Appendix X: Comprehensive Air Resource Protection Protocol (CARPP)

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Introduction

The purpose of this Comprehensive Air Resource Protection Protocol (CARPP) is to further clarify Air and Atmospheric Values management goals, objectives, and actions displayed in Table 2-2 of the Proposed Resource Management Plan (PRMP). This CARPP describes air resources management and outlines BLM's commitments for managing air resources and authorizing activities that have the potential to adversely impact air resources in the KFO Planning Area. The plan also outlines specific requirements for proponents of projects that have the potential to generate air emissions and adversely impact air resources in the KFO Planning Area.

General Conditions

1) This CARPP may be modified as necessary to comply with laws, regulations, and policies, and to address new information and changing circumstances. Maintenance or Amendment of a Resource Management Plan is necessary to change the goals, objectives or management actions set forth in the RMP, while changes to implementation actions, including this CARPP, may be made without Maintaining or Amending a Resource Management Plan.

2) The BLM has the authority and responsibility under the Federal Land Policy and Management Act to manage public lands in a manner that will protect the quality of air and atmospheric values. The BLM, therefore, may manage the pace, place, density, and intensity of leasing and development to meet air quality goals.

3) The BLM will ensure implementation of reasonable mitigation, control measures, and design features through appropriate mechanisms, including oil and gas lease stipulations and conditions of approval, notices to lessees, and permit terms and conditions provided for by law, consistent with lease rights and obligations.

4) The BLM will ensure that air resource management strategies and control measures (those agreed to by an operator or as required mitigation) are enforceable by including specific conditions in a Record of Decision (ROD).

5) Within one year of signing the ROD, the BLM will establish a mechanism to track actual annual criteria and VOC pollutant emissions from BLM authorized oil and gas activities within the planning area. The emissions tracking system may be developed in collaboration with the CDPHE and with input from the EPA.

6) Within one year of signing the ROD, and annually thereafter, the BLM will conduct a review of its air resources management plan in order to implement the adaptive management strategy included in item 2.7 of the CARPP. This annual review will include the following:

    a) Evaluation of current air monitoring data and trends from air monitoring sites located in the Planning Area to determine the status of current air quality conditions in the Planning Area including:

(I) Measured concentrations approaching or exceeding any NAAQS;
(II) Measured adverse impacts to AQRVs at Class I areas or sensitive Class II areas (as identified on a case-by-case basis by CDPHE or federal land management or Tribal agencies).

b) Review of annual emissions data from BLM authorized oil and gas activities and comparison to emission levels analyzed in the PRMP/FEIS.

c) Review of oil and gas development activities authorized by the BLM in the Planning Area in the previous 12 months and comparison to the level of development analyzed in the PRMP/FEIS, including numbers of wells drilled, compressor stations installed, and centralized gathering and treatment facilities constructed.

d) Evaluate oil and gas development projection data for the coming three- to five-year period.

7) Based on the annual review of the CARPP outlined in item 2.6, the BLM, with input from the CDPHE and the EPA, will determine if the air analysis conducted for the PRMP/FEIS should be updated. Based on the emissions tracking, air monitoring data, and development projections, the BLM, with input from the CDPHE and the EPA, will determine if current management strategies are meeting the goals and objectives established in the PRMP/FEIS. The BLM in coordination with the CDPHE and the EPA will adapt management strategies as necessary to effectively manage air resources. Adaptive management strategies may include pacing of development, sponsoring additional air monitoring, conducting updated air modeling, or requiring mitigation within BLM's authority.

8) The BLM will work collaboratively with other state, local, federal, and Tribal agencies responsible for regulating air quality and authorizing oil and gas activities to develop a comprehensive management strategy to reduce air emissions from all oil and gas development in western Colorado. This strategy will include conducting a new modeling analysis, as soon as possible after signing the ROD, using updated emissions inventory, monitoring data, and oil and gas development projection data. The modeling analysis would limit projections of potential impacts from oil and gas development up to a maximum of ten years in the future to reflect realistic estimations of development projections and technology improvements. The new modeling analysis would be performed as a collaborative effort with appropriate state, local, federal, and Tribal agencies involved in the authorization and regulation of oil and gas development. Modeling may be conducted as part of a broader regional assessment, but results will include the direct KFO impacts resulting from the project. Results of the modeling will be made available for public review. The modeling analysis would provide a cumulative analysis for all agencies involved in oil and gas authorizations to tier to. The agencies would evaluate the modeling results and identify any needed additional reductions in criteria pollutant or ozone precursor emissions and if needed, would use their respective authorities to implement enhanced emission control strategies or operating limitations necessary to ensure continued compliance with applicable ambient air quality standards. Absent effective control technologies, reductions in the pace of development may be utilized to ensure ambient air quality standards are met.

