



Location:

Rio Arriba County, New Mexico

U.S. Department of the Interior

Bureau of Land Management:

Farmington District Office

Farmington Field Office

6251 North College Boulevard, Suite 1A

Farmington, New Mexico 87402

505-564-7600

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The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

On December 30, 2020, the Bureau of Land Management (BLM) issued a decision regarding the February 2020 Farmington Field Office Competitive Oil and Gas Lease Sale. The decision was challenged in *Diné Citizens Against Ruining Our Environment v. BLM*, No. 1:20-cv-00673 (D.N.M.) (*Diné CARE 3*). On April 5, 2022, the BLM entered into a settlement agreement *Diné CARE 3* in which the BLM agreed to review the adequacy of the National Environmental Policy Act (NEPA) analyses underlying the challenged leasing decisions. On July 31, 2022, the BLM issued a new decision reaffirming the previous decision to issue the lease parcel described in the February 2020 Lease Sale Notice. Plaintiffs subsequently filed a new lawsuit, *Diné CARE v. BLM*, 1:22-cv-00804 (D.N.M.) (*Diné CARE 4*), challenging the July 31, 2022 decision. That lawsuit is pending as to the parcels undergoing supplemental review.

This supplemental analysis to the Farmington Field Office (FFO) February 2020 Oil and Gas Lease Sale Environmental Assessment (EA) (DOI-BLM-NMA010-2019-0103-EA) is the result of BLM's review of the subject NEPA analysis and provides information, data, and/or analyses that are 1) new since work was completed on the Final EA (December 30, 2020) and the accompanying supplement (July 31, 2022) and 2) substantive and relevant to the BLM's informed decision making and public disclosure process. This supplemental analysis replaces the analysis of the same issues in the Final EA and the supplemental analyses previously approved in December 2020 and July 2022 and accompanies the Final EA and the associated, new Finding of No Significant Impact (FONSI) and Decision Record (DR). This supplemental analysis, together with the analysis from July 2022 and the Final EA, constitutes the final NEPA documentation for the FFO February 2020 Competitive Oil and Gas Lease Sale. The analysis for those issues not being replaced in full in this supplemental EA is incorporated by reference.

Future potential development of the one lease parcel (80 acres) nominated for auction during the February 2020 Competitive Oil and Gas Lease Sale is estimated at approximately one vertical well and 4.35 acres of surface disturbance. Total oil, gas, and produced water production is estimated to be 19,000 barrels (bbl), 3,235,000 thousand cubic feet (mcf), and 140,000 bbl, respectively.

1.1.1 Purpose and Need

The BLM's purpose is to determine whether to maintain the leasing decision from the original EA or alter that decision by retracting, or cancelling, the lease which the BLM has already approved. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act of 1920 (MLA), as amended, to promote the exploration and development of oil and gas on the public domain consistent with the regulations prescribed by the Secretary of the Interior, where consistent with Federal Land Policy and Management Act (FLPMA), the National Environmental Policy Act (NEPA), and other applicable laws, regulations, and policies.

1.1.2 Decision to Be Made

The BLM Authorized Officer will decide whether to reaffirm its previous decision to make available for lease the subject lease parcels with or without constraints, in the form of lease stipulations, as provided for in the approved land use plans. If the decision is to reaffirm the previous decision to make the lands available for lease, and reaffirm the issuance of a lease, standard terms and conditions under Section 6 of

the BLM Lease Form (Form 3100-11, Offer to Lease and Lease for Oil and Gas), herein referred to as standard terms and conditions, would apply. The BLM Authorized Officer also has the authority to cancel previously leased parcels, based on the analysis of potential effects presented in this supplemental analysis. The Decision Record will identify whether the BLM decided to reaffirm its previous decision to lease the nominated lease parcels and the rationale for the decision.

1.1.3 Proposed Action

Under the Proposed Action Alternative, the BLM would reaffirm its previous decision to offer and issue the subject lease. Any parcels that were leased previously would remain leased.

1.1.4 No Action

Under the No Action Alternative, the BLM would not reaffirm its previous decision to offer and lease the subject lease. Selection of the No Action alternative would not prevent future leasing in these areas consistent with the relevant RMPs.

1.2 ADDITIONAL PUBLIC INVOLVEMENT

On December 20, 2023, the BLM posted proposed the draft of its supplemental NEPA analysis for this lease on the BLM's e-Planning website. The BLM accepted comments on the analysis through January 19, 2024. The BLM held a second public comment period on this analysis from February 12 through March 12, 2024.

CHAPTER 2. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

2.1 ISSUES ANALYZED IN BRIEF

The Final EA contains final analysis for several issues analyzed in brief (AIB). AIB-15 (Public Health and Safety), and AIB-21 (Environmental Justice) analyzed in the original FFO February 2020 EA were replaced by the analysis in the July 2022 supplement.¹ In addition, the Quality-of-Life analysis within the July 2022 supplement remains the latest analysis of the issue.

2.2 ISSUES ANALYZED IN DETAIL

Supplemental analysis of Issue 1 (Air Quality), and Issue 2 (Greenhouse Gases and Climate Change) are provided in Sections 2.2.1 and 2.2.2, respectively. These analyses completely replace the analyses that were prepared in the sections 2.1.1 and 2.1.2 of the July 2022 supplemental analysis. Note that Issue 3 (Water Use and Quantity Analysis) in the July 2022 supplemental analysis remains the latest analysis of that issue.

¹ See supplemental analysis at [https://eplanning.blm.gov/projects/1500871/200330182/20064989/250071171/Rio%20Puerco%20Field%20Office_February%202020%20Competitive%20Oil%20and%20Gas%20Lease%20Sale_Supplemental%20Analysis_2022_508%20\(1\).pdf](https://eplanning.blm.gov/projects/1500871/200330182/20064989/250071171/Rio%20Puerco%20Field%20Office_February%202020%20Competitive%20Oil%20and%20Gas%20Lease%20Sale_Supplemental%20Analysis_2022_508%20(1).pdf).

2.2.1 Issue 1: Air Quality

How would future potential development of the nominated lease parcels affect air quality (particularly National Ambient Air Quality Standards and volatile organic compounds) in the analysis area?

Air quality is determined by the quantity and chemistry of atmospheric pollutants in consideration of meteorological factors (i.e., weather patterns) and topography, both of which influence the dispersion and concentration of those pollutants. Air pollutants result from a number of different and widespread sources of emissions. The analysis area for this issue is the entirety of San Juan, Sandoval, Rio Arriba, and McKinley Counties, which make up the New Mexico portion of the San Juan Basin. This spatial scope of analysis was identified based on the regional nature of air pollution and to facilitate analysis using the best available air quality data, which are generally provided at the county level. For the purposes of this analysis, short-term effects to air quality are considered those that cease after well construction and completion (30–60 days); long-term effects are considered those associated with operations and production and would cease after operations/production are concluded.

Much of the information in this section is incorporated from the *BLM 2022 Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas* (herein referred to as Air Resources Technical Report and incorporated into this EA by reference) (BLM 2023a).

2.2.1.1 Affected Environment

The Clean Air Act (CAA), 42 U.S.C. §§ 7401-7671(q), requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. *Primary standards* provide public health protection, and *secondary standards* provide for public welfare, including protection against degraded visibility and damage to animals, crops, vegetation, and buildings (EPA 2023a). The primary NAAQS are required to be set at a level to protect public health, including the health of at-risk populations, with an adequate margin of safety in order to prevent a known or anticipated health related effects from polluted air.

The EPA has set NAAQS for six principal pollutants (“criteria” air pollutants): carbon monoxide (CO); nitrogen dioxide (NO₂); O₃; particulates (PM₁₀ and PM_{2.5}); sulfur dioxide (SO₂); and lead (Pb) (EPA 2022a). The EPA has delegated the responsibility of regulation and enforcement of the NAAQS to the state level and has approved the New Mexico State Implementation Plan (SIP), which allows the State to enforce both the New Mexico Ambient Air Quality Standards (NMAAQs) and the NAAQS on all public and private lands with the exception of tribal lands and lands within Bernalillo County.² NMED Air Quality Bureau is responsible for implementation of the SIP and enforcement of air quality standards (BLM 2023a). A detailed description of these pollutants, along with their health effects and their sources, can be found in Chapter 3 of the Air Resources Technical Report (BLM 2023a) and has been incorporated by reference.

CRITERIA POLLUTANT CONCENTRATIONS

Concentrations of air pollutants are measured at air monitoring sites and expressed in ppm, parts per billion (ppb), or micrograms per cubic meter (µg/m³) depending on the unit of measure for a specific

² Under the CAA and the Tribal Authority Rule, tribes have express authority to manage air quality on tribal lands. Air quality in Bernalillo County is regulated by the City of Albuquerque/Bernalillo Air Quality Division.

standard. The EPA and State of New Mexico periodically analyze and review air monitor locations and will discontinue monitoring where pollutant concentrations have been well below standards or may add monitors in areas where concentrations may be suspected of approaching the NAAQS or the NMAAQS (BLM 2023a).

Design values are the concentrations of air pollution at a specific monitoring site that can be compared with the NAAQS. Compliance with the NAAQS is typically demonstrated through monitoring of ground-level concentrations of atmospheric air pollutants. Areas where pollutant concentrations are below the NAAQS are designated as attainment or unclassifiable. Locations where monitored pollutant concentrations are higher than the NAAQS are designated nonattainment, and air quality is considered unhealthy (BLM 2023a). The most recent design values for criteria pollutants within San Juan, Sandoval, and Rio Arriba Counties are listed in Table 2.1 and are incorporated by reference from the Air Resources Technical Report (BLM 2023a). These counties do not have monitoring data for CO, Pb, PM_{2.5}, and PM₁₀ concentrations, nor is there any criteria pollutant monitoring data for McKinley County, but because the counties are relatively rural, it is likely that these pollutants are not elevated.

Table 2.1. 2022 Design Values for Counties within the New Mexico Portion of the San Juan Basin

Pollutant	2022 Design Values	Averaging Time	NAAQS	NMAAQS
O ₃	Rio Arriba County: 0.064 ppm Sandoval County: 0.070 ppm San Juan County: 0.070 ppm: four stations; Bloomfield at 0.064 ppm, Navajo Dam at 0.070 ppm, Chaco Culture at 0.068 ppm, Shiprock at 0.067 ppm	8-hour	0.070 ppm [†]	–
NO ₂	San Juan County: 9 ppb: four stations; Bloomfield at 9 ppb, Navajo Dam at 6 ppb, Chaco Culture at 1 ppb, Shiprock at 3 ppb	Annual	53 ppb [‡]	50 ppb
NO ₂	San Juan County: 31 ppb: four stations; Bloomfield at 31 ppb, Navajo Dam at 24ppb, Chaco Culture at 4 ppb, Shiprock at 22 ppb	1-hour	100 ppb [§]	–
SO ₂	San Juan County: 8 ppb: two stations; Bloomfield 1 ppb, Shiprock at 8 ppb	1-hour	75 ppb [¶]	–

Source: Air Resource Technical Report (BLM 2023a).

Notes: The NMAAQS standard for total suspended particulates, which was used as a comparison for PM₁₀ and PM_{2.5}, was repealed as of November 30, 2018. Where no standards are presented, the NAAQS still apply.

* Annual mean, averaged over 3 years.

† Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years.

‡ Not to be exceeded during the year.

§ 98th percentile, averaged over 3 years.

O₃ is the criteria pollutant that is of most concern for the analysis area. O₃ design values indicate that levels of O₃ have come close to but have not yet violated the NAAQS in San Juan, Sandoval, Rio Arriba, and McKinley Counties. As a secondary pollutant, O₃ is not a direct emission pollutant (that is, it is not emitted directly into the air), but it is the result of chemical reactions between a group of highly reactive gases called NO_x and Volatile Organic Compounds (VOCs) (which are organic compounds that vaporize [i.e., become a gas] at room temperature) when exposed to sunlight (EPA 2023b). O₃ and NO₂ are criteria air pollutants and are regulated under the NAAQS and NMAAQS. VOCs are not criteria pollutants, however, because O₃ is not a direct emission; emissions of NO_x (particularly NO₂, which is used as an indicator for the larger group of gases) and VOCs are used as a proxy for determining potential levels of secondary formation of O₃.

O₃ is most likely to reach unhealthy levels on hot, sunny days in urban environments and can be transported long distances by wind into rural areas (EPA 2023b). People most at risk from breathing air containing O₃ include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. In addition, people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as vitamins C and E, are at greater risk from O₃ exposure (EPA 2023c). The largest sources of both NO_x and VOCs emissions in the San Juan Basin include oil and gas sources, point sources, and on-road and non-road mobile sources (incorporated by reference from Section 4 of the Air Resource Technical Report [BLM 2023a]). Biogenic sources, such as vegetation and soil, can also represent a substantial portion of NO_x and VOC emissions, including in the San Juan Basin (BLM 2023a). Additional information on ozone, along with its health effects and sources, can be found in Section 3 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

NMED is required by New Mexico state statute, NMSA 1978, § 74-2-5(C), to plan for O₃ mitigation in areas where monitors indicate O₃ levels within 95% of the federal O₃ standard. Section 74-2-5(C) also authorizes the state's Ozone Attainment Initiative (OAI) and encompasses three main goals (NMED 2023):

- To ensure the health and welfare of current residents and future generations in New Mexico.
- To protect the attainment/unclassifiable status of all areas in the state.
- To develop plans that detail how nonattainment areas will attain and maintain the standards by reducing O₃.

To address NO_x and VOC emissions, the NMED developed the "Oil and Natural Gas Regulation for Ozone Precursors," NMAC 20.2.50.1, which was published on July 26, 2022, with an effective date of August 5, 2022. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, nitrogen oxide (NO) emissions by 23,148 tons, and CH₄ emissions by 200,000 to 425,000 tons statewide. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. The regulation also encourages operators to stop venting and flaring and use fuel cells technology to convert CH₄ to electricity at the well site and incentivizes new technology for leak detection and repair.

NMED also participates in the voluntary Ozone Advance Program, which is a collaborative effort to encourage O₃ emission reductions in attainment areas. Through this program, states, tribes, and local governments work with EPA to take near-term steps to improve local air quality and ensure continued health protection over the long term. The goal is to avoid violations of a NAAQS and maintain an attainment designation. Since New Mexico began participating in the Ozone Advance Program in April 2019, O₃ levels in Rio Arriba, Sandoval, Santa Fe, and Valencia Counties either currently or recently have exceeded 95% of the 2015 8-hour O₃ NAAQS (67 ppb) and could soon violate this standard. In total, the Ozone Advance Program and outreach efforts include the following nine counties: Chaves, Doña Ana, Eddy, Lea, Rio Arriba, San Juan, Santa Fe, Sandoval, and Valencia.

Another pollutant of concern in the southwestern United States is particulate matter. The EPA regulates particulate matter 10 micrometers in diameter or smaller (PM₁₀ and PM_{2.5}) because these smaller particles are associated with negative health effects, including respiratory and cardiovascular problems, and because they can become more deeply imbedded into the lungs and may even get into the bloodstream (BLM 2023a) but does not regulate particles larger than 10 micrometers in diameter (such as sand and larger dust particles). Previous PM_{2.5} monitoring in San Juan County in the early 2010s showed design

values below the NAAQS (BLM 2023a). PM₁₀ design values are only available and presented as average estimated exceedances value for each county. EPA data for San Juan County in the years 2020-2022 show three average estimated exceedances of the 1987 24-hour PM₁₀ NAAQS. Although exceedances are presented, the information listed in this PM₁₀ design value report is intended for informational use only and does not constitute a regulatory determination by EPA as to whether an area has attained a NAAQS. PM₁₀ monitored outdoor air quality data can be obtained from the EPA Air Data webpage and interactive tool (EPA 2023d). Like O₃, particulate matter is formed by reactions between other chemicals, specifically between SO₂ and NO_x, which are emitted from vehicles, power plants, and other industrial processes (EPA 2023e). Additionally, particulate matter emissions often result directly from activities like construction, traffic on unpaved roads, fields, and fires (EPA 2023e). Additional information on particulate matter, along with its health effects and sources, can be found in Section 3 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

CRITERIA POLLUTANT EMISSIONS

Along with criteria pollutant concentrations as measured by air monitors, the EPA provides data on criteria pollutant emissions, expressed in tons per year or total volume of pollutant released into the atmosphere. Emissions data point to which industries and/or practices are contributing the most to the general level of pollution. State, basin, and county total emissions for all sources are reported in Table 2.2, based on the 2020 National Emissions Inventory (NEI) in tons per year. NEI data have been incorporated by reference from Section 4 of the Air Resources Technical Report (BLM 2023a).

The primary sources of air pollution in the analysis area are oil and gas sources, natural sources (biogenics), point sources, and on-road/non-road sources. In New Mexico, the largest sources of Criteria Air Pollutants (CAPs) emitted by human activities are area sources for PM₁₀ and PM_{2.5}, on-road sources for CO, and oil and gas sources for VOCs, SO₂, and NO_x. In the San Juan Basin, the largest sources of CAPs emitted by human activities are area sources for PM₁₀ and PM_{2.5}, point sources for SO₂, and oil and gas sources for CO, VOCs, and NO_x (BLM 2023a). The largest sources in individual counties may vary from state total emissions. Additional 2020 NEI data can be found in Section 4 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

Table 2.2. 2020 Air Pollutant Emissions, in Tons per Year

Source	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs
State of New Mexico Total Emissions	129,132	42,623	199,462	87,828	615,513	712,639	105,524
San Juan Basin Total Emissions	24,218	6,042	53,708	2,301	108,755	141,794	15,277
Sandoval County, NM Total Emissions	8,574	1,984	6,635	69	30,860	14,477	2,618
San Juan County, NM Total Emissions	6,979	1,955	18,821	1,477	39,645	19,906	4,272
Rio Arriba County, NM Total Emissions	3,568	838	4,135	36	16,874	30,328	4,829
McKinley County, NM Total Emissions	5,300	1,299	11,339	448	20,345	20,454	3,558

Note: BLM reports both biogenic and human-caused emissions in the table above.

Source: Air Resources Technical Report (BLM 2023a).

HAZARDOUS AIR POLLUTANTS (HAPs)

The CAA requires control measures for HAPs. A pollutant is classified as a HAP if it has been identified by the EPA as a compound that is known or suspected to cause cancer or other serious health effects, such as compromises to immune and reproductive systems, birth defects, developmental disorders, and/or adverse environmental effects (BLM 2023a). There are currently 187 compounds listed as HAPs by the EPA. National Emissions Standards for HAPs (NESHAPs), established by the EPA, limit the release of specified HAPs from specific industries (40 C.F.R. §§ 61, 63). NESHAPs for oil and gas development include control of benzene, toluene, ethyl benzene, mixed xylenes, and n-hexane from major sources, and benzene emissions from triethylene glycol dehydration units as area sources (BLM 2023a).

The Air Resources Technical Report discusses the relevance of HAPs to oil and gas development and the particular HAPs that are regulated in relation to these activities (BLM 2023a) and has been incorporated by reference. Potential health risks associated with HAPs released into the air from oil and gas operations have been evaluated by review of existing emissions data, air quality monitoring, and modeling studies. The Air Resources Technical Report discusses in detail a 2019 health assessment study for which scientists from Colorado State University conducted on-site air monitoring for 47 VOCs (including HAPs) during various stages of well development and production at oil and gas extraction facilities in Colorado. In summary, simulated cancer risks to average individuals were below one in one million at distances of 1,400 feet from the well pads, four in one million at 500 feet from the well pads, and ten in one million at 300 feet from the well pads. Fewer than one in one million people at distances of 2,000 feet from the well pads experienced the worst potential long-term combination of individual risk factors, oil and gas emissions, and local meteorological conditions (maximum exposed individual). This figure rises to seven in one million at 500 feet from the well pads, and 10 in 1 million at 400 feet from the well pads (BLM 2023a).

The Air Toxics Screening Assessment (AirToxScreen), published by the EPA, provides a screening tool for state, local, and tribal air agencies (EPA 2022a). The EPA Air Toxics Screening Assessment is used to evaluate impacts from existing HAP emissions in New Mexico. AirToxScreen is the successor to the previous National Air Toxics Assessment. In December 2022, EPA released the results of its 2019 AirToxScreen. AirToxScreen calculates concentration and risk estimates from a single year's emissions data using meteorological data for that same year. The risk estimates assume a person breathes these emissions each year over a lifetime (or approximately 70 years). AirToxScreen provides quantitative estimates of potential cancer risk and five classes of non-cancer hazards (grouped by organ/system: immunological, kidney, liver, neurological, and respiratory) associated with chronic inhalation exposure to real-world toxics for each county and census tract (BLM 2023a). AirToxScreen is a cumulative HAP assessment based on total HAP emissions from all sources contained in the NEI. Per the AirToxScreen Technical Support Document, this national-scale assessment (AirToxScreen) is consistent with EPA's definition of a cumulative risk assessment, as stated in EPA's Framework for Cumulative Risk Assessment, as "an analysis, characterization, and possible quantification of the combined risks to health or the environment from multiple agents or stressors" (EPA 2003; EPA 2022b). A review of the results of the 2019 AirToxScreen shows that cancer, neurological risks, and respiratory risks in the analysis area are all lower than national levels and are generally the same as the state of New Mexico.

The 2019 AirToxScreen analysis reveals that the total cancer risk (defined as the probability of contracting cancer over the course of a 70-year lifetime, assuming continuous exposure) in San Juan, Sandoval, Rio Arriba, and McKinley Counties as 17.6, 18.7, 12.3, 11.1 cases per 1 million people, respectively, which is lower than the nationwide level (25.5 cases per 1 million people) and in the same range as the state of New Mexico (19.1 cases per 1 million people). The contribution of the oil and gas

industry to the cancer risk in San Juan, Sandoval, Rio Arriba, and McKinley Counties is 2.06, 0.01, 0.04 and 0.01 cases in a million, respectively (BLM 2023a). The total cancer risk is within the acceptable range of risk published by the EPA of 100 in 1 million as discussed in 40 C.F.R. § 300.430 (e)(2)(i)(A)(2) and the Residual Risk Report to Congress, EPA- 453/R-99-001 (EPA 1999).

AirToxScreen non-cancer hazards (i.e., respiratory) are expressed as a ratio of an exposure concentration (EC) to a reference concentration (RfC). RfCs are indicators defined by the EPA as the daily inhalation concentrations at which no long-term adverse health impacts are expected. For a given air toxin, exposures at or below the RfC (i.e., hazard quotients (HQ) 1 or less) are not likely to be associated with adverse health effects. As exposures increase above the RfC (i.e., HQ greater than 1), the potential for significant adverse effects also increases (BLM 2023a). Chronic non-cancer hazards are estimated for multiple air toxic by summing the HQs, creating a hazard index (HI). The respiratory HI in the analysis area (San Juan, Sandoval, Rio Arriba, and McKinley Counties) ranges from 0.28, 0.22, 0.13, and 0.12, respectively, which is lower than the national HI (0.31) and within a similar range as the New Mexico HI (0.22) (BLM 2023a). Additional AirToxScreen data can be found in Section 5 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

Since the publication of this supplemental analysis for public comment on December 20, 2023, the BLM has completed additional cumulative analysis of HAPs. The additional HAPs analysis was prepared in response to an adverse decision of the Tenth Circuit. The U.S. Court of Appeals for the Tenth Circuit directed the BLM to analyze cumulative HAPs emissions for the San Juan Basin in its oil and gas leasing NEPA. *Diné Citizens Against Ruining Our Env't v. Haaland*, 59 F.4th 1016, 1047 (10th Cir. 2023) (“Diné CARE II”).³ The BLM Cumulative Hazardous Air Pollutants Modeling – Final Report (Ramboll and BLM 2023) and the BLM Summary of Cumulative Oil and Gas Hazardous Air Pollutant Analysis for the FFO (Ramboll and BLM 2024), incorporated by reference and summarized below, detail the modeling methods used and the results of the modeling.

The BLM’s Western United States HAP photochemical modeling assessment was prepared to support BLM’s analysis of cumulative oil and gas impacts from HAPs originating from oil and gas production in Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming (states where the BLM commonly authorizes federal activities for fossil energy development) on public health. In regards to which HAPs to consider in the analysis, the Diné CARE II Court specifically mentioned five HAPs—benzene, toluene, ethylbenzene, mixed xylenes, and n-hexane—as applying to oil and gas development activities based on the National Emission Standards for HAPs (NESHAPs; see 43 C.F.R. Part 63). The modeling assessment evaluated emissions from existing federal, new federal, and non-federal oil and gas sources and includes six key HAPs—benzene, toluene, ethylbenzene, xylene, n-hexane, and formaldehyde—because these compounds are common in the oil and gas sector and consistent with regulatory requirements described in the Environmental Protection Agency’s New Source Performance Standards, see 43 C.F.R. Part 60, and NESHAPs. HAP emissions in this study include emission sources associated with wellsite exploration, wellsite production, and midstream sources (Ramboll and BLM

³ The federal Clean Air Act defines a Hazardous Air Pollutant (HAP) as “any air pollutant” of which “emissions, ambient concentrations, bioaccumulation or deposition of the substance are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effect.” 42 U.S.C. § 7412.

2023). The modeling analysis evaluated air quality out to a future year of 2032⁴ utilizing data from the 2028 Western Regional Air Partnership (WRAP)/Western Air Quality Study (WAQS) modeling platform, the Environmental Protection Agency SPECIATE 5.14 speciation profiles, the EPA’s 2016v2 emissions modeling platform (EPA 2022d), and the BLM oil and gas development projections to quantify and apportion federal and non-federal oil and gas emissions (Ramboll and BLM 2023). The model output allows the BLM to compare concentrations of HAPs to calculated risk-based thresholds in order to provide the hard look at the effects on public health required by NEPA.

Carcinogenic and noncarcinogenic chronic risks from modeled oil and gas concentrations were calculated for the 2032 future year. As noted in the Cumulative Effects section of this EA, the Reasonably Foreseeable Development (RFD) scenarios (FFO and RPFO) for the New Mexico portion of the San Juan Basin represents a conservative projection for oil and gas production based on the number of completions occurring compared to the RFD forecast value. Health-based inhalation thresholds and cancer unit risk estimate threshold values were obtained from the weight of evidence for carcinogenicity under the 2005 EPA cancer guidelines (without revisions) (EPA 2021; EPA 2022e). A residency exposure adjustment factor was applied to the cancer inhalation risk by multiplying the annual modeled concentration by the cancer unit risk factor and multiplying this product by an applicable exposure adjustment factor. The residency exposure adjustment factor⁵ is computed by taking the average residency of the county where development is proposed (Table 2.3) and dividing that by length of exposure over an assumed 70-year life span. For example, for San Juan County, the residency exposure adjustment factor would be 14.5/70. All other values in the following tables are raw model output with no adjustment applied.

Table 2.3. County specific residency information

Area	San Juan County, New Mexico	McKinley County, New Mexico	Sandoval County, New Mexico	Rio Arriba County, New Mexico	New Mexico	United States
Years	14.5	17.3	12.8	18.6	13.1	12.4

Source: Estimate based on data from U.S. Census Bureau (USCB), 2022, 2017-2021 American Community Survey 5-Year Estimates, Table S2502 Demographic Characteristics for Occupied Housing Units, <https://data.census.gov/table/ACSST5Y2021.S2502>, accessed on October 5, 2023.

Table 2.4 shows the oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde. The risk analysis was performed only for the three HAPs (benzene, ethylbenzene, and formaldehyde) because these pollutants had EPA-provided non-zero unit risk estimate (URE) values based on the weight of evidence approach (EPA 2021). The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San

⁴ EPA's 2016v2 modeling platform (EPA 2022d), the most advanced dataset at the time of model development, includes emissions for the years 2016, 2023, 2026, and 2032. Future year 2032 was used in this modeling assessment. The Western Regional Modeling for the FFO and RPFO included all the wells that were producing and expected to be producing up to 2032. The HAPs modeling followed the RFDs for both the FFO and the RPFO up until 2032, but total RFD production was not analyzed because of the limits of the current EPA data.

⁵ EPA. Exposure Assessment Tools by Routes – Inhalation, <https://www.epa.gov/expobox/exposure-assessment-tools-routes-inhalation>

Juan, McKinley, Sandoval, and Rio Arriba Counties, as described above, is 5.69, 0.55, 1.76, and 5.83, respectively.

Table 2.4. Estimated Cancer Risk from 2032 Oil and Gas Production in the Farmington Field Office by Mineral Designation

County	Cancer Risk* from Existing Federal Wells (per million)	Cancer Risk* from New Federal Wells (per million)	Cancer Risk* from Nonfederal Wells (per million)	70-Year Cancer Risk* from Cumulative Oil and Gas Production	Adjusted Cancer Risk** From Cumulative Oil and Gas Production
McKinley	0.04 to 0.84	0.02 to 0.55	0.05 to 0.88	0.11 to 2.21	0.03 to 0.58
Rio Arriba	0.29 to 15.51	0.13 to 2.75	0.25 to 4.27	0.67 to 21.74	0.19 to 6.15
Sandoval	0.12 to 2.76	0.07 to 3.11	0.13 to 3.91	0.32 to 9.60	0.06 to 1.93
San Juan	0.07 to 16.70	0.04 to 4.02	0.09 to 7.18	0.20 to 27.48	0.04 to 6.09

*Cancer risk from emissions of benzene, ethylbenzene, and formaldehyde.

**Adjusted residency risk based on residency factors by county (17.3 years for McKinley County, 19.8 years for Rio Arriba County, 14.1 for Sandoval County, and 15.5 for San Juan County).

Risk characterization is a description of the nature and, often, magnitude of human risk, including resulting uncertainties. Risk characterization is accomplished by integrating information from the components of the risk assessment and synthesizing an overall conclusion about risk that is complete, informative, and useful for decision makers (EPA 2000⁶). A “bright line” in risk characterization refers to a threshold value that separates acceptable and unacceptable levels of risk. It is regarded as a clear and unambiguous limit used to determine whether a particular level of exposure to a hazardous substance is safe or not.

Bright lines were not used in the analysis of the cumulative oil and gas HAPs results to determine if a particular risk level is acceptable or not, as no such construct for risk exists within the Clean Air Act framework akin to the national ambient air quality standards (that is, there are no national ambient air quality standards against which to compare modeled HAP concentrations). Rather, values or ranges of values published by EPA (e.g., AirToxScreen [National Air Toxics Assessment] or 40 C.F.R. Part 300.430 [Remedial Investigation/Feasibility Study]) were used to provide useful context to risk estimates associated with the cumulative oil and gas HAPs study. As described in the BLM Cumulative Hazardous Air Pollutants Modeling Final Report (Ramboll and BLM 2023b), while no explicit risk thresholds are available, EPA uses 1 in 1 million and 100 in 1 million risk for context (EPA 2022e). As a result, both the 70-year cancer risk and the adjusted cancer risk in Table 2 are within the contextual range published by the EPA.

It is important to note that the cancer risks estimated by this assessment only consider cumulative oil and gas sources and six common oil and gas HAP pollutants. While the cumulative oil and gas contribution is within the contextual range published by EPA (1 in 1 million and 100 in 1 million), additional HAPs from non-oil and gas sources could increase the overall risk in the project area. This modeling assessment looked at cumulative oil and gas sources to address the court’s holding in regards to analysis of

⁶ EPA. 2000. Science Policy Council Handbook “Risk Characterization”, EPA 100-B-00-002, December 2000, https://www.epa.gov/sites/default/files/2015-10/documents/osp_risk_characterization_handbook_2000.pdf.

cumulative HAP emissions. It was beyond the scope of this modeling assessment to determine cumulative HAP values from non-oil and gas sources.

Table 2.5 shows the Hazard Quotients (HQs) for each compound and the Hazard Index (HI). EPA estimates chronic noncancer HQs by dividing a chemical’s estimated long-term exposure concentration by the reference concentration for that chemical. Chronic noncancer hazards from multiple air toxics were assessed by calculating a HI through the summation of individual HAP HQs that share similar adverse health effects, resulting in a target organ-specific HI representing the risk to a specific organ or organ system. An HQ or HI value less than 1 indicates that the exposure is not likely to result in adverse noncancer effects. (Ramboll and BLM 2023, EPA 2022e). San Juan, McKinley, Sandoval, and Rio Arriba Counties show HQ and HI values below 1 for all mineral designations, indicating that cumulative oil and gas source exposure is not likely to result in adverse noncancer effects. The maximum HI from total oil and gas production is also below 1, at 0.208, 0.017, 0.071, and 0.168, for San Juan, McKinley, Sandoval, and Rio Arriba Counties, respectively. It is important to note that the noncancer risks estimated by this assessment only consider cumulative oil and gas sources and the six common oil and gas pollutants. While the cumulative oil and gas contribution are below 1, additional HAPs from non-oil and gas sources could increase the overall risks in the project area. This modeling assessment looked at cumulative oil and gas sources to address the court’s holding in regards to analysis of cumulative HAP emissions. It was beyond the scope of this modeling assessment to determine cumulative HAP values from non-oil and gas sources.

Table 2.5. Estimated Hazard Quotients and Hazard Index from Circa 2032 Oil and Gas Production in the Farmington Field Office by Mineral Designation

Source	Hazard Quotient (HQ)						Hazard Index (HI)
	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	
McKinley County							
Existing Federal	<0.0001 to 0.0003	Range is <0.0001	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	0.0003 to 0.0060	0.0003 to 0.0064
New Federal	<0.0001 to 0.0005	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0001	0.0001 to 0.00033	0.0002 to 0.0040
Total Federal	0.0001 to 0.0008	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0002	0.0004 to 0.0093	0.0004 to 0.0103
Non-Federal	<0.0001 to 0.0005	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0002	0.0003 to 0.0060	0.0004 to 0.0067
Total Oil and Gas	0.0001 to 0.0012	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0003	0.0007 to 0.0150	0.0008 to 0.0167
Rio Arriba County							
Existing Federal	0.0001 to 0.0046	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0005	<0.0001 to 0.0021	0.0022 to 0.1130	0.0022 to 0.1203
New Federal	<0.0001 to 0.0035	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0003	<0.0001 to 0.0007	0.0009 to 0.0168	0.0010 to 0.0214
Total Federal	0.0001 to 0.0071	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0007	<0.0001 to 0.0022	0.0031 to 0.1271	0.0032 to 0.1372
Non-Federal	0.0001 to 0.0033	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0005	0.0019 to 0.0311	0.0019 to 0.0353
Total Oil and Gas	0.0002 to 0.0083	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0009	<0.0001 to 0.0022	0.0049 to 0.1564	0.0051 to 0.1679
Sandoval County							
Existing Federal	<0.0001 to 0.0017	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0004	0.0090 to 0.0186	0.0009 to 0.0209
New Federal	<0.0001 to 0.0046	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0006	<0.0001 to 0.0007	0.0005 to 0.0155	0.0005 to 0.0215

Total Federal	0.0001 to 0.0054	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0007	<0.0001 to 0.0011	0.0014 to 0.0341	0.0014 to 0.0414
Non-Federal	<0.0001 to 0.0026	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0003	<0.0001 to 0.0005	0.0010 to 0.0257	0.0010 to 0.0291
Total Oil and Gas	0.0001 to 0.0079	Range is <0.0001	<0.0001 to 0.0002	<0.0001 to 0.0010	<0.0001 to 0.0016	0.0024 to 0.0598	0.0024 to 0.0705
San Juan County							
Existing Federal	<0.0001 to 0.0055	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0006	<0.0001 to 0.0010	0.0005 to 0.1210	0.0006 to 0.1282
New Federal	<0.0001 to 0.0050	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0006	<0.0001 to 0.0008	0.0003 to 0.0220	0.0003 to 0.0285
Total Federal	<0.0001 to 0.0082	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0009	<0.0001 to 0.0011	0.0008 to 0.1430	0.0008 to 0.1534
Non-Federal	<0.0001 to 0.0037	Range is <0.0001	Range is <0.0001	<0.0001 to 0.0004	<0.0001 to 0.0006	0.0006 to 0.0516	0.0006 to 0.0563
Total Oil and Gas	0.0001 to 0.0107	Range is <0.0001	<0.0001 to 0.0001	<0.0001 to 0.0012	<0.0001 to 0.0015	0.0014 to 0.1946	0.0015 to 0.2082

AIR QUALITY RELATED VALUES

The PSD is a CAA permitting program for new or modified major sources of air pollution located in attainment areas. It is designed to prevent NAAQS violations, preserve and protect air quality in sensitive areas, and protect public health and welfare (EPA 2023f). Under PSD regulations, the EPA classifies airsheds as Class I, Class II, or Class III. The CAA PSD requirements give more stringent air quality and visibility protection to national parks and wilderness areas that are designated as Class I areas, but a PSD designation does not prevent emission increases. Federal land managers are responsible for defining specific AQRVs, including visual air quality (haze), and acid (nitrogen and sulfur) deposition, for an area and for establishing the criteria to determine an adverse impact on the AQRVs. The nearest Class I areas are Mesa Verde National Park to the north, San Pedro Parks Wilderness Area and Bandelier Wilderness Area to the southeast, and Petrified National Park to the southwest. The analysis area is in attainment for the NAAQS and the NMAAQs and is categorized as a Class II area (BLM 2023a). This project is not subject to PSD analysis or permitting.

Visibility trends based on air monitoring data from the IMPROVE monitors in the BLM NM area of responsibility show visibility trends have been flat or improving (Figures 9–20 of the Air Resources Technical Report [BLM 2023a]). Specifically, visibility trends shown for San Pedro Parks, Mesa Verde, and Weminuche Wilderness indicate that visibility on the best days has been flat to improving and visibility on worst days has shown little change over the period of record. Implementation of Best Available Retrofit Technology (BART) strategies as required under the federal Regional Haze Rule over the next few years should result in further improvements (BLM 2023a).

The National Park Service (NPS) monitors and evaluates deposition to determine which parks are most at risk from air pollution and where conditions are declining or improving. Nitrogen deposition conditions in NPS-managed areas near the project area are generally poor to good with no trend for improving or worsening conditions, while sulfur deposition conditions are fair to good and generally improving (where trend data is available) (BLM 2023a).

AIR QUALITY DESIGN CONSIDERATIONS

Various federal and state-level permitting programs ensure protectiveness of the NAAQS and reduce effects to AQRVs at Class I areas. New major emitting facilities or significant modifications to major emitting facilities are required to undergo prevention of significant degradation (PSD) pre-construction review. PSD review requires an air quality analysis to assess the project's potential contribution to the

NAAQS and PSD increments (maximum allowable increases in air quality over baseline concentrations), a Best Available Control Technology Analysis, and an additional effects analysis (to assess potential effects to soils, vegetation, and visibility) (EPA 2023f). Complete PSD applications are generally forwarded to the NPS Air Quality Division for review to ensure protectiveness of AQRVs at Class I areas.

Additional state-level permitting requirements have been adopted by NMED such as New Source Review permitting requirements or de-minimis emission thresholds (10 pounds per hour or 25 tons per year of any criteria pollutant) that must be met in lieu of completing the construction permitting process are also enforced within the analysis area to ensure protectiveness of the NAAQS (NMED 2023). Construction permitting requirements are listed in NMAC 20.2.72. The Air Resources Technical Report (BLM 2023a) contains additional discussion on federal and state air quality rules and regulations and is incorporated by reference. At the Application for Permit to Drill (APD) stage, the BLM looks to minimize air pollutants via Conditions of Approval (COAs). Examples of additional air quality control measures imposed at the APD stage may include submission of an emissions inventory for the plan of development, air quality modeling, or implementation of mitigation measures and Best Management Practices (BMPs). The BLM would do this in coordination with the EPA, NMED, and other agencies that have jurisdiction on air quality.

2.2.1.2 Environmental Effects

IMPACTS OF THE PROPOSED ACTION

Substantial air resource impacts are not anticipated from leasing as it is an administrative action. Any potential effects to air quality from the sale of lease parcels would occur at such time that any issued lease is developed and not at the leasing stage itself. The Proposed Action does not authorize or guarantee the number of wells analyzed herein. If leased, drilling of wells on a lease would not be permitted until the BLM approves an APD. Any APD received would be subject to site-specific NEPA review. However, development assumptions have been made in this EA to better inform the decision maker and the public of potential impacts to air quality if the lease is developed.

There are four general phases of post-lease development that would generate air pollutant emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations (extraction, separation, gathering), 3) mid-stream (refining, processing, storage, and transport/distribution), and 4) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions (phases 1 and 2) occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions (phases 3 and 4) typically occur off-lease where the BLM has no program authority.

During well development, there could be emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. NO₂, SO₂, and CO would be emitted from vehicle tailpipes. Fugitive dust concentrations would increase with additional vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance. Drill rig and fracturing engine operations would result mainly in NO₂ and CO emissions, with lesser amounts of SO₂. These temporary emissions would be short-term during the drilling and completion phases, which is expected to last between 30 to 60 days. During well production and operations there could be continuous emissions from separators, condensate storage tanks, flares or combustors, and daily tailpipe and fugitive dust emissions from operations traffic. During the operational phase of a well, NO₂, CO, VOC, and HAPs emissions would result from the long-term use of storage tanks, pumps, separators, and other equipment. Additionally, dust (PM₁₀ and PM_{2.5}) would be

produced due to wind erosion on well pads and roads, and by vehicles servicing the wellsite infrastructure.

The BLM FFO emission estimates were developed from the BLM Single Oil and Gas Well Emission Inventory Tool, which covers the San Juan Basin. The BLM Single Oil and Gas Well Emission Inventory Tool uses the EPA Compilation of Air Pollutant Emissions Factors (AP-42), EPA Motor Vehicle Emission Simulator (MOVES), EPA Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition, and other sources. The tool has also been modified to account for San Juan Basin gas profiles, typical project details, and recent EMNRD and NMED rules and regulations (Waste Prevention Rule and Ozone Precursor Rule). Production data from the IHS Markit Enerdeq database (commercial source), including an estimate of the total potential mineral yield, or estimated ultimate recovery (EUR), and the associated decline rates were included in the BLM Single Oil and Gas Well Emission Inventory Tool. Single-well estimates and associated production data were based on horizontal drilling (Max Emissions from Oil and Gas Scenarios–Single Well Emissions in the San Juan Basin). The horizontal oil emissions were based on the deep oil with high gas scenario. The horizontally drilled single-well emissions could be used in cases when well types are unknown, such as during leasing, providing a conservative estimate for vertically drilled wells (if vertical wells were to be drilled). Whereas this information provides an estimate of emissions based on typical development occurring in New Mexico, actual emissions from the development of any given well may differ. The FFO/RPFO is calculating project-specific emissions on a project-specific basis. Emissions estimates per well are included in Table 2.6.

Table 2.6. Percent Increase from Future Potential Development of the Lease Parcels

Future Potential Development	Lease Sale Emissions (tons per year)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs
Single well construction/development phase	9.45	1.48	14.50	0.0008	3.69	1.07	0.02
Single well operation phase	4.35	0.56	2.54	0.0013	5.75	12.19	0.49
Single well total	13.80	2.04	17.04	0.0021	9.44	13.26	0.51
Total emissions from lease sale (1 well)	13.80	2.04	17.04	0.0021	9.44	13.26	0.51
San Juan Basin emissions	24,218	6,042	53,708	2,301	108,755	141,794	15,277
Percent increase	0.057%	0.034%	0.032%	0.0001%	0.009%	0.009%	0.003%

Note: The analysis contained in this table provides percentage contribution rounded to two decimal points. The representative well used to calculate emissions is a horizontal well.

As stated, the most substantial criteria pollutants and O₃ precursors emitted by oil and gas development and production are VOCs, HAPs, particulate matter, and NO_x. VOCs and NO_x contribute to the formation of O₃, which is the pollutant of most concern in northwestern New Mexico, and because O₃ is not a direct emission, emissions of NO_x and VOCs are used as proxies for estimating O₃ levels. Under the Proposed Action, the additional NO_x and VOC emissions (quantified in Table 2.6) from the potential wells would incrementally add to O₃ levels within the analysis area. However, based on the current rate of development (below the projected RFD) and the RFD projections compared to the CARMMS 2.0 modeling (discussed in the cumulative effects section), the corresponding CARMMS 2.0 low modeling

scenario, which represents a conservative estimate of federal impacts through 2025, indicates that the emissions from this project would not be expected to result in any exceedances of the NAAQS or NMAAQs for any criteria pollutants in the analysis area.

Levels of HAPs would also temporarily increase during construction and completion activities under the Proposed Action, particularly in the form of diesel particulate matter from the on- and off-road construction equipment. However, concentrations of mobile source emissions of diesel particulate matter are typically reduced by 60% at approximately 300 feet (Zhu *et al.* 2002). According to Zhu *et al.* (2002), the ultrafine particle (diameter <100 nanometers) concentration measured at 300 m downwind from the source of emissions was indistinguishable from the upwind background concentration. The relatively steep drop-off with distance of diesel particulate matter concentrations as well as the short duration of the activity make the effects from exposure to HAP emissions minimal during construction. Additionally, a 2019 health assessment study completed by Colorado State University (CSU) (ICF and CSU 2019) during various stages of well development and production at oil and gas extraction facilities in Colorado found that chemical air concentrations for VOCs (including HAPs) and associated exposure levels decreased rapidly with distance. Simulated chronic cancer risks over a lifetime of exposure for average individuals were below one in one million at distances of 1,400 feet from the well pads, four in one million at 500 feet from the well pads, and ten in one million at 300 feet from the well pads. Fewer than one in one million people at distances of 2,000 feet from the well pads experienced the worst potential long-term combination of individual risk factors, oil and gas emissions, and local meteorological conditions (maximum exposed individual). This figure rises to seven in one million at 500 feet from the well pads, and ten in one million at 400 feet from the well pads (ICF and CSU 2019). Additional information related to HAPs and the CSU study can be found in Section 5 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

Construction activities would be one of the primary sources of particulate matter emissions as a result of dust and fine particles generated from on-site equipment use and related groundwork, as well as on- and off-site vehicles (Araújo *et al.* 2014; Reid *et al.* 2010). How particulate matter interacts with the environment is dependent on a variety of factors, with the size and chemical composition of the airborne particles being the most important in terms of dispersion (distance from the source) and deposition from the atmosphere. Effects of all particulate matter emissions would not be confined to the construction site because PM_{2.5} (fine particles) can travel farther in terms of distance than PM₁₀ (dust) and other total suspended particulates (particles of sizes up to 50 micrometers) (Araújo *et al.* 2014). According to Araújo *et al.* (2014), construction site activities may influence the environment in the immediate area or neighborhood through emissions of total suspended particulate. Total suspended particulates are particles that have lower permanence in the atmosphere, thereby depositing near the emission sources (Araújo *et al.* 2014). The dispersion and concentration of particulate matter emissions depend on the technology and management control methods used by each project and the weather condition variables (i.e., wind speed, wind direction, and humidity/moisture) (Araújo *et al.* 2014). Compliance with state permitting requirements and following BMPs can reduce off-site effects from fugitive dust.

Emissions of criteria air pollutants would also occur outside the planning area from transport, processing, distribution, and end-use. Generally, crude oil from the well fields in the San Juan Basin of northwestern New Mexico is transported to the crude oil refinery in Artesia, located in southeastern New Mexico. The refinery processes crude oils and serves markets in the southwestern United States and northern Mexico. A small refinery in northwestern New Mexico, which processed local San Juan Basin crude oil, closed in 2020 (EIA 2023b). Natural gas is produced from shales, low permeability sands, and coalbeds in the San

Juan Basin in northwestern New Mexico. Interstate pipelines bring natural gas into New Mexico from Texas and Colorado and carry most of the natural gas that leaves the state to Arizona or back to Texas. Some of New Mexico's natural gas is placed in the state's two underground storage fields (EIA 2023b). Since combustion of all petroleum products emit criteria and hazardous air pollutant emissions, local ambient concentrations of these pollutants could increase in areas where products from the San Juan Basin (oil and gas) are combusted. This could contribute to an area exceeding either national or local air quality standards. Air quality involves complex physical and chemical transformations at a local/regional level, so impacts would vary considerably depending on background concentrations, meteorology, and other local pollutant sources. If any pollutant concentration is near or above its standard in a particular area, the combustion of oil and gas products could contribute to or exacerbate nonattainment. Potential pollutant concentration change resulting from combustion is therefore often a key driver of public policy to mitigate air quality and public health impacts in such areas. Downstream combustion and end uses are regulated by the EPA or delegated to state agencies.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not reaffirm the issuance of this lease. However, in the absence of a Land Use Plan Amendment closing the lands to leasing, the parcels could be considered for inclusion in future lease sales. No new emissions associated with new federal oil and gas development for the subject lease would occur under the No Action Alternative in the near term.

MITIGATION MEASURES AND RESIDUAL EFFECTS

Based on the BLM's authority under the standard terms and conditions, the BLM requires industry to incorporate and implement BMPs, which are designed to reduce effects on air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include requirements for watering dirt roads or applying magnesium chloride dust suppressants on dirt roads during periods of high use to reduce fugitive dust emissions of PM₁₀; colocation of wells and production facilities to reduce new surface disturbance; implementation of directional and horizontal drilling and completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores; suggestions that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; green completions where technically feasible, and interim reclamation to revegetate areas not required for production facilities and reduce the amount of fugitive dust. Examples of additional air quality control measures imposed at the APD stage may include submission of an emissions inventory for the plan of development, air quality modeling, or implementation of mitigation measures and BMPs. The BLM would do this in coordination with the EPA, NMED, and other agencies that have jurisdiction on air quality. At the APD stage, COAs could be applied based on site specific environmental analysis for the APD. Emission control techniques would be further evaluated when specific lease development projects are proposed.

The BLM also encourages industry to participate in the Natural Gas STAR program, administered by the EPA. The Natural Gas STAR program is a flexible, voluntary partnership that encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions (BLM 2023a). Additionally, EPA and State of New Mexico rules/regulations help to reduce emissions. The EPA has New Source Performance Standards (NSPS) in place at 40 C.F.R. § 60, Subparts OOOO and OOOOa, to reduce VOCs from well completion operations and storage tanks, and imposes emissions limits, equipment design standards, and monitoring requirements on oil and gas facilities. The new EPA Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector

Climate Review will sharply reduce emissions of methane and other harmful air pollution from oil and natural gas operations. The final action includes NSPSs to reduce methane and smog-forming VOCs from new, modified and reconstructed sources (EPA 2023g).

At the state level, the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) published the New Mexico Oil Conservation Division (NMOCD) Statewide Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, on May 25, 2001, as part of the New Mexico statewide enforceable regulatory framework to secure reductions in oil and gas sector emissions and to prevent natural gas waste from new and existing sources. Key provisions include prohibition of unnecessary venting and flaring of waste natural gas where it is technically feasible to route the gas to pipeline or to use this gas for some other beneficial purpose (such as on-site fuel consumption). In all cases, operators must flare rather than vent natural gas except where this is technically infeasible or would pose a safety risk. These provisions will reduce VOC emissions due to stringent limitations on natural gas venting which results in un-combusted VOC emissions. Additionally, it proposes that natural gas be recovered and reused rather than flared, which would result in reductions of VOCs, NO_x, CO, SO₂, GHGs, and PM emissions. The NMED developed the “Oil and Natural Gas Regulation for Ozone Precursors,” NMAC 20.2.50, which was published on July 26, 2022 with an effective date of August 5, 2022. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, nitrogen oxide (NO) emissions by 23,148 tons, and CH₄ emissions by 200,000 to 425,000 tons. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. A description of federal and state rules and regulations can be found in Section 2 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

2.2.1.3 Cumulative Effects

Cumulative impacts for air quality are the result of the incremental impacts from the Proposed Action when added to other past, present, and reasonably foreseeable future actions. The sections below describe trends in air quality and how they relate to past and present oil and gas activities and projected emissions through modeling for the FFO RFD/RPFO RFD scenarios. The cumulative effects analysis area is the San Juan Basin and the surrounding airshed. More information regarding cumulative effects can be found in Chapters 3, 6, 8, and 9 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

EMISSIONS TRENDS

Past and present actions that have affected and would likely continue to affect air quality in the analysis area include surface disturbance resulting from ongoing oil and gas development and associated infrastructure, geophysical exploration, ranching, and livestock grazing, range improvements, recreation (including OHV use), authorization of rights of ways (ROWs) for utilities and other uses, and road development. Past and present actions that have affected and would likely continue to affect air quality are too numerous to list here but would include the development or conversion of power plants; the development of energy sources such as oil and gas; the development of highways and railways; and the development of various industries that emit pollutants. These types of actions and activities can reduce air quality through emissions of criteria pollutants including fugitive dust, VOCs, and HAPs, as well as contribute to deposition impacts and to a reduction in visibility.

Emissions in the oil and gas sector roughly parallel oil and gas production. Future trends in oil and gas production growth for the Mountain Region (Montana, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, and New Mexico) are used from the U.S. Energy Information Administration (EIA) 2023 Annual Energy Outlook (AEO) (EIA 2023a) to provide an estimate of the change in emissions from oil and gas sources in New Mexico. U.S. production of natural gas and petroleum and liquids is projected to rise amid growing demand for exports and industrial uses. U.S. natural gas production is expected to increase by 15 percent from 2022 to 2050, while crude oil is expected to increase by 11 percent during the same period. Similarly, oil and gas related CAP and HAP emissions from existing and foreseeable wells, plus development of lease parcels, are anticipated to rise due to increasing production.

Design value trends for pollutants in the San Juan Basin can be found in Section 3 of the Air Resource Technical Report (BLM 2023a), incorporated by reference. O₃ (8-hour) design value trends from the 2011-2013 design value to the 2020-2022 design value indicate a slight increase to a steady trend, depending on the county in the San Juan Basin. NO_x (annual and 1-hour) and SO₂ (1-hour) design value trends during this same period show a decline.

RFD

While there are other sources of emissions in the FFO/RPFO, the oil and gas industry is one of the most prominent sources of emissions. There are approximately 22,014 active oil and gas wells in the New Mexico portion of the San Juan Basin. Of this total, roughly 15,697 wells are federal, with the remainder falling in other jurisdictions (BLM 2023a). Over the past seven years, there have been a total of 267 federal well completions, all of which occurred within the FFO and RPFO (Table 2.7).

Table 2.7. Past and Present Federal Well Completions

Number of Federal Well Completions	2016	2017	2018	2019	2020	2021	2022
BLM FFO New Mexico portion of San Juan Basin	29	51	35	39	18	22	64
BLM RPFO New Mexico portion of San Juan Basin	2	1	5	0	0	0	1
Total*	31	52	40	39	18	22	65

Source: Petroleum Engineering Group, FFO

*The number of well completions within the FFO and RPFO.

As with past and present actions, continued oil and gas development is the most prominent reasonably foreseeable environmental trend and planned action affecting air quality in the analysis area. The FFO Mancos-Gallup RFD (2018 RFD) estimates that there could be an additional 3,200 (federal and non-federal) wells drilled within the analysis area by 2037, of which 2,490 would be federal (Crocker and Glover 2018). In addition, the RPFO RFD (2019 RFD) estimates that an additional 200 wells will be built within the analysis area by 2039, of which 129 would be federal (Crocker and Glover 2019). With consideration of both RFDs, there would be an estimated 3,400 wells drilled within the New Mexico portion of the San Juan Basin by 2039, with an average of 170 wells per year (of which 131 would be federal). The RFD scenarios attempt to predict the development scenario without factoring in economics and demand, hence the predicted numbers may not represent actual development. As seen in Table 2.7, there have been far fewer than 170 total (131 federal) wells completed each year over the past

five years, as a result, the FFO/RPFO RFD emissions/percentages shown in Table 2.8 are a conservative estimate based on actual completions.

Table 2.8. Total and Federal FFO/RPFO Emissions Per Year Based on the RFD

FFO/RPFO RFD	RFD Emissions (tons per year)						
	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	HAPs
Single well construction/development phase	9.45	1.48	14.50	0.0008	3.69	1.07	0.02
Single well operation phase	4.35	0.56	2.54	0.0013	5.75	12.19	0.49
Single well total	13.80	2.04	17.04	0.0021	9.44	13.26	0.51
Total emissions from RFD (170 wells)	2,346.00	346.80	2,896.80	0.36	1,604.80	2,254.20	86.70
Federal emissions from RFD (131 wells)	1,807.80	267.24	2,232.24	0.28	1,236.64	1,737.06	66.81
San Juan Basin emissions	24,218	6,042	53,708	2,301	108,755	141,794	15,277
Total RFD percent of San Juan Basin emissions (170 wells)	9.69%	5.74%	5.39%	0.016%	1.48%	1.59%	0.57%
Federal RFD percent of San Juan Basin emissions (131 wells)	7.46%	4.42%	4.16%	0.012%	1.14%	1.23%	0.44%

Note: The analysis contained in this table provides percentage contribution rounded to two decimal points. The representative well used to calculate emissions is a horizontal well.

AIR QUALITY AND AIR QUALITY-RELATED VALUES MODELING

The Comprehensive Air Quality Model with Extensions photochemical grid model is used in the Colorado Air Resources Management Modeling Study (CARMMS) 2.0 to assess the air quality (AQ) and Air Quality Related Value (AQRV) impacts associated with BLM-authorized mineral development on federal lands within BLM Colorado and Northern New Mexico (including San Juan, Sandoval, Rio Arriba, and McKinley Counties). CARMMS 2.0 uses data from the modeling platform of Western Air Quality Study (WAQS) from the Intermountain West Data Warehouse (IWDW) for the 2011 base year and 2025 future year air quality modeling and has adopted a two-way nested 12/4 km horizontal resolution domain. Three 2025 future year oil and gas levels were developed for a range of potential outcomes, a high development scenario, a low development scenario, and a medium development scenario (which is a mitigated version of the high development scenario where additional emission controls were applied). Additional information on CARMMS 2.0 methodology can be found in the CARMMS 2.0 Report, incorporated by reference (BLM and Ramboll 2017; BLM and Ramboll 2018). The estimated emissions, AQ, and AQRV impacts from oil and gas development from Mancos Shale are modeled in the CARMMS 2.0 and are used to estimate impacts from development in the Air Impact Assessment for BLM Farmington Field Office Oil and Gas Development report (BLM and Ramboll 2018), incorporated by reference. In CARMMS 2.0, 74% of Mancos Shale gas well activity is assumed to occur in New Mexico, with remaining Mancos Shale gas well activity occurring in Colorado. All Mancos Shale oil well activity is estimated to occur in New Mexico. Most Mancos Shale activity in New Mexico

occurs in the FFO; a small portion of the southeastern part of Mancos Shale activity is located outside of the FFO (in the RPFO). The Mancos Shale was treated as a separate source group in the CARMMS 2.0 modeling and AQ and AQRV impacts from the Mancos Shale separately quantified, enabling this analysis for the FFO/RPFO. As stated above, with consideration of both RFDs, there would be an estimated 3,400 (federal and non-federal) wells drilled within the New Mexico portion of the San Juan Basin by 2039. In contrast, in CARMMS 2.0 it is estimated that by 2025 there will be 2,756 new oil and gas wells for the high scenario and 1,378 new oil and gas wells for the low scenario in the Mancos Shale in New Mexico. Compared to the Mancos-Gallup RFD, CARMMS 2.0 predicts that 749 more federal wells under the low scenario and 2,127 more federal wells under the high scenario would be developed by 2025 than predicted by the RFD. CARMMS 2.0 also predicts that 567 more total wells under the low scenario and 1,866 more wells under the high scenario would be developed in the planning area as a whole (federal and nonfederal development). Note that the additional 200 wells from the RPFO RFD added into the comparison to the CARMMS 2.0 modeling would still result in more wells developed by 2025 in the CARMMS 2.0 modeling than predicted by the RFD. The low and high scenarios of CARMMS 2.0 well development estimates are conservatively high relative to the RFD baseline scenario and current development (BLM and Ramboll 2018, Section 2.1.1.1). As a result, the low scenario can be used to represent a conservative estimate of federal and planning area-wide impacts through 2025.

The ozone NAAQS is defined as the 3-year average of the fourth highest daily maximum 8-hour (DMAX8) ozone concentration. Since CARMMS 2.0 only uses one year of meteorology (2011), the 2025 fourth highest DMAX8 ozone concentration is used as a pseudo-NAAQS comparison metric. For the 2011 Base Case, there are vast regions where the modeled fourth high DMAX8 ozone exceeds the NAAQS (all source groups). In the 2025 High, Low, and Medium Development Scenarios, the areas of ozone exceedances decrease from the 2011 Base Case, with the 2025-2011 ozone differences showing decreases in almost all areas. The large contribution of natural emissions (natural wildfires) to the modeled fourth highest DMAX8 ozone concentrations was noted in the analysis. Maximum ozone contributions to the 2025 fourth highest DMAX8 ozone due to the New Mexico FFO are 1.7 parts per billion (ppb), 0.9 ppb and 1.0 ppb for the 2025 High, Low, and Medium Development Scenarios, respectively. Maximum contributions of the New Mexico FFO ozone to the fourth highest DMAX8 ozone above the current ozone NAAQS (71.0 ppb and higher) for the 2025 High, Low, and Medium Development were 2.01%, 0.84%, and 0.90%, respectively (BLM and Ramboll 2017).

In summary, the CARMMS 2.0 Low scenario, which represents a conservative estimate of federal impacts through 2025, does not exceed the indicator thresholds for any of the NAAQS, PSD Class I or Class II increment thresholds, the sulfur deposition threshold, the change in visibility threshold at any Class I area, or the thresholds for acid neutralizing capacity at sensitive lakes. The Low scenario would exceed the indicator threshold for change in visibility at one Class II area, the Aztec Ruins National Monument, and the nitrogen deposition threshold at Mesa Verde National Park, San Pedro Parks Wilderness, Weminuche Wilderness, Aztec Ruins National Monument, Chama River Canyon Wilderness, South San Juan Wilderness, and Cruces Basin Wilderness. Additional information on the CARMMS 2.0 can be found in Section 6 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

New Mexico Ozone Attainment Initiative Study

The State of New Mexico initiated the New Mexico Ozone Attainment Initiative (OAI) Photochemical Modeling Study (New Mexico OAI Study) in the spring of 2018 to address the high O₃ concentrations in the state, protect the O₃ attainment status of the state, and ensure health and welfare of the residents of the state for future generations (NMED 2021). Based on the WRAP, Western Air Quality Study (WAQS) CAMx 2014 36/12-km modeling platform, a CAMx 2014 36/12/4-km O₃ modeling platform was developed with the 4-km domain focused on New Mexico and adjacent states. Additional methodology can be found in Section 6 of the Air Resources Technical Report (BLM 2023a). The New Mexico OAI Study also looked at 2028 future year base case modeling and oil and gas control sources. The 2028 oil and gas control strategy reduced oil and gas NO_x emissions by approximately 21,000 tpy (or by 64% compared to the 2028 base case) and oil and gas VOC emissions by approximately 53,000 tpy (or by 46% compared to the 2028 base case) (BLM 2023a).

For the San Juan Basin, the 2028 base case saw future O₃ design value reductions of –5.6 ppb at Bernalillo in Sandoval County, and –2.2 ppb and –3.3 ppb at Bloomfield and Navajo Lake, respectively, in San Juan County. The 2028 oil and gas control strategy saw future O₃ design value reductions of –1.5 ppb and –0.8 ppb at Navajo Lake and Bloomfield, respectively, and –0.3 ppb at Bernalillo from the 2028 base case. Using this method and following EPA guidance, all 2028 projected O₃ future design values at monitoring sites in New Mexico were below the 2015 NAAQS for O₃ of 70 ppb using the 2012–2016 design value, including those in the San Juan Basin (base and control) (BLM 2023a).

The New Mexico OAI study also looked at more recent design values (2015-2019 and 2017-2019). The results of the sensitivity study using the 2015-2019 O₃ design values for the San Juan Basin showed all 2028 projected O₃ future design values at monitoring sites were below the 2015 NAAQS for O₃ of 70 ppb (base and control). The results of the sensitivity study using the 2017-2019 O₃ design values for the San Juan Basin showed all 2028 projected O₃ future design values at monitoring sites were below the 2015 NAAQS for O₃ of 70 ppb (base and control) (BLM 2023a).

The final part of the New Mexico OAI Study investigated source apportionment and was conducted to determine the contributions of source sectors to 2028 future year O₃ design values under the oil and gas control strategy scenario. One investigation involved international emissions. The speciated modeled attainment test (SMAT) O₃ projection tool was run without the contributions of international anthropogenic emissions for current design values 2012-2016, 2015-2019, and 2017-2019. In New Mexico, international anthropogenic emissions contributed from 11 to 26 ppb to the projected 2028 future design values. The Bloomfield site, in the northern part of the state and in San Juan County, had reductions of 13.8 ppb, 14.5 ppb, and 14.6 ppb, respectively. Bloomfield, which had not produced a projected 2028 O₃ exceedance for either the 2008 and 2015 NAAQS for O₃ under the current design value 2017-2019 scenario (68 ppb), was below 50 ppb for a future design value under all three design value scenarios (2012-2016, 2015-2019, and 2017-2019) (BLM 2023a). Additional information on the New Mexico OAI study can be found in Section 6 of the Air Technical Report (BLM 2023a), incorporated by reference.

It is not possible to determine the change in cumulative cancer risk in the San Juan Basin from potential new wells without performing air quality modeling. However, using the best science and data available (EPA's AirToxScreen), the current San Juan, Sandoval, Rio Arriba, and McKinley Counties cancer risk is 17.6, 18.7, 12.3, 11.1 cases per 1 million people, respectively, and is well below the level of concern (100 in a million). Additionally, the oil and gas activity in the San Juan Basin contribute a max of 12% to the total cancer risk in San Juan County (the county percentages for Sandoval, Rio Arriba, and McKinley are

lower). New production from the foreseeable development of the Proposed Action and from approved and pending APDs should outweigh the production decline from currently producing wells (EIA 2023a) and result in slightly higher HAPs emissions. However, an increase in oil and gas related HAPs emissions should not make a substantial change to cumulative HAPs impacts since the total county cancer risk is well below levels of concern and the oil and gas industry contributes a small percentage to the cancer risk.

In summary, the cumulative air quality in the impact analysis area is maintained at current levels or projected to improve. Atmospheric concentrations for CAPs are projected to be below the NAAQS. Visibility is generally projected to be steady or improving at national parks near the project area (BLM 2023a). Nitrogen deposition in only a few managed areas near the project area are exceeding deposition analysis thresholds (DATs), and while NPS monitored conditions range from poor to good, trends are showing relatively unchanging conditions (no improving or worsening conditions where trend data is available). Sulfur deposition conditions are fair to good and generally improving (where trend data is available). Emissions of HAPs are not anticipated to substantially change the cancer and noncancer respiratory risks in the area of analysis.

2.2.2 Issue 2: Greenhouse Gases and Climate Change

How would future potential development of lease contribute to greenhouse gas (GHG) emissions and climate change?

Any subsequent development of lease parcels under consideration could lead to emissions of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O); the three most common greenhouse gases associated with oil and gas development. These GHG emissions would be emitted from activities occurring on the leased parcels, and from the consumption of any fluid minerals produced. However, the BLM cannot reasonably determine at the leasing stage whether, when, and in what manner a lease would be explored or developed. The uncertainty that exists at the time the BLM offers a lease for sale includes crucial factors that would affect actual GHG emissions and associated impacts, including but not limited to the future feasibility of developing the lease, well density, geological conditions, development type (vertical, directional, or horizontal), hydrocarbon characteristics, specific equipment used during construction, drilling, and production, abandonment operations, product transportation, and potential regulatory changes over the 10-year primary lease term. Actual development on a lease is likely to vary from what is analyzed in this EA and will be evaluated through a site-specific NEPA analysis when an operator submits an APD or plan of development to the BLM.

For the purposes of this analysis, the BLM has evaluated the potential climate change impacts of the proposed leasing action by estimating and analyzing the projected potential GHG emissions from oil and gas development on the parcels. Projected emissions estimates are based on previous actual oil and gas development analyses, and any available information from existing development within the State.

Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM's oil and gas leasing actions and methodologies are included in the *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM 2023b) (Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis and is available at <https://www.blm.gov/content/ghg/2022>.

2.2.2.1 Affected Environment

Climate change is a global process that is affected by the sum total of GHGs in the Earth’s atmosphere. GHGs act to contain solar energy loss by trapping longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component. GHGs influence the global climate by increasing the amount of solar energy retained by land, water bodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become well mixed and uniformly distributed over the entirety of the Earth’s surface no matter their point of origin. The buildup of these gases has contributed to the current changing state of the climate equilibrium towards warming. A discussion of past, current, and projected future climate change impacts is described in Chapters 4, 8, and 9 of the Annual GHG Report. These chapters describe currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels.

The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources resulting from a specific subset of emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change resulting from the accumulation of GHG emissions over time.

For the purposes of this EA, the projected emissions from the proposed action can be compared to modeled emissions that have been shown to have definitive or quantifiable impacts on the climate in order to provide context of their potential contribution to climate change. Table 2.9 shows the total estimated GHG emissions from fossil fuels at the global, national, and state scales over the last six years. Emissions are shown in megatonnes (Mt) per year of carbon dioxide equivalent (CO₂e). Chapter 3 of the Annual GHG Report contains additional information on GHGs and an explanation of CO₂e. State and national energy-related CO₂ emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) and are released at the location where the fossil fuels are consumed.

Additional information on current state, national, and global GHG emissions as well as the methodology and parameters for estimating emissions from BLM fossil fuel authorizations and cumulative GHG emissions is included in the Annual GHG Report (see Chapters 5, 6, and 7).

Table 2.9 Global and U.S. Fossil Fuel GHG Emissions 2016 - 2021 (Mt CO₂e/yr)

Scale	2016	2017	2018	2019	2020	2021
Global (CO₂ Only)	36,465.6	36,935.6	37,716.2	37,911.4	35,962.9	37,500
U.S.	4,909.9	4,852.5	4,989.8	4,855.9	4,344.9	4,639.1
New Mexico	48.8	49.4	45.2	48.4	45.03	N/A

Source: Annual GHG Report (BLM 2023b), Chap. 5, Table 5-1 (U.S.) and Table 5-2 (State). Global emissions (CO₂ only) from the Emissions Database for Global Atmospheric Research (EDGAR) 2023 Report - https://edgar.jrc.ec.europa.eu/report_2023?vis=co2tot#emissions_table

Mt (megatonne) = 1 million metric tons

NA = Not Available

2.2.2.2 Environmental Consequences

PROPOSED ACTION

While the leasing action does not directly result in development that would generate GHG emissions, emissions from future potential development of the leased parcels can be estimated for the purposes of this lease sale. There are four general phases of post-lease development that would generate both direct (on-lease) and indirect (downstream) GHG emissions. Direct emissions would result from well development (well site construction, well drilling, and well completion), and well production operations (extraction, separation, gathering), while downstream emissions would result from mid-stream (refining, processing, storage, and transport/distribution), and end-use (combustion or other uses) of the fluid minerals produced. BLM has program authority for on-lease well development and production operations but no authority for off-lease operations including mid-stream and end-use.

Emissions inventories at the leasing stage are imprecise due to uncertainties including the type of mineral development (oil, gas, or both), scale, and duration of potential development, types of equipment (drill rig engine tier rating, horsepower, fuel type), and the mitigation measures that a future operator may propose in their development plan. Due to these uncertainties, the BLM applies several assumptions to estimate emissions at the leasing stage. The number of estimated well numbers per parcel are based on State data for past lease development combined with per-well drilling, development, and operating emissions data from representative wells in the area. The amount of oil or gas that may be produced if the offered parcels are developed is unknown. For purposes of estimating production and end-use emissions, potential wells are assumed to produce oil and gas in similar amounts as existing nearby wells. While the BLM has no authority to direct or regulate the end-use of the products, for this analysis, the BLM assumes all produced oil or gas would be combusted (such as for domestic heating or energy production). The BLM acknowledges that there may be additional sources of GHG emissions along the distribution, storage, and processing chains (commonly referred to as midstream operations) associated with production from the lease parcels. These sources may include emissions of methane (a more potent GHG than CO₂ in the short term) from pipeline and equipment leaks, storage, and maintenance activities. These sources of emissions are highly speculative at the leasing stage, therefore, the BLM has chosen to assume that mid-stream emissions associated with lease parcels for this analysis would be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL 2009) (NETL 2019). Section 6 of the Annual GHG Report includes a more detailed discussion of the methodology for estimating midstream emissions.

The emission estimates calculated for this analysis were generated using the assumptions previously described above using the BLM Lease Sale Emissions Tool. Emissions are presented for each of the four phases of post-lease development described above.

- Well development emissions occur over a short period and may include emissions from heavy equipment and vehicle exhaust, drill rig engines, completion equipment, pipe venting, and well treatments such as hydraulic fracturing.
- Well production operations, mid-stream, and end-use emissions occur over the entire production life of a well, which is assumed to be 30 years for this analysis based on the productive life of a typical oil/gas field.

- Production emissions may result from storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, fugitives, and vehicle exhaust.
- Mid-stream emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated ultimate recovery (EUR) of produced oil and gas with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG Report (Chapter 6, Table 6-8 and 6-10) (BLM 2023b).
- For the purposes of this analysis, end-use emissions are calculated assuming all produced oil and gas is combusted for energy use. End-use emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors for combustion established by the EPA (Tables C-1 and C-2 to Subpart C of 40 CFR § 98). Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 6) (BLM 2023b).

Table 2.10 lists the estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tonnes (t) for the subject lease over the average 20-year production life of the lease. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of 256,282 t CO₂e over the life of the lease.

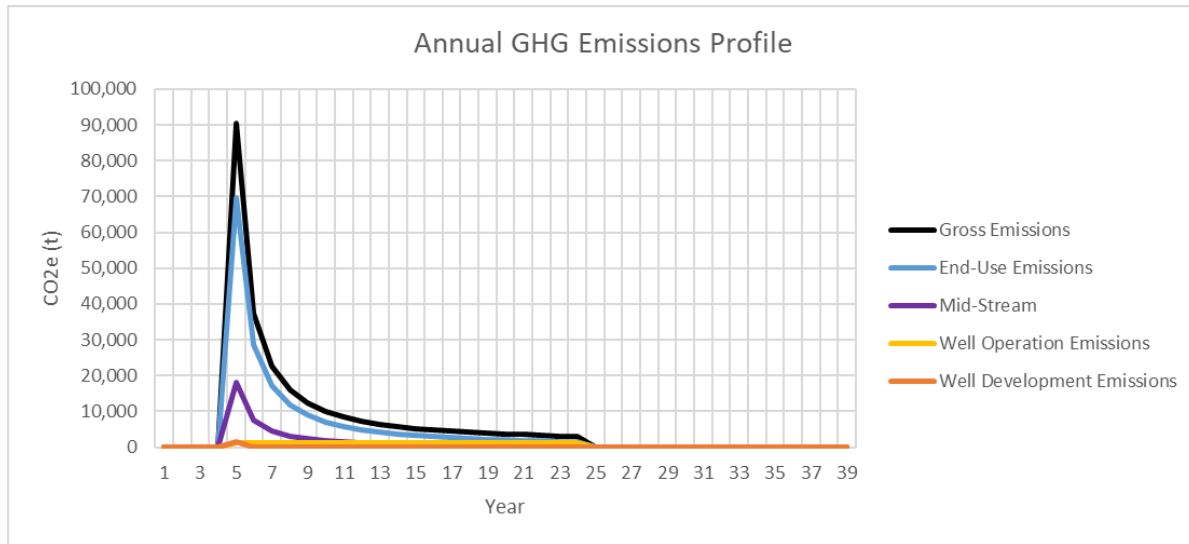
Table 2.10 Estimated Life of Lease Emissions from Well Development, Well Production Operations, Mid-stream, and End-use (tonnes)

Activity	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-yr)	CO ₂ e (20-yr)
Well Development	1,608	0.66	0.013	1,631	1,665
Well Production Operations	18,746	108.00	0.040	21,976	27,667
Mid-Stream	33,436	489.10	0.463	48,138	73,913
End-Use	184,321	3.65	0.398	184,538	184,730
Total	238,110	601.41	0.914	256,282	287,976

Source: BLM Lease Sale Emissions Tool
 IPCC Sixth Assessment Report Global Warming Potentials (GWP) - 100-year GWP: CO₂=1, CH₄=29.8, N₂O=273; 20-year GWP: CO₂=1, CH₄=82.5, N₂O=273 (IPCC 2021).

GHG emissions vary annually over the production life of a well due to declining production rates over time. Figure 1 shows the estimated GHG emissions profile over the production life of a typical lease including well development, well production operations, mid-stream, end-use, and gross (total of well development, well production, mid-stream, and end-use) emissions.

Figure 1. Estimated GHG Emissions Profile over the Life of a Lease



Source: BLM Lease Sale Emissions Tool

To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the lease parcels for this sale can be compared to other common activities that generate GHG emissions. The EPA GHG equivalency calculator (EPA 2022c) can be used to express the potential average year GHG emissions on a scale relatable to everyday life (<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>). For instance, the projected average annual GHG emissions from potential development of the subject lease are equivalent to 2,762 gasoline-fueled passenger vehicles driven for one year, or the emissions that could be avoided by operating 3 wind turbines as an alternative energy source or offset by the carbon sequestration of 15,255 acres of forest land.

Table 2.11 compares emission estimates over the 20-year life of the lease compared to the 30-year projected federal fossil fuel emissions in the state and nation from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions.

Table 2.11. Comparison of the Life of Lease Emissions to Other Federal Oil and Gas Emissions

Reference	Mt CO ₂ e (100-year)	Life of Lease Percentage of Reference
Lease sale emissions (life of lease)	0.256	100.0%
New Mexico reasonably foreseeable short-term federal (oil and gas)*	3,183.2	0.008%
New Mexico EIA projected long-term federal (oil and gas) [†]	9,961.8	0.003%
U.S. reasonably foreseeable short-term federal (oil and gas)*	6,033.0	0.004%
U.S. EIA projected long-term federal (oil and gas) [†]	16,523.0	0.002%

Source: U.S. and federal emissions from BLM Lease Sale Emissions Tool Data and Tables 7-18, 7-19, and Section 7 of the 2022 Annual GHG Report (BLM 2023b).

* Short-term foreseeable is estimated federal emissions from existing producing wells, approved APDs, and one year of leasing.

† Long-term foreseeable are estimated federal emissions to meet EIA projected energy demand.

Compared to emissions from other existing and foreseeable federal oil and gas development, the life of lease emissions for the Proposed Action is between 0.003% and 0.008% of federal fossil fuel authorization emissions in the state and between 0.002% and 0.004% of federal fossil fuel authorization emission in the nation. In summary, potential GHG emissions from the Proposed Action could result in GHG emissions of 0.256 Mt CO_{2e} over the life of the lease.

SOCIAL COST OF GREENHOUSE GASES

The “social cost of carbon,” “social cost of nitrous oxide,” and “social cost of methane” – together, the “social cost of greenhouse gases” (SC-GHG) are estimates of the monetized damages associated with incremental increases in GHG emissions in a given year. These numbers were monetized; however, they do not constitute a complete cost-benefit analysis, nor do the SC-GHG numbers present a direct comparison with other impacts analyzed in this document. The SC-GHG measure is provided only to inform agency decision-making. For federal agencies, the best currently available estimates of the SC-GHG are the interim estimates of the social cost of carbon dioxide, methane, and nitrous oxide developed by the Interagency Working Group (IWG) on the SC-GHG.

Table 2.12 presents the SC-GHG associated with estimated emissions from future potential development of the lease parcels. The IWG’s SC-GHG estimates are based on complex models describing how GHG emissions affect global temperatures, sea level rise, and other biophysical processes; how these changes affect society through, for example, agricultural, health, or other effects; and monetary estimates of the market and nonmarket values of these effects. One key parameter in the models is the discount rate, which is used to estimate the present value of the stream of future damages associated with emissions in a particular year. A higher discount rate assumes that future benefits or costs are more heavily discounted than benefits or costs occurring in the present (i.e., future benefits or costs are a less significant factor in present-day decisions). The current set of interim estimates of SC-GHG have been developed using three different annual discount rates: 2.5%, 3%, and 5% (IWG 2021).

To address uncertainty in the estimates, the IWG recommends reporting four SC-GHG estimates in any analysis. Three of the SC-GHG estimates reflect the average costs from the multiple simulations at each of the three discount rates. The fourth value represents higher-than-expected economic impacts from climate change. Specifically, it represents the 95th percentile of impacts estimated, applying a 3% annual discount rate for future economic effects. This is a low probability, but high impact scenario, and represents an upper bound of impacts within the 3% discount rate model.

The estimates below follow the IWG recommendations and represent the present value (from the perspective of 2021) of future market and nonmarket costs associated with CO₂, CH₄, and N₂O emissions from potential well development and operations and potential end-use. Estimates are calculated based on IWG estimates of social cost per metric ton of emissions for a given emissions year and BLM’s estimates of emissions in each year, rounded to the nearest \$1,000.

Table 2.12 SC-GHGs Associated with Future Potential Development

Social Cost of GHGs (\$)				
	Average Value, 5% discount rate	Average Value, 3% discount rate	Average Value, 2.5% discount rate	95 th Percentile Value, 3% discount rate
Development and Operations	\$313,000	\$1,127,000	\$1,680,000	\$3,375,000
Mid-Stream and End-Use	\$3,371,000	\$11,840,000	\$17,588,000	\$35,573,000
Total	\$3,684,000	\$12,967,000	\$19,268,000	\$38,948,000

Source: BLM SC-GHG Emissions Tool

NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would not offer any of the nominated parcels in the lease sale. However, in the absence of a Land Use Plan Amendment closing the lands to leasing, they could be considered for inclusion in future lease sales. Although no new GHG emissions resulting from new Federal oil and gas development would occur under the No Action Alternative, the national and global demand for energy is not expected to differ regardless of BLM decision-making.

The BLM does not have a model to estimate energy market substitutions at a spatial resolution needed for this onshore production scenario. Reductions in oil and natural gas produced from Federal leases may be partially offset by non-Federal production