct and indirect effects of the no action alternative on the four Colorado River fish or their designated critical habitat. The no action alternative would not result in any additional water depletions.

### **3.5.4 Alternative 3**

#### **3.5.4.1 Direct Effects and Indirect Effects**

For the Canada lynx, Alternative 3 in this analysis remains the same as Alternative 3 analyzed in the SFEIS (Section 3.10.1.3, pages 189-191). In summary, effects to lynx would come about by both subsidence of surface topography that may result in landslides and other surface changes in addition to the installation of MVBs and associated roads. These disturbances total a maximum of 1,221 acres of lynx habitat within the LAU. There are no changes to direct or indirect effects to the Canada lynx. A full description of the impacts associated with this alternative can be found in the SFEIS.

For the four Colorado River fish, the proposed action analyzed in the SFEIS (Appendix A, Criterion 9, page 542), implementation of Alternative 3 is expected to result in depletions of 4.5 acre-feet of water (SFEIS, Table 2-6, page 68). These impacts would only occur during the drilling of the MVBs and are expected to be short-term.

### **3.5.5 Cumulative Impacts**

Cumulative Effects under NEPA

There is no change to the cumulative effects addressed in the SFEIS, Section 3.10.1.6, pages 191-192.

Cumulative Effects under ESA

There is no change to the cumulative effects addressed in the SFEIS, Section 3.10.1.6, page 193.

### **3.5.6 Determination**

There is no change to the “may affect but is not likely to adversely affect” Canada lynx determination made in the previous consultation. There is no change to the “may affect and is likely to adversely affect” the bonytail, Colorado pikeminnow, the humpback chub, and the razorback sucker and the “may affect and is likely to adversely affect” designated critical habitat for these fish species downstream. A

letter was sent to the USFWS on November 19, 2019, confirmation was received on December 9, 2019 (USFWS, 2019).

### **3.6 Migratory Birds, Birds of Conservation Concern, and Raptors**

In compliance with the Migratory Bird Treaty and the Fish and Wildlife Coordination Acts, the SFEIS considered the impacts of modifying coal leases on migratory birds, bird species of conservation concern in the Southern Rockies/Colorado Plateau region, and Land Bird Conservation Plan created by the Colorado Partners in Flight (Section 3.14, pages 226-228). This analysis will also address raptors because of the addition of voluntary flaring to the proposed action.

#### **3.6.1 Affected Environment**

Potential habitat for birds in the lease modification area is limited because of the high elevation which places much of the area above many habitat types. The SFEIS reports that according to literature and local data, there is breeding habitat for the golden eagle, flammulated owl, Williamson's sapsucker, and Virginia's warbler in the analysis area. Surveys conducted by Western Biology in spring and early summer 2019 encountered Cooper's and red-tailed hawks in addition to a number of migratory birds (Western, 2019). Active nests were located for Cooper's hawk, red-tailed hawk, and common raven.

#### **3.6.2 Alternative 1: Proposed Action**

##### **3.6.2.1 Direct Effects and Indirect Effect**

The proposed action in this analysis is the same as the proposed action considered in the SFEIS with the addition of voluntary flaring of liberated methane from MVBs. The addition of voluntary flaring of methane does not change any of the surface impacts analyzed previously in Section 3.14.3 of the SFEIS. Post-lease development has the potential to alter up to 75 acres of bird habitat in the short term associated with the installation of the MVBs and associated roads while exploration for coal has the potential to impact an additional 22.7 acres of habitat. These effects have the potential to impact individual birds, especially passerines and other birds which utilize aspen, spruce-fir, and oak for nesting.

The addition of voluntary flaring of methane from the MVBs could create additional impacts for migratory birds, bird species of conservation concern, and especially raptors beyond those analyzed in the SFEIS. Methane flaring is commonly used in association with oil and gas development and solid waste landfill operations. While there is still little in the way of systematic analysis of impacts from these facilities, there is anecdotal evidence of impacts on birds.

Safety controls that would automatically shut off the mobile flare should certain thresholds be reached (described in detail in Section 2.3.2) mean that operation of the flare could be intermittent. MCC estimates that the flares would operate 95 percent of the time. Birds could be badly burned or killed should they attempt to perch on the operating flare stack (KCWC and EDM, 2013). Raptors in particular seek elevated structures from which to perch and hunt, and the 33-foot flare stack described in Chapter 2 would likely be an attractive perch.

In addition to potential impacts to birds that might perch on the flare stack, there has also been at least one documented occurrence of migrating songbirds flying into or near a gas flare at a liquid natural gas processing facility in New Brunswick, Canada, and being injured or killed (Mandel, 2013). Methane flares can burn at 1,700° Fahrenheit and flames would not be visible due to enclosure (KCWC and EDM, 2013). The 2013 incident in New Brunswick is not well understood (Mandel, 2013).

There is the potential for effects to migratory birds, bird species of conservation concern, and raptors associated with the proposed action. Indirect effects to birds include alteration to habitat, up to 100 acres, in the analysis area from clearing trees and vegetation for the drill pads. This has the potential to impact individual birds in the short term, particularly those that utilize aspen, spruce-fir, and oak for nesting. Once the MVBs are no longer needed, the areas will be reclaimed (as described in the SFEIS, Section 3.3.2.2, page 90) and vegetative succession will proceed. Direct effects could include injury or death to individual birds during the short-term operation of the flare but with the installation of the perch deflectors' impacts would be moderate. There would not be long-term direct effects to birds associated with the proposed action.

### **3.6.3 Alternative 2: No Action**

#### **3.6.3.1 Direct Effects and Indirect Effect**

There is no change to the analysis of direct and indirect effects of the no action alternative on migratory birds, BOCC, or raptors as presented in the SFEIS (page 227). In summary, the direct and indirect effects of the no action alternative would not change current habitat or population conditions of any of the bird species in the short term. Long-term changes would continue to be dependent on existing conditions, current succession of vegetation types, and other actions within the project area. The full analysis can be found in Section 3.14.2 of the SFEIS.

### **3.6.4 Alternative 3**

#### **3.6.4.1 Direct Effects and Indirect Effect**

There are no changes to the direct or indirect effects associated with Alternative 3, which was presented as the proposed action in the SFEIS (Section 3.14.3, pages 227-228). In summary, leasing was not expected to have any effect to birds analyzed, and post-lease development has the potential to impact bird species analyzed. Stipulations in the lease require breeding bird surveys and include timing restrictions where needed for specific species. The SFEIS found that there would be some alteration of up to 75 acres of bird habitat in the short term associated with the installation of the MVBs and associated roads. This was expected to impact individual migratory birds, especially passerines and other birds which utilize aspen, spruce-fir, and oak for nesting. Exploration for coal was anticipated to impact 22.7 acres of habitat. The complete analysis can be found in Section 3.14.3).

### **3.6.5 Cumulative Impacts**

There is no change to the cumulative effects analysis presented in the SFEIS (Section 3.14.5, page 228). Natural processes and management activities in the vicinity of the analysis area will continue to impact migratory birds wherever removal or habitat conversions occur. Cumulative effects would be minor.

## Chapter 4 Coordination and Consultation

### 4.1 Agencies and People Consulted

The following agencies and people were consulted in the preparation of this EA.

- USFS – Levi Broyles, Niccole Mortenson
- BLM – Amy Carmichael, Doug Siple, Christina Stark
- CDRMS – Leigh Simmons, Jason Musick, James Stark
- USFWS – J. Creed Clayton
- Colorado State Historic Preservation Office – Steve Turner and Lindsay Johansson
- Tribes - Cheyenne & Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Nation of Oklahoma, Crow Creek Sioux Tribe, Crow Nation, Eastern Shoshone Tribe (Wind River Reservation), Fort Sill Apache Tribe, The Hopi Tribe, Jicarilla Apache Nation, Kewa Pueblo, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Navajo Nation, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Ohkay Owingeh (Pueblo of San Juan), Osage Nation, Paiute Indian Tribe of Utah, Pawnee Nation of Oklahoma, Pueblo of Acoma, Pueblo de Cochiti, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of San Felipe, Pueblo of San Ildefonso, Pueblo of Sandia, Pueblo of Santa Ana, Pueblo of Santa Clara, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Zia, Rosebud Sioux Tribe, San Juan Southern Paiute Tribe, Shoshone-Bannock Tribes, Southern Ute Indian Tribe, Standing Rock Sioux Tribe, Three Affiliated Tribes, Ute Indian Tribe (Uintah & Ouray Reservation), Ute Mountain Ute Tribe, Wichita & Affiliated Tribes, Ysleta del Sur Pueblo, Zuni Tribe of the Zuni Reservation.

### 4.2 Preparers and Participants

The following people prepared this EA or provided important oversight and review.

- Gretchen Pinkham, OSMRE, Natural Resource Specialist. Project Lead.
- Ed Vasquez, Ph. D., OSMRE, Ecologist, Section 7 Lead.
- Flynn Dickinson, OSMRE, Hydrologist.
- Jeremy Iliff, OSMRE, Archaeologist, Section 106 Lead.
- Cameo Flood, Tetra Tech, Inc., Senior NEPA Project Manager. Alternatives descriptions, NEPA review.
- Kristin McClure, Tetra Tech, Inc. Environmental Engineer. Air and Climate impacts, Cumulative Effects.
- Timothy Reeves, Tetra Tech, Inc., Principal Hydrologist/Water Quality Specialist. Water Quality and Quantity impacts
- Sarah Beck, Tetra Tech, Inc. Wildlife and Fish Biologist. Threatened and Endangered Species and Migratory Birds, Birds of Conservation Concern and Raptors impacts.



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**Appendix A**  
**Plan to Address a Methane Flare System**

## METHANE FLARE SYSTEM

### GENERAL DESCRIPTION

The Methane Emission Control System (MECS) is comprised of trailer mounted equipment for extracting, measuring, and incinerating gas from the vertical methane ventilation boreholes currently approved in the mine's Ventilation Plan. The gas is extracted from the borehole by either an existing exhauster attached to the MECS (shown on page 4) or directly by the MECS (shown on page 5) which utilizes a centrifugal blower system. Control systems monitor and records methane concentration of the gas, temperature, flow rate, quantity of gas extracted, quantity of gas flared, system operating time, and alarm conditions. The system incorporates multiple safety devices including, but not limited to, failsafe (fail closed) isolation shut-off valve, flame arrestor, detonation arrestor, and temperature sensing. On-board propane bottles provide fuel for the flare's pilot, which only operates at system startup. Power is supplied by grid power or a diesel generator when a grid interconnect is not possible. The system will be utilized on existing boreholes in the active gob of the current longwall panel and will be moved from borehole to borehole as necessary. The system may also be used on other boreholes within sealed areas of the mine.

### FLARE SYSTEM REQUIREMENTS

1. The system will be trailer mounted and contain a failsafe isolation valve, detonation arrestor, electric motor and blower, monitoring and measurement systems, programmable logic controller (PLC), data logging and communications system, and enclosed flare. A diesel generator will be utilized where grid power is not available. A typical MECS is shown on page 6. Additional sample ports, valves, tees or other connections not affecting the safety systems may be added for sampling and maintenance purposes.
2. Monitoring equipment will measure the following and record the information at the programmed intervals except as noted below:
  - A. Gas pressure. Pressure (vacuum) of the gas will be measured with a pressure sensor located upstream of the blower, monitoring the amount of vacuum the system is pulling. This parameter is not recorded.
  - B. Flow rate. A gas flow meter is located in the straight section of pipe immediately upstream of the flare.
  - C. Methane concentration. A gas sample return port will be located upstream of the blower (vacuum). The gas analyzer will be located in a cabinet next to the control panel. The methane analyzer will monitor the mine gas methane concentration and automatically deactivate the flare if the methane concentration drops below 30%. The analyzer will be checked, and calibrated if necessary, at least every 31 days. A record of the check/calibration will be maintained for 1 year.
  - D. Flare stack temperature. Three thermocouples at different elevations in the flare stack will continuously measure the stack's temperature. If the measured temperature of the flare exceeds the design temperature of the flare, power to the blower is turned off and the fail-safe valve closes.

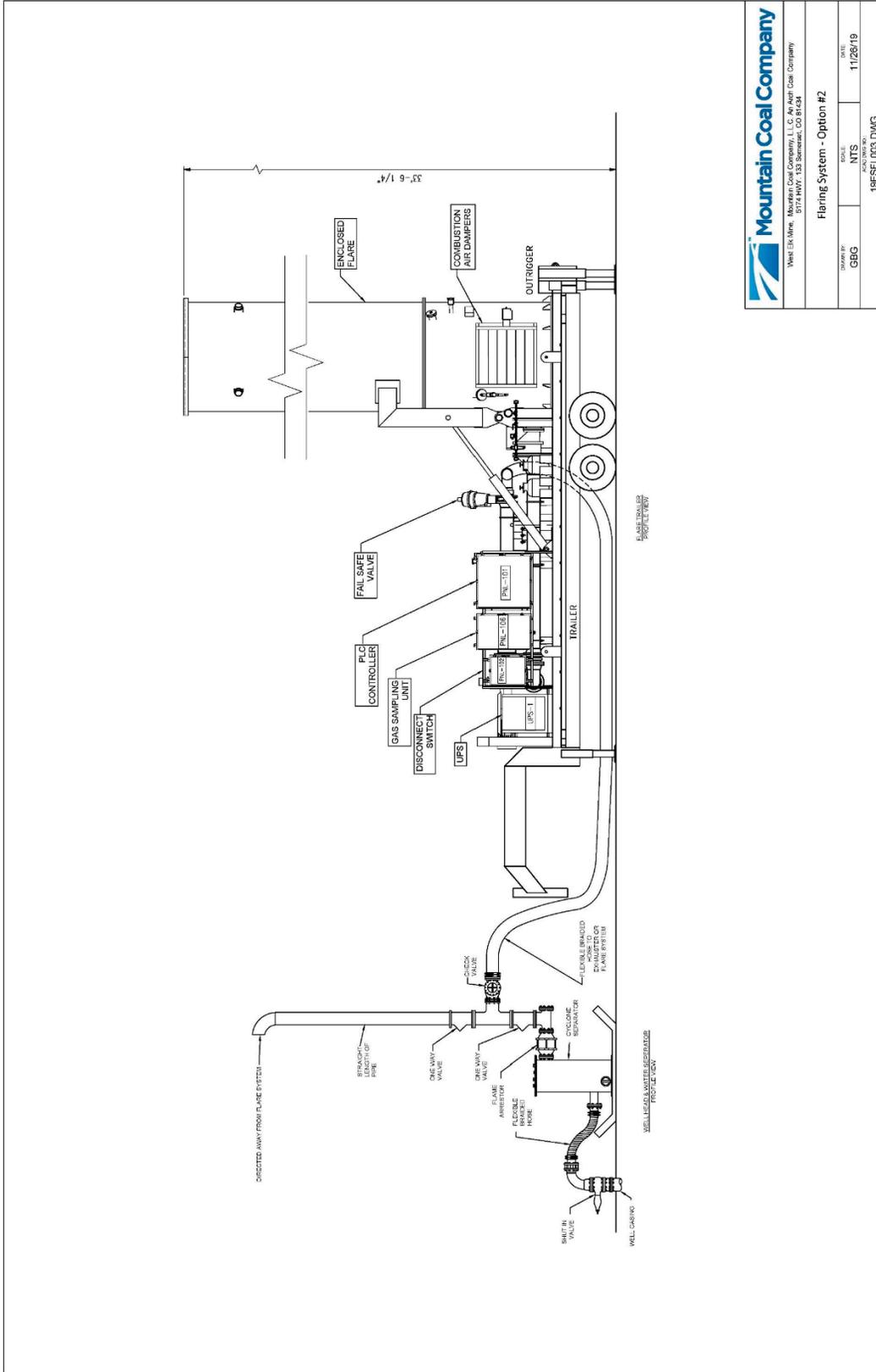
3. The PLC will automatically record faults and will activate the failsafe isolation valve and shut the flare system down if the mine gas methane concentration drops below 30%, or, the flare temperature is less than 1,400° F for more than 10 minutes or above 2,000° F. Under these conditions, the failsafe valve closes, isolating the MECS. With the removal of the flare system vacuum, the one-way valve allows free venting, either through the free vent stack on the exhauster or at the vertical methane ventilation borehole. The PLC will continuously monitor the methane concentration and total gas flow rate and calculate the amount of heat energy flowing to the flare stack. The PLC will increase power to the blower until the maximum capacity of the flare stack is achieved. The PLC will then maintain the heat energy flow rate by adjusting power to the blower as needed.
4. The data logging and communication system will transmit alarm conditions (text or email) via satellite modem to the designated recipients and allows for remote monitoring only. The system will not be controlled remotely and requires operator presence at the equipment to correct alarm conditions. The alarms will be transmitted to the mine's AMS operator who will notify the appropriate personnel and record the condition(s) and action taken. If the communication link fails, an operator will be sent to the facility to reestablish communication. If communication cannot be reestablished, the MECS will be shut down.
5. The MECS and diesel generator, if present, will be located a minimum of 30 feet from the borehole.
6. The trailer will be positioned so that the flare stack is a minimum of 50 feet from the free vent stack.
7. Dry trees and brush within 25 feet of the flare stack and within 15 feet of the trailer will be removed.
8. Fencing will be installed around the perimeter of the facility to prevent unauthorized entry.
9. The trailer and diesel generator, if present, will be frame grounded and bonded to the fence.
10. The diesel generator, if present, will be equipped with an automatic fire suppression system. If the generator runs out of fuel, the blower will shut down, the failsafe valve will close, the gas flow rate will drop to zero, the flare will shut down, and the PLC will send a message indicating that external power has been lost.
11. "No Smoking" and "Hot Surfaces" signs will be posted at the entrance gate to each facility.
12. The equipment will be maintained per the manufacturer's recommendations. A complete copy of the manufacturer's maintenance manual will be maintained at the mine site and will be made available to MSHA upon request.
13. A qualified person will conduct a weekly examination of each active MECS. A record of the examination will be maintained at the mine office for a period of one year.
14. Lines between the MECS and the exhauster or the borehole may be steel, polyethylene, PVC, or flexible hosing with a continuous wire braid.
15. If the system incurs a fire or explosion, it will be reported in accordance with 30 CFR 50.2(h) and 50.10(d).

### **EXHAUSTER REQUIREMENTS**

1. Piping installed on the surface may be steel, polyethylene, PVC, or flexible hosing with a continuous wire braid. The vent stacks will be polyethylene.

2. A typical exhauster layout for remote locations is shown on page 3. Additional sample ports, valves, tees, or other connections may be installed as necessary. Multiple drill holes may be connected to the exhauster, and/or multiple exhausters may be used. When multiple drill holes or exhausters are used:
  - A. Shut-in valves will be installed to provide isolation of each drill hole.
  - B. Check valves will be installed to prevent backflow between drill holes.
  - C. The flame arrestor(s) will be positioned to protect each drill hole.
  - D. Each drill hole in a multiple drill hole system will be capable of being automatically shut-in if the methane concentration in the drill hole drops below 25.0%.
3. The methane may be vented through the free-flow stack or the pump discharge stack.
4. Check valves will be used to prevent airflow reversal from the free-flow stack and the pump discharge stack when the exhauster is not operating.
5. A Lamson Model 859 or similar exhauster will be used. The unit may be started with propane before switching to the run on methane mode.
6. If the MECS shuts down, the failsafe valve on the MECS will automatically close, isolating the MECS. The one-way valve will allow free venting from the operating exhauster. The methane/propane powered exhauster will automatically shut down if the methane concentration drops below 25.0%. If electrically powered exhausters are used, methane monitors will automatically shut down the engine.

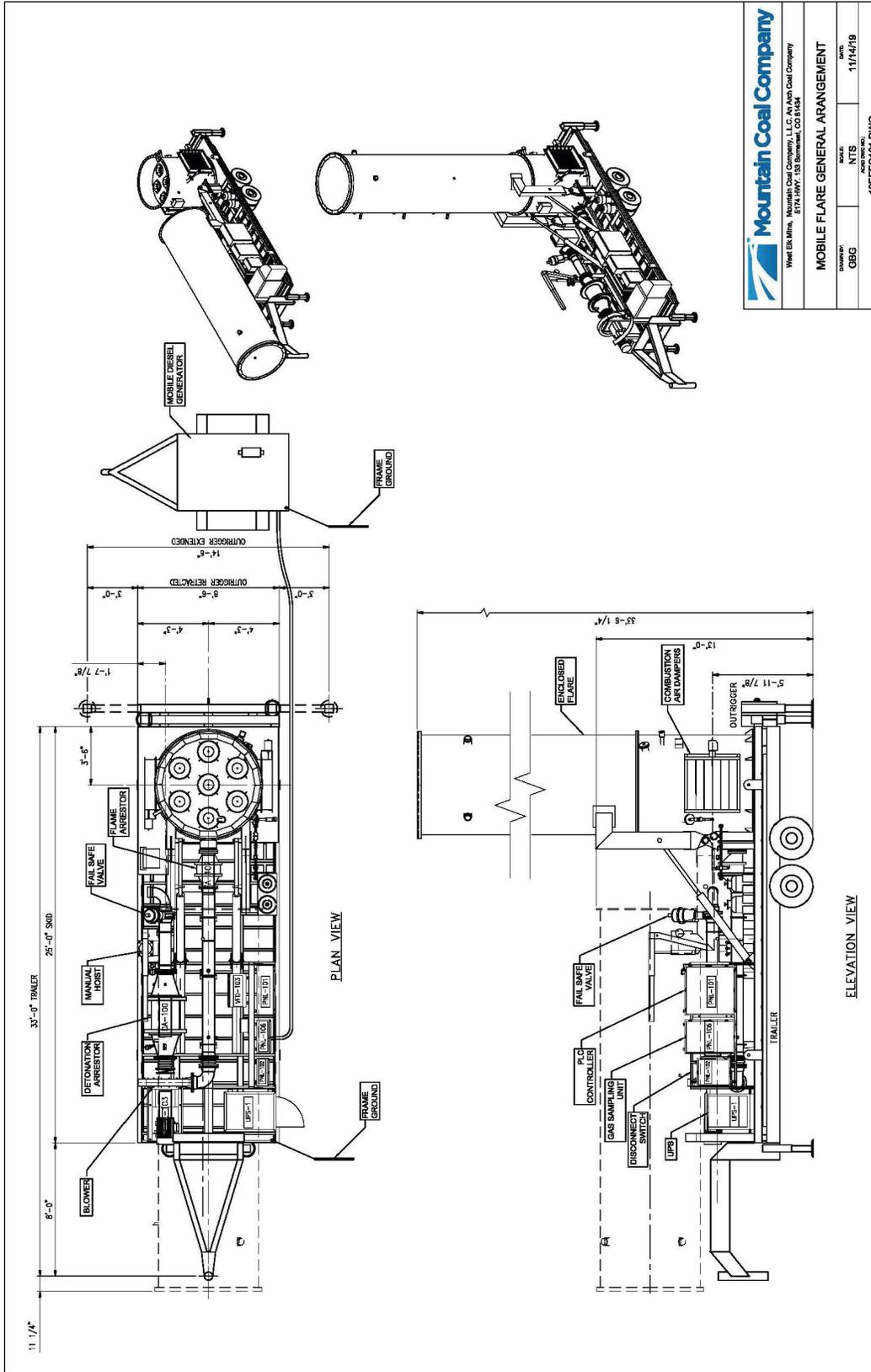




**Mountain Coal Company**  
 West Elk Mine, Mountain Coal Company, L.L.C., An Active Coal Company  
 8174 HWY. 133, Steamboat, CO 81630

**Flaring System - Option #2**

DESIGNED BY	GBC	CHECKED BY	NTS	DATE	11/28/19
19ESFL003.DWG					



**Mountain Coal Company**  
 West Elk Mine, Mountain Coal Company, L.L.C. An Ash Coal Company  
 3724 HWY. 138 Burnham, CO 81424

PROJECT:	MOBILE FLARE GENERAL ARRANGEMENT	DATE:	11/14/19
DRAWN BY:	GBG	SCALE:	NTS
APP'D BY: 19BEFEQ101.DWG			

**Appendix B**  
**Lease, Lease Modification, and CDRMS Permit Stipulations**

**Table B- 1. USFS Lease Stipulations for Protection of Non-Mineral (Surface) Resources**

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
Cultural and Paleontological Resources	<p>The USFS is responsible for assuring that the leased lands are examined to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the USFS, shall:</p> <ul style="list-style-type: none"> <li>• Contact the USFS to determine if a site specific cultural resource inventory is required. If a survey is required then:</li> <li>• Engage the services of a cultural resource specialist acceptable to the USFS to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the USFS for review and approval at the time a surface disturbing plan of operation is submitted.</li> <li>• Implement mitigation measures required by the USFS and BLM to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing, salvage, and recordation or other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all</li> </ul>	<p>The USFS is responsible for assuring that the leased lands are examined to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the USFS, shall:</p> <ul style="list-style-type: none"> <li>• Contact the USFS to determine if a site specific cultural resource inventory is required. If a survey is required then:</li> <li>• Engage the services of a cultural resource specialist acceptable to the USFS to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the USFS for review and approval at the time a surface disturbing plan of operation is submitted.</li> <li>• Implement mitigation measures required by the USFS and BLM to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing, salvage, and recordation or other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all</li> </ul>	Use language from parent leases (required Standard Notice for Lands under the Jurisdiction of the Department of Agriculture.)

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	<p>data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.</p> <ul style="list-style-type: none"> <li>The lessee or operator shall immediately bring to the attention of the USFS and BLM any cultural or paleontological resources or any other objects of scientific interest discovered as a result of surface operations under this license, and shall leave such discoveries intact until directed to proceed by USFS and BLM.</li> </ul>	<p>data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.</p> <ul style="list-style-type: none"> <li>The lessee or operator shall immediately bring to the attention of the USFS and BLM any cultural or paleontological resources or any other objects of scientific interest discovered as a result of surface operations under this license, and shall leave such discoveries intact until directed to proceed by USFS and BLM</li> </ul>	
Endangered or Threatened Species	<p>The USFS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.</p> <p>The lessee/operator may, unless notified by the USFS that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the USFS. An acceptable report must be provided to the USFS identifying the anticipated effects of a Proposed Action on endangered or threatened species or their habitats.</p>	<p>The USFS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.</p> <p>The lessee/operator may, unless notified by the USFS that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the USFS. An acceptable report must be provided to the USFS identifying the anticipated effects of a Proposed Action on endangered or threatened species or their habitats.</p>	Use language from parent leases, required Standard Notice for Lands under the Jurisdiction of the Department of Agriculture.

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	<p>If there is reason to believe that USFS Sensitive species, Threatened or Endangered species of plants or animals, or migratory bird species of high Federal interest are present, or become present in the lease area, the Lessee/Operator shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall include species or groups of species identified by the USFS, and will be conducted to by a qualified specialist. A report of findings will be prepared and provided to the USFS. A plan will be made that recommends protection for these species or action necessary to mitigate the disturbance consistent with the Forest Plan. The cost of conducting such</p> <p style="text-align: center;"><u>inventory, preparing reports and carrying out mitigation measures shall be borne by the Lessee/Operator.</u></p>	<p>If there is reason to believe that Sensitive, Threatened or Endangered species of plants or animals, or migratory bird species of high Federal interest are present, or become present in the lease area, the Lessee/Operator shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist, and a report of findings prepared. A plan will be made that recommends protection for these species or action necessary to mitigate the disturbance. The cost of conducting such inventory, preparing reports and carrying out mitigation measures shall be borne by the Lessee/Operator.</p>	<p>Use language from parent leases, required Standard Notice for Lands under the Jurisdiction of the Department of Agriculture.</p>
Canada Lynx	<p>To comply with the USDA USFS Conservation Agreement with US Fish and Wildlife Service (USFWS), to follow the conservation measures in the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000), the following special constraints will apply if surface use on the lease is proposed in lynx habitat:</p> <ul style="list-style-type: none"> <li>• Winter access will be limited to designated routes.</li> <li>• Further, should surface disturbing operations be proposed on the lease in lynx habitat, the following special constraints may apply, depending on site-specific</li> </ul>	<p>To comply with the Canada Lynx Assessment and Strategy (Ruediger et al. 2000), the following special constraints will apply if post-lease surface use is proposed in lynx habitat:</p> <ul style="list-style-type: none"> <li>• Winter access will be limited to designated routes.</li> </ul> <p>Further, should post-lease operations be proposed on the lease in lynx habitat, the following special constraints may apply, depending on site-specific circumstances:</p> <ul style="list-style-type: none"> <li>• Remote monitoring of the development sites and facilities may be required to reduce snow compaction.</li> <li>• A reclamation plan (e.g. road reclamation</li> </ul>	<p>To comply with the GMUG Forest Plan 2008 amendment, the following special constraints will apply if surface use on the lease is proposed in lynx habitat:</p> <ul style="list-style-type: none"> <li>• Winter access will be limited to designated routes.</li> </ul> <p>Further, should surface disturbing operations be proposed on the lease in lynx habitat, the following special constraints will apply:</p> <ul style="list-style-type: none"> <li>• Remote monitoring of the development sites and facilities will be required to reduce snow compaction.</li> </ul>

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	<p>circumstances:</p> <ul style="list-style-type: none"> <li>• Remote monitoring of the development sites and facilities may be required to reduce snow compaction.</li> <li>• A reclamation plan (e.g. road reclamation and vegetation rehabilitation) for sites and facilities that promotes the restoration of lynx habitat may be required.</li> <li>• Public motorized use on new roads constructed for project- specific purposes will be restricted.</li> <li>• Access roads will be designed to provide for effective closures and will be reclaimed or decommissioned at project completion if they are no longer needed for other management objectives.</li> <li>• New permanent roads will not be built on ridge tops or in saddles, or in areas identified as important for lynx habitat connectivity. New roads will be situated away from forested stringers.</li> </ul>	<p>and vegetation rehabilitation) for sites and facilities that promotes the restoration of lynx habitat may be required.</p> <ul style="list-style-type: none"> <li>• Public motorized use on new roads constructed for project- specific purposes will be restricted.</li> <li>• Access roads will be designed to provide for effective closures and will be reclaimed or decommissioned at project completion if they are no longer needed for other management objectives.</li> <li>• New permanent roads will not be built on ridge tops or in saddles, or in areas identified as important for lynx habitat connectivity. New roads will be situated away from forested stringers.</li> <li>• If post lease surface use occurs in lynx habitat, the Lessee will be required to submit an annual report to the USFS and USFWS of all activities having</li> <li>• occurred in lynx habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• A reclamation plan (e.g.road reclamation and vegetation rehabilitation) for sites and facilities that promotes the restoration of lynx habitatwill be required.</li> <li>• Public motorized use on new roads constructed for project-specific purposes will be restricted.</li> <li>• Access roads will be designed to provide for effective closures and will be reclaimed or decommissioned at project completion if they are no longer needed for other management objectives.</li> <li>• New permanent roads will not be built on ridge tops or in saddles, if possible, or in areas identified as important for lynx habitat connectivity. New roads will be situated away from forested stringers, if possible.</li> </ul>
Raptors	<p>For raptors (except American kestrel) the Lessee will be required to:</p> <ul style="list-style-type: none"> <li>• Conduct surveys for nesting raptors on the lease prior to development of any surface facilities, and</li> <li>• No surface activities will be allowed within ¼ mile radius of active nest sites between the dates of February 1 and August 15, unless authorized by the USFS on a site-specific basis.</li> </ul>	<p>For raptors (except American kestrel) the Lessee will be required to:</p> <ul style="list-style-type: none"> <li>• Conduct surveys for nesting raptors on the lease prior to development of any surface facilities, and</li> <li>• No surface activities will be allowed within ½-mile radius of active nest sites between the dates of February 1 and August 15, unless authorized by the USFS on a site-specific basis.</li> </ul>	<p>Use combined language from COC-67232 and COC-1362 which reflects Forest Plan standards as well as guidelines from the Biological Evaluation for this project:</p> <ul style="list-style-type: none"> <li>• Conduct surveys for nesting raptors on the lease prior to development of any surface facilities, and</li> <li>• No surface activities will be allowed within ½-mile radius of active nest sites between the dates of February</li> </ul>

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	<ul style="list-style-type: none"> <li>No surface activities will be allowed within 1-mile radius of active bald eagle or peregrine falcon nest sites between the dates of February 1 and August 15, unless authorized by the USFS on a site-specific basis</li> </ul>		<p>1 and August 15, unless authorized by the USFS on a site-specific basis.</p> <ul style="list-style-type: none"> <li>No surface activities will be allowed within 1-mile radius of active bald eagle or peregrine falcon nest sites * between the dates of February 1 and August 15, unless authorized by the USFS on a site-specific basis.</li> </ul> <p>(* No bald eagle or peregrine falcon nest site habitat has been identified within the lease modifications as indicated in the Biological Evaluation prepared for this analysis.)</p>
Big game winter range	In order to protect big game wintering areas, elk calving areas, and other key wildlife habitat and/or activities, specific surface use may be curtailed during specific times of year. Specific time restrictions for specific species will be evaluated by the USFS at the individual project stage, and any additional site specific conditions of use developed at that time.	In order to protect big game wintering areas, elk calving areas, and other key wildlife habitat and/or activities, specific surface use may be curtailed during specific times of year. Specific time restrictions for specific species will be evaluated by the USFS at the individual project stage, and any additional site specific conditions of use developed at that time.	Use language from parent leases.
Water depletions	In the future, if water to be used for mine related activities is taken from a source that is not considered to be non-tributary waters by the USFWS, or which exceeds a depletion amount previously consulted upon, the permitting agency must enter into consultation with the USFWS to determine appropriate conservation measures to offset effects to listed fish and critical habitat in the upper Colorado River Basin.	In the future, if water to be used for mine related activities is taken from a source that is not considered to be non-tributary waters by the USFWS, or which exceeds a depletion amount previously consulted upon, the permitting agency must enter into consultation with the USFWS to determine appropriate conservation measures to offset effects to listed fish and critical habitat in the upper Colorado River Basin.	Based on the CRR Section 7 consultation effort for the CRR’s North Fork Coal Mining Area in 2016, the USFS took on the responsibility for reinitiating consultation if minor water depletion caps were exceeded. The USFS wants to ensure the lessee provides the necessary information from monitoring and reporting to determine if minor water depletion caps are exceeded, and, in the highly

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
			<p>unlikely event that the depletion caps were exceeded, the lessee would meet any additional conservation measures the USFWS might require. This updated stipulation provides clarification to the process that has been occurring on the parent leases regarding water depletion. Changes to stipulation are in italics.</p> <p>In the future, if water to be used for mine related activities is taken from a source that is not considered to be non-tributary waters by the USFWS, or which exceeds a depletion amount previously consulted upon, <i>the surface management agency</i> must enter into consultation with the USFWS to determine appropriate conservation measures to offset effects to listed fish and critical habitat in the upper Colorado River Basin. <i>The lessee shall monitor and report all depletions to the Forest Service. Notwithstanding the fact that the surface management agency has the obligation to consult, the Lessee has the obligation to comply with all appropriate conservation measures to offset effects to listed fish and critical habitat in the upper Colorado River Basin in the event the depletion threshold is exceeded and additional reasonable and prudent actions are required.</i></p>
Breeding birds	If surface disturbance is proposed on the lease,	If surface disturbance is proposed on the lease,	Use language from COC-1362 parent

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	the lessee/operators will be required to conduct breeding bird surveys prior to surface disturbance as prescribed by the USFS.	the lessee/operators will be required to conduct breeding bird surveys prior to surface disturbance.	lease on both modifications.
Geologic hazards	No surface occupancy would be allowed in areas of high geologic hazard or high erosion potential, or on slopes which exceed 60%.	No surface occupancy would be allowed in areas of high geologic hazard or high erosion potential.	Use language from parent lease COC-1362 on both modifications.
	Special interdisciplinary team analysis and mitigation plans detailing construction and mitigation techniques would be required on areas where slopes range from 40-60 percent. The interdisciplinary team could include engineers, soil scientist, hydrologist, landscape architect, reclamation specialist and mining engineer.	Special interdisciplinary team analysis and mitigation plans detailing construction and mitigation techniques would be required on areas where slopes range from 40-60 percent. The interdisciplinary team could include engineers, soil scientist, hydrologist, landscape architect, reclamation specialist and mining engineer.	Use language from parent leases.
Baseline Information	The operator/lessee would be required to perform adequate baseline studies to quantify existing surface and subsurface resources. Existing data can be used for baseline analyses provided that the data is adequate to locate, quantify, and demonstrate interrelationships between geology, topography, hydrogeology, and hydrology. Baseline studies are critical to the success of future observation and assessment of mining related effects on resources.	The operator/lessee would be required to perform adequate baseline studies to quantify existing surface and subsurface resources. Existing data can be used for baseline analyses provided that the data is adequate to locate, quantify, and demonstrate interrelationships between geology, topography, hydrogeology, and hydrology. Baseline studies are critical to the success of future observation and assessment of mining related effects on resources in the Dry Fork lease tract.	Use language from parent leases.
Monitoring Program	The operator/lessee would be required to establish or amend a monitoring program to be used as a continuing record of change over time of area resources in order to assess mining induced impacts. The monitoring program shall provide the procedures and methodologies to adequately assess interrelationships between geology,	The operator/lessee of the lease tract would be required to establish or amend a monitoring program to be used as a continuing record of change over time of area resources in order to assess mining induced impacts. The monitoring program shall provide the procedures and methodologies to adequately assess interrelationships between geology,	Use language from parent leases.

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	topography, hydrogeology, and hydrology identified in the baseline assessment to mining activities on the lease area. The monitoring program shall incorporate baseline data so as to provide a continuing record over time.	topography, hydrogeology, and hydrology identified in the baseline assessment to mining activities in the lease tract area. The monitoring program shall incorporate baseline data so as to provide a continuing record over time.	
Riparian, wetland or floodplain	Surface use or disturbances (except for surface subsidence and resource monitoring purposes defined in the approved mining permit) will avoid riparian, wetland or floodplain areas, and a buffer zone surrounding these areas (the definition of riparian areas and appropriate buffer zone will be consistent with that defined in the USFS Manual and Water Conservation Practices Handbook. Wetland definition will follow Army Corps of Engineers guidelines) unless no practical alternatives exist.	Surface use or disturbances (except for surface subsidence and resource monitoring purposes defined in the approved mining permit) will not be permitted in riparian, wetland or floodplain areas, or within a buffer zone surrounding these areas (the definition of riparian areas and appropriate buffer zone will be consistent with that defined in the USFS Manual and Water Conservation Practices Handbook. Wetland definition will follow Army Corps of Engineers guidelines) unless no practical alternatives exist.	Use language from parent leases.
Subsidence	If subsidence adversely affects surface resources in any way (including, but not limited to a documented water loss), the Lessee, at their expense will be responsible to: restore stream channels, stock ponds, protect stream flow with earthwork or temporary culverts, restore affected roads, or provide other measures to repair damage or replace any surface water and/or developed ground water source, stock pond, water conveyance facilities, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, livestock and wildlife use, or other land uses as authorized by 36 CFR 251.	If subsidence adversely affects surface resources in any way (including, but not limited to a documented water loss), the Lessee, at their expense will be responsible to: restore stream channels, stock ponds, protect stream flow with earthwork or temporary culverts, restore affected roads, or provide other measures to repair damage or replace any surface water and/or developed ground water source, stock pond, water conveyance facilities, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, livestock and wildlife use, or other land uses as authorized by 36 CFR 251.	Use language from parent leases.

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	<p>The Lessee/Operator shall be responsible for monitoring, repairing and/or mitigating subsidence effects on existing facilities under Special Use Permit with the USFS. Monitoring, repair and/or mitigation, if needed, would be performed at the Lessee’s expense. These requirements will be coordinated with the District Ranger and the Special Use Permittee.</p>	<p>The Lessee/Operator shall be required to perform the following with respect to monitoring, repairing and/or mitigating subsidence effects on existing facilities under Special Use Permit with the USFS. Monitoring, repair and/or mitigation will be performed at the Lessee’s expense. The Lessee may request variations on timing for surveys, monitoring and reporting. Approving such requests would be at the discretion of the District Ranger.</p> <p>Baseline condition surveys of existing facilities will be completed the Fall following award of lease. Reports of this survey will be deliverable to the USFS by December 1 of that same year.</p> <p>In consultation with the Special Use Permittee and the USFS, install equipment to monitor flow on water conveyance facilities during the Fall following award of lease. Flow monitoring shall commence the following spring and continue until one year post mining. Flow data shall be provided to the USFS annually by December 1.</p> <p>A Surface Facility Monitoring and Mitigation Plan (Plan) will be submitted to the USFS for review and approval not later than 12 months prior to scheduled undermining. The Plan will detail measures to be taken to monitor, repair and mitigate subsidence effects of the facilities during actual mining and for <u>one year</u>.</p>	<p>As parent lease for COC-67232 deals specifically with an irrigation ditch on that lease, use language from COC-1362 on both lease modifications.</p>
Roadless	<p>The permittee/lessee must comply with <u>all the rules and regulations of the Secretary of Agriculture</u> set forth at Title 36, Chapter II, of the CFR governing the use and management of</p>	<p>All or parts of the following lands <u>encompassed in this lease are in the West Elk Inventoried Roadless Area</u> and may be subject to restrictions on road- building pursuant to rules</p>	<p>On the following lands within the <u>Sunset CRA, surface operations</u> incident to underground coal mining are subject to regulations in 36 CFR 294, subpart D:</p>

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
	<p>the NFS when not inconsistent with the rights granted by the Secretary of Interior in the permit. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an exploration plan by the Secretary of the Interior, (2) uses of all existing improvements, such as forest development roads, within and outside the area permitted by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by the permit/operation approved by the Secretary of the Interior.</p> <p>Federal Coal Lease C-1362, as modified October 2001</p> <p>All or parts of the following lands encompassed in this lease are in the West Elk Inventoried Roadless Area and may be subject to restrictions on road- building pursuant to rules and regulations of the Secretary of Agriculture applicable at the time any roads may be proposed on the lease.</p> <p>Legal descriptions are approximate. Locations of any proposed surface use would be verified for relationship to IRA boundaries using site-specific maps if/when surface operations are proposed.</p>	<p>and regulations of the Secretary of Agriculture applicable at the time any roads may be proposed on the lease.</p> <p>All or parts of the following lands encompassed in this lease are in the West Elk Inventoried Roadless Area and may be subject to restrictions on road- building pursuant to rules and regulations of the Secretary of Agriculture applicable at the time any roads may be proposed on the lease.</p>	<ul style="list-style-type: none"> <li>• All roads that may be constructed must be temporary.</li> <li>• All temporary road construction must be consistent with applicable land management plan direction</li> <li>• Road construction may only occur if motorized access has been deemed infeasible by the responsible official; unless a temporary road is needed to protect public health and safety in cases of an imminent threat of flood, fire or other catastrophic event that, without intervention, would cause the loss of life or property</li> <li>• Temporary road construction must be completed in a manner that reduces effects on surface resources, and prevents unnecessary or unreasonable surface disturbance</li> <li>• All temporary roads must be decommissioned and affected landscapes restored when it is determined that the road is no longer needed for the established purpose</li> <li>• All temporary roads must prohibit public motorized vehicles (including off- highway vehicles) except:             <ul style="list-style-type: none"> <li>i. Where specifically used for the purpose for which the road was established; or</li> </ul> </li> </ul>

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			<p>ii. Motor vehicle use that is specifically authorized under a Federal law or regulation.</p> <p>For any linear construction zone (LCZ) over 50 inches wide used to install pipelines, the Regional Forester must determine that they are needed, and the responsible official must determine that motorized access without a linear construction zone is not feasible.</p> <ul style="list-style-type: none"> <li>• Construction and use of linear construction zones must be consistent with the GMUG Forest Land and Resource Management Plan, and may be no wider than their respective intended uses.</li> <li>• Installation of linear construction zones will be done in a manner that minimizes ground disturbance.</li> <li>• Reclamation of a linear construction zone will not diminish, over the long-term, roadless area characteristics. All authorizations approving the installation of linear facilities through the use of a linear construction zone shall include a responsible official approved reclamation plan for reclaiming the affected landscape while conserving roadless area characteristics over the long-term. Upon completion of the installation of a linear facility via the use of a linear construction zone, all areas of surface</li> </ul>

Resource Area	Stipulations Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Stipulations Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Stipulations Specific to Lease Modifications
			disturbance shall be reclaimed as prescribed in the authorization and the approved reclamation plan and may not be waived.
Visuals	n/a	n/a	Within the lease modification areas, the lessee will work with the District Ranger and his/her representative to see that all mine operations are situated on the ground in such a manner that reasonably minimizes impacts to the scenic integrity of that landscape as prescribed in the Forest Plan.
Methane use	n/a	n/a	If flaring or other combustion is prescribed as part of any future mitigation measure, lessee will be required to submit a fire prevention and protection plan subject to responsible USFS official for approval. A draft of this plan has been submitted to the USFS for approval (West Elk Mine, 2019b). See Section 2.3.3

The parent leases also contain lease terms from BLM regarding coal mine methane. These are addressed as a lease addenda and stipulations as described in **Table B-2**.

**Table B-2. BLM-specific Lease Stipulations for Protection of Non-Mineral (Surface) Resources**

Resource Area	Addendum Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Addendum Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Revised Addendum per BLM IM 2017-037 (January 20, 2017)
Methane Flaring,	Sec. 3. Notwithstanding the language in Sec. 2 of this lease and subject to the terms and	Sec. 3. Notwithstanding the language in Sec. 2 of this lease and subject to the	“Section 3. Notwithstanding the language in Section 2 of the lease and subject to the

Resource Area	Addendum Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Addendum Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Revised Addendum per BLM IM 2017-037 (January 20, 2017)
<p>Capture/Use or other alternatives to venting</p>	<p>conditions below, lessee is authorized to drill for, extract, remove, develop, produce and capture for use or sale any or all of the coal mine methane from the above described lands that it would otherwise be required to vent or discharge for safety purposes by applicable laws and regulations. For purposes of this lease, “coal mine methane” means any combustible gas located in, over, under, or adjacent to the coal resources subject to this lease, that will or may infiltrate underground mining operations.</p> <p>Sec. 4. Notwithstanding any other provision of this lease, nothing herein shall, nor shall it be interpreted to, waive, alter or amend lessee’s right to vent, discharge or otherwise dispose of coal mine methane as necessary for mine safety or to mine the coal deposits consistent with permitted underground mining operations and federal and state law and regulation. Lessee shall not be obligated or required to capture for use or sale coal mine methane that would otherwise be vented or discharged if the capture of coal mine methane, independent of activities related to mining coal, is not economically feasible or if the coal mine methane must be vented in order to abate the potential hazard to the health or safety of the coal miners or coal mining activities. In the event of</p> <p>a dispute between lessor and lessee as to the economic or other feasibility of capturing for use or sale the coal mine methane, lessor’s remedy as a prevailing party shall be limited to recovery of the compensatory royalties on coal</p>	<p>terms and conditions below, lessee is authorized to drill for, extract, remove, develop, produce and capture for use or sale any or all of the coal mine methane from the above described lands that it would otherwise be required to vent or discharge for safety purposes by applicable laws and regulations. For purposes of this lease, “coal mine methane” means any combustible gas located in, over, under, or adjacent to the coal resources subject to this lease, that will or may infiltrate underground mining operations.</p> <p>Sec. 4. Notwithstanding any other provision of this lease, nothing herein shall, nor shall it be interpreted to, waive, alter or amend lessee’s right to vent, discharge or otherwise dispose of coal mine methane as necessary for mine safety or to mine the coal deposits consistent with permitted underground mining operations and federal and state law and regulation. Lessee shall not be obligated or required to capture for use or sale coal mine methane that would otherwise be vented or discharged if the capture of coal mine methane, independent of activities related to mining coal, is not economically feasible or if the coal mine methane must be vented in order to abate the potential hazard to the health or safety of the coal miners or coal mining activities. In the</p>	<p>terms and conditions below, lessee is authorized to drill for, extract, remove, develop, produce and capture for use or sale any or all of the waste mine methane for the above described lands that it would otherwise be required to vent or discharge for safety purposes by applicable laws and regulations. For purposes of this lease, “waste mine methane” means any combustible methane gas located in, over, under, or adjacent to the coal resources subject to this lease, that will or may infiltrate underground mining operations and that must be vented to protect the health and safety of the mine workers.</p> <p>Section 4. Notwithstanding any other provision of this lease, nothing herein waives, alters, or amends lessee’s right to vent, discharge or otherwise dispose of waste mine methane as necessary for mine safety or lessee’s obligation to mine the coal deposits consistent with Federal and state law and regulation and with safety requirements contained in permits applicable to underground mining operations subject to this lease. Lessee is not obligated or required to capture for use or sale waste mine methane that would otherwise be vented or discharged if the capture of waste mine methane, independent of the activities related to mining coal, is not economically feasible, or if the waste mine methane must be vented in order to abate the potential hazard to the</p>

Resource Area	Addendum Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Addendum Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Revised Addendum per BLM IM 2017-037 (January 20, 2017)
	<p>mine methane not captured for use or sale by lessee. Lessee shall have the right to continue all mining activities under the lease, including venting coal mine methane, pending resolution of any dispute regarding the application of the terms of Sections 3 and 4.</p> <p>Sec. 2 (c) COAL MINE METHANE OPERATIONS AND ROYALTIES-</p> <p>Notwithstanding the language in Part II, Section 2 (a) of this lease, the royalty shall be 12.5 percent of the value of any coal mine methane that is captured for use or sale from this lease. For purposes of this lease, the term “capture for use or sale” shall not include and the royalty shall not apply to coal mine methane that is vented or discharged and not captured for the economic or safety reasons described in Part I, Section 4 of this lease. Lessee shall have no obligation to pay royalties on any coal mine methane that is used on or for the benefit of mineral extraction at the West Elk coal mine. When not inconsistent with any express provision of this lease, the lease is subject to all rules and regulations related to Federal gas royalty collection in Title 30 of the CFR now or hereinafter in effect and lessor’s rules and regulations related to applicable reporting and gas measurement now or hereinafter in effect</p> <p>SEVERABILITY- In the event any provision of this addendum is subject to a legal challenge or is held to be invalid, unenforceable or illegal in any respect, the validity, legality and enforceability of this lease will not in any way be affected or impaired thereby and lessee will</p>	<p>event of</p> <p>a dispute between lessor and lessee as to the economic or other feasibility of capturing for use or sale the coal mine methane, lessor’s remedy as a prevailing party shall be limited to recovery of the compensatory royalties on coal mine methane not captured for use or sale by lessee. Lessee shall have the right to continue all mining activities under the lease, including venting coal mine methane, pending resolution of any dispute regarding the application of the terms of Sections 3 and 4.</p> <p>Sec. 2 (c) COAL MINE METHANE OPERATIONS AND ROYALTIES-</p> <p>Notwithstanding the language in Part II, Section 2 (a) of this lease, the royalty shall be 12.5 percent of the value of any coal mine methane that is captured for use or sale from this lease. For purposes of this lease, the term “capture for use or sale” shall not include and the royalty shall not apply to coal mine methane that is vented or discharged and not captured for the economic or safety reasons described in Part I, Section 4 of this lease. Lessee shall have no obligation to pay royalties on any coal mine methane that is used on or for the benefit of mineral extraction at the West Elk coal mine. When not inconsistent with any express provision of this lease, the lease is subject to all rules and</p>	<p>health or safety of the miners or mining activities. In the event of a dispute between the lessor and the lessee as to the economic or technical feasibility of capturing the waste mine methane for use or sale, lessor’s remedy as a prevailing party is limited to recovery of compensatory royalties on the waste mine methane not captured for use or sale by the lessee. Lessee retains the right to continue all mining activities under the lease, including venting waste mine methane, pending resolution of any dispute regarding the application of the terms of Sections 3 and 4.</p> <p>PART II. TERMS AND CONDITIONS</p> <p>(c) WASTE MINE METHANE OPERATIONS AND ROYALTY – Notwithstanding the language in Part II, Sec. 2(a) of this lease, the royalty will be 12.5 percent of the value of any waste mine methane that is captured for use or sale from this lease. For purposes of this lease, the term “capture for use or sale” does not include, and the royalty will not apply to, waste mine methane that is vented, or otherwise discharged and not captured, for the economic feasibility or safety reasons described in Part I, Section 4 of this lease. Lessee will have no obligation to pay royalties on any waste mine methane that is used on or for the benefit of mineral extraction at the (insert mine name here) coal mine. When not inconsistent with any express provision of this lease, this lease is subject to all the rules and regulations</p>

Resource Area	Addendum Carried Forward from Parent Lease COC-1362 Specific to Forest Service Lands	Addendum Carried Forward from Parent Lease COC-67232 Specific to Forest Service Lands	Revised Addendum per BLM IM 2017-037 (January 20, 2017)
	<p>retain, in accordance with the terms of this lease, the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits ,upon, or under the lands described in this lease, including the right to vent or discharge coal mine methane for safety purposed as required by applicable laws and regulation.</p>	<p>regulations related to Federal gas royalty collection in Title 30 of the CFR now or hereinafter in effect and lessor’s rules and regulations related to applicable reporting and gas measurement now or hereinafter in effect</p> <p>SEVERABILITY- In the event any provision of this addendum is subject to a legal challenge or is held to be invalid, unenforceable or illegal in any respect, the validity, legality and enforceability of this lease will not in any way be affected or impaired thereby and lessee will retain, in accordance with the terms of this lease, the exclusive right and privilege to drill for, mine, extract, remove or otherwise process and dispose of the coal deposits ,upon, or under the lands described in this lease, including the right to vent or discharge coal mine methane for safety purposed as required by applicable laws and regulation.</p>	<p>related to Federal gas royalty collection in Title 30 of the CFR now or hereinafter in effect and the lessor’s rules, regulations, notices, and orders related to applicable reporting and gas measurement now or hereinafter in effect.</p> <p>SEVERABILITY – In the event any provision of this addendum is subject to a legal challenge or is held to be invalid, unenforceable, or illegal in any respect, the validity, legality, and enforceability of this lease will not in any way be affected or impaired thereby and lessee will retain, in accordance with the terms of this lease, the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the lands described in this lease, including the right to vent or otherwise discharge waste mine methane for safety purposes as required by applicable laws and regulations</p>
			<p>West Elk Mine shall provide to BLM an updated report on the economic feasibility of capturing or flaring the mine’s mine methane for beneficial use or abatement, and should provide it to BLM no later than 1 year after the modification is approved. This report was completed (Tetra Tech, 2018).</p>

## **CDRMS Permit Stipulations Still in Effect**

### **Stipulation No. 3**

The operator shall, upon closure, install water-tight seals within the mine to prevent gravity discharge. This requirement may be waived upon the Division's approval of a plan submitted by the operator. This plan shall include a demonstration that the water quality of the discharge from the mine workings will be of acceptable quality and will remain acceptable after mine closure. This shall include chemical analysis and a predictive model that uses oxidation and reduction potential to determine long-term water quality of mine waters. Also, the plan shall include the construction of a suitable channel for mine discharge.

### **Stipulation No. 7**

The Division directs MCC, prior to any disturbance at the upper waste site, to install several electronic tilt meter tubes downslope from the toe of the proposed waste structure. These tilt meter installations shall be installed as specified in MCC's August 15, 1985 submittal. One indicator shall be installed within 160 feet of the toe of the waste pile currently half way between Monuments 51 and 54. The second shall be installed appropriately 100 feet northeast of Monument S2, 160 feet north of the toe of the waste pile, as indicated on Drawing No. MG-R C-001, included in the Permit Revision No. 6 application. During the installation of these tilt meter tubes, the operator shall auger and log the surficial and bedrock stratigraphy encountered. Augering shall continue until the operator has established intact bedrock occurrence. If any evidence of existing landslide deposits is encountered, the operator shall define the nature and extent of the pre-existing slope instability. If such landslide activity is discerned, the operator will be required to appropriately reconfigure the pile design, prior to initiation of any construction activity.

### **Stipulation No. 76**

MCC will inform the Montrose Office of the Colorado Division of Water Resources of placement of all new survey monuments. MCC will copy the Montrose Office of the Colorado Division of Water Resources on all survey, piezometer, and accelerometer/seismometer monitoring in and around Monument Dam. MCC will notify the Montrose Office of the Colorado Division of Water Resources whenever the peak ground acceleration threshold is exceeded during the monitoring period, whether mine-induced or naturally-occurring.