Permitting

1) The BLM has the responsibility to implement the decisions of an RMP in a manner that protects air quality and also must recognize valid and existing leasing rights. The BLM can require specific actions and measures necessary to protect air quality in response to adverse impacts at the project permitting stage.

2) The BLM will, prior to authorizing any oil and gas development project, consider the magnitude of potential air emissions from the project or activity, existing air quality conditions, proximity to Class I areas, and issues identified during project scoping to identify pollutants of concern and to determine the appropriate level of air analysis to be conducted for the project. This analysis may include obtaining additional air monitoring data; air dispersion modeling; photochemical grid modeling; or mitigation measures, in addition to any applicable regulatory emission limits and standards.

3) The BLM will require an emissions inventory for oil and gas development project proposals. The emissions inventory will quantify emissions of regulated air pollutants from all sources related to the proposed project estimated for each year for the life of the project, including fugitive emissions and greenhouse gas emissions. The BLM will review any submitted project-specific emissions inventory to determine its completeness and accuracy. The BLM will use this estimated emissions inventory to identify pollutants of concern and to determine the appropriate level of air analysis to be conducted for the proposed project. This information will inform any monitoring, modeling, or mitigation decisions to be made during the annual review.

2) The proponent of a mineral development project that has the potential to emit any regulated air pollutant will be required to provide a detailed description of measures agreed to by the operator, to reduce project-related air pollutant emissions, including greenhouse gases and fugitive dust. The list is not intended to preclude the use of other effective air pollution control technologies which may be proposed. Details of measures agreed to by the operator would be submitted by the applicant and enforced as a condition of the BLM-issued authorization.

3) The BLM will include, as a Condition of Approval for any oil and gas authorization, a requirement that operators submit an annual report of actual annual emissions for all criteria pollutants, VOCs, and GHG emissions related to the authorization. The BLM will use the reported emissions to track total emissions from BLM authorized oil and gas activities in the Planning Area.

Monitoring

The BLM recognizes that ambient air monitoring is valuable for determining current concentrations of air pollutants, describing long-term trends in air pollutant concentrations, and evaluating the effectiveness of air control strategies. As part of a comprehensive air resource protection protocol for the Planning Area, the BLM commits to the measures described in this section regarding ambient air monitoring.

1) The BLM will continue to fund and operate the BLM's air monitoring stations located in Meeker and Rangely, contingent upon continued funding.

2) The BLM will facilitate a cooperative effort with oil and gas industry, the CDPHE, the USFS, the NPS, the EPA, and local counties to establish, fund, operate, and maintain a comprehensive air monitoring network in the Planning Area. The purpose of the air monitoring network is to establish background concentrations of air pollutants, determine long-term trends in air pollutant concentrations, and determine the effectiveness of air pollutant control strategies. The BLM will facilitate the sharing of air monitoring data collected by the air monitoring network.

3) The BLM may require project proponents for oil and gas development projects to conduct pre-construction air monitoring within or adjacent to the proposed development area. The purpose of this monitoring is to establish baseline air quality conditions prior to development at the site. The requirement for monitoring will be determined by BLM based on:

   a) Absence of existing representative air monitoring data;

   b) Existing air quality conditions;

   c) Magnitude of potential air emissions from the project or activity;

   d) Magnitude of existing emission sources in the area;

   e) Proximity to a federally mandated Class I area, sensitive Class II area (as identified on a case-by-case basis by the CDPHE or federal land management or Tribal agencies), or population center;

   f) Location within a non-attainment or maintenance area;

   g) Meteorologic or geographic conditions;

   h) Project duration; or

   i) Issues identified during project scoping.

   The project proponent will be required to provide a minimum of 1 year of baseline ambient air monitoring data for any pollutant(s) of concern as determined by the BLM. If the BLM determines that baseline monitoring is required, this pre-analysis data must meet CDPHE air monitoring standards, be obtained from a site within 50 km of the project boundary, and cover the year immediately prior to the proposed project submittal. The project proponent will be responsible for siting, installing, operating, and maintaining any required air monitoring.

4) The BLM may require project proponents for oil and gas development projects to conduct air monitoring for the life of the oil and gas development project, considering the factors listed in items 3 (a) through 3 (i), above. The purpose of this air monitoring is to determine impacts attributable to the project over time. The project proponent will be responsible for siting, installing, operating, and maintaining any required air monitoring.

5) The BLM will work cooperatively with the CDPHE to determine a mechanism to submit, track, and approve project-specific pre-construction monitoring or monitoring data required in a project-specific record of decision.

Modeling

The BLM recognizes that air dispersion and photochemical grid models are useful tools for predicting project specific impacts to air quality, predicting the potential effectiveness of control measures and strategies, and for predicting trends in regional concentrations of some air pollutants. As part of a comprehensive air resource protecion protocol for the Planning Area, the BLM commits to the measures described in this section regarding air quality modeling.

1) The BLM has identified air modeling as a significant component of its adaptive management strategy for managing air resources, as outlined in sections 2.7 and 2.8 above.

2) The BLM may require a project proponent to conduct air quality modeling for any pollutant(s) of concern in the absence of sufficient data, to ensure compliance with laws and regulations or to determine the effectiveness of mitigation options, unless the project proponent can demonstrate that the project will result in no net increase in emissions of the pollutant(s) of concern. The requirement for modeling will be based on:

   a) Existing air quality conditions;

   b) Magnitude of potential air emissions from the project or activity;

   c) Magnitude of existing emission sources in the area;

   d) Proximity to a federally mandated Class I area, sensitive Class II area (as identified on a case-by-case basis by the CDPHE or federal land management or Tribal agencies), an area expected to exceed a NAAQS or PDS increment, population center, non-attainment or maintenance area;

   e) Meteorologic or geographic conditions;

   f) Project duration; or

   g) Issues identified during project scoping.

   The BLM, in cooperation with an interagency review team, will determine the parameters for the modeling analysis through the development of a project-specific modeling protocol.

3) The BLM will support and participate in regional modeling efforts through multi-state or multi-agency organizations such as Western Governors' Association – Western Regional Air Partnership (WRAP) and the Federal Leadership Forum (FLF).

Mitigation

The BLM recognizes that many of the activities it authorizes, permits, or allows, generate air pollutant emissions that have the potential to adversely impact air quality. The primary mechanism to reduce air quality impacts is to reduce emissions (mitigation). As part of this comprehensive air resource protection protocol for the Planning Area, the BLM commits to the measures described in this section regarding reducing emissions.

1) The BLM will require additional air emission control measures and strategies within its regulatory authority and in consultation with federal, state, and Tribal agencies with responsibility for managing air resources if proposed or committed measures are insufficient to achieve air quality goals and objectives. Mitigation measures may include emission control strategies listed in Table X-1.

2) The BLM will consider applying mitigation to emissions sources not otherwise regulated by the CDPHE for oil and gas development projects, where an air quality impact analysis determines there are, or will likely be, future impacts above acceptable levels, including impacts to Class I or sensitive Class II areas (as identified on a case-by-case basis by the CDPHE or federal land management or Tribal agencies). In addition, the BLM will consider applying mitigation to emissions sources when nearby air monitoring identifies exceedances of the NAAQS or measured adverse impacts to AQRVs in Class I or sensitive Class II areas (as identified on a case-by-case basis by the CDPHE or federal land management or Tribal agencies) in close proximity to the project area. Mitigation may include reduction in the pace or scale of development.

3) The proponent of a project will be required to minimize air pollutant emissions by complying with all applicable state and federal regulations (including application of best available control technology) and may be required to apply mitigation including, but not limited to, best management practices and other control technologies or strategies identified by the BLM or the CDPHE, in accordance with delegated regulatory authority.

4) Development and implementation of appropriate protection measures is effective at the project approval stage, because the proposed action has been defined in terms of temporal and spatial characteristics, as well as development processes and procedures. This better-defined information allows more precise identification of impacts to air quality, which results in more specific impact analysis and identification of effective mitigation. As part of the project approval process, the BLM will identify project-specific measures in response to identified impacts to air resources. These measures may include emission control strategies listed in Table X-1.

5) The BLM may require project proponents for oil and gas development projects to submit a contingency plan that provides for reduced operations in the event of an air quality episode such as a monitored exceedance. Specific operations and pollutants to be addressed in the contingency plan will be determined by the BLM on a case-by-case basis, taking into account existing air quality and pollutants emitted by the project.

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Control Strategies for Drilling and Compression			
Directional Drilling.	Reduces construction related emissions (dust and vehicle and construction equipment emissions). Decreases surface disturbance and vegetation impacts (dust and CO2 and nitrogen flux). Reduces habitat fragmentation.	Could result in higher air impacts in one area with longer sustained drilling times.	Depends on geological strata.
Improved engine technology (Tier 2 or better) for diesel drill rig engines.	Reduced NOx, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers.
Selective Catalytic Reduction (SCR) for drill rig engines and/or compressors.	NO_x emissions reduction, potential decreased formation of visibility impairing compounds and ozone. NOx control efficiency of 95% achieved on drill rig engines. NOx emission rate of 0.1 g/hp-hr achieved for compressors.	Potential NH3 emissions and formation of visibility impairing ammonium sulfate. Regeneration/disposal of catalyst can produce hazardous waste.	Not applicable to 2-stroke engines.
Non-selective catalytic reduction (NSCR) for drill rig engines and/or compressors.	NOx emissions reduction, potential decreased formation of visibility impairing compounds, and ozone. NOx control efficiency of 80-90% achieved for drill rig engines. NOx emission rate of 0.7 g/hp-hr achieved for compressor engines greater than 100 hp.	Regeneration/disposal of catalysts can produce hazardous waste.	Not applicable to lean burn or 2-stroke engines.

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Natural Gas fired drill rig engines.	NOx emissions reduction, potential decreased formation of visibility impairing compounds, and ozone.		Requires onsite processing of field gas.
Electrification of drill rig engines and/or compressors using electric generating unit (EGU).	Decreased emissions at the source. Transfers emissions to more efficiently controlled source (EGU).	Displaces emissions to EGU.	Depends on availability of power and transmission lines.
Improved engine technology (Tier 2 or better) for all mobile and non-road diesel engines.	Reduced NOx, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers.
Green (a.k.a. closed loop or flareless) completions.	Reduction in VOC and CH4 emissions. Reduces or eliminate flaring and venting and associated emissions. Reduces or eliminates open pits and associated evaporative emissions. Increased recovery of gas to pipeline rather than atmosphere.	Temporary increase in truck traffic and associated emissions.	Need adequate pressure and flow. Need onsite infrastructure (tanks/dehydrator). Availability of sales line. Green completion required where feasible per the COGCC Rule 805(b)(3).
Green workovers.	Same as above.	Same as above.	Same as above.
Minimize/eliminate venting and/or use closed loop process where possible during "blow-downs".	Same as above.		
Eliminate evaporation pits for drilling fluids.	Reduces VOC and GHG emissions. Reduces potential for soil and water contamination. Reduces odors.	May increase truck traffic and associated emissions.	Requires tank and/or pipeline infrastructure.
Electrification of wellhead compression/ pumping.	Reduces local emissions of fossil fuel combustion and transfers to more easily controlled source.	Displaces emissions to EGU.	Depends on availability of power and transmission lines.

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Wind (or other renewable) generated power for compressors.	Low or no emissions.	May require construction of infrastructure. Visual impacts. Potential wildlife impacts.	Depends on availability of power and transmission lines.
Compressor seals – replace wet with dry or use mechanical seal.	Reduce gas venting (VOC and GHG emissions).		May be costly or not mechanically feasible.
Compressor rod packing system – use monitoring and replacement system.	Reduce gas leaks (VOC and GHG emissions).		Requires establishing a monitoring system and doing replacements.
Control Strategies Utilizing Centralized Systems			
Centralization (or consolidation) of gas processing facilities (e.g., separation, dehydration, sweetening).	Reduces vehicle miles traveled (truck traffic) and associated emissions. Reduced VOC and GHG emissions from individual dehydration/ separator units.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure.
Liquids Gathering systems (for condensate and produced water).	Reduces vehicle miles traveled and associated emissions. Reduced VOC and GHG emissions from tanks, truck loading/unloading, and multiple production facilities.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure.
Water and/or fracturing liquids delivery system.	Reduced long term truck traffic and associated emissions.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure. Not feasible for some terrain.
Control Strategies for Tanks, Separators, and Dehydrators			
Eliminate use of open top tanks.	Reduced VOC and GHG emissions.		

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Capture and control of flashing emissions from all storage tanks and separation vessels with vapor recovery and/or thermal combustion units.	Reduces VOC and GHG emissions.	Pressure build up on older tanks can lead to uncontrolled rupture.	
Capture and control of produced water, crude oil, and condensate tank emissions.	Reduces VOC and GHG emissions.		95% VOC control required by the COGCC in some areas.
Capture and control of dehydration equipment emissions with condensers, vapor recovery, and/or thermal combustion.	Reduces VOC, HAP, and GHG emissions.		90% VOC control required by the COGCC in some areas.
Use zero emissions dehydrators or use desiccants dehydrators.	Reduces VOC, HAP, and GHG emissions.	Requires desiccants (salt tablets and forms a brine solution that must be disposed of.	Can be as effective as Triethylene glycol (TEG) dehydration.
Control Strategies for Misc. Fugitive VOC Emissions			
Install plunger lift systems to reduce well blow downs.	Reduces VOC and GHG emissions.		Can be more efficient at fluids removal than other methods, must have adequate pressure.
Install and maintain low VOC emitting seals, valves, hatches on production equipment.	Reduces VOC and GHG emissions.		
Initiate equipment leak detection and repair program (e.g., including use of FLIR infrared cameras, grab samples, organic vapor detection devices, and/or visual inspection).	Reduction in VOC and GHG emissions.		

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Install or convert gas operated pneumatic devices to electric, solar, or instrument (or compressed) air driven devices/controllers.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	
Use "low" or "no bleed" gas operated pneumatic devices/controllers.	Reduces VOC and GHG emissions.		Required by the COGCC.
Use closed loop system or thermal combustion for gas operated pneumatic pump emissions.	Reduces VOC and GHG emissions.		
Install or convert gas operated pneumatic pumps to electric, solar, or instrument (or compressed) air driven pumps.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	
Install vapor recovery on truck loading/unloading operations at tanks.	Reduces emissions of VOC and GHG emissions.	Pressure build up on older tanks can lead to uncontrolled rupture.	
Control Strategies for Fugitive Dust and Vehicle Emissions			
Unpaved surface treatments including watering, chemical suppressants, and gravel.	20% - 80% control of fugitive dust (particulates) from vehicle traffic.	Potential impacts to water and vegetation from runoff of suppressants.	
Use remote telemetry and automation of wellhead equipment.	Reduces vehicle traffic and associated emissions.		
Speed limit control and enforcement on unpaved roads.	Reduction of fugitive dust emissions.		
Reduce commuter vehicle trips through car pools, commuter vans or buses, innovative work schedules, or work camps.	Reduced combustion emissions, reduced fugitive dust emissions, reduced ozone formation, reduced impacts to visibility.		

Table X-1: Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Miscellaneous Control Strategies			
Use of ultra-low sulfur diesel (e.g., in engines, compressors, construction equipment).	Reduces emissions of particulates and sulfates.		Fuel not readily available in some areas.
Reduce unnecessary vehicle idling.	Reduced combustion emissions, reduced ozone formation, reduced impacts to visibility, reduced fuel consumption.		
Reduced pace of (phased) development.	Peak emissions of all pollutants reduced.	Emissions generated at a lower rate but for a longer period. LOP, duration of impacts is longer.	May not be economically viable or feasible if multiple mineral interests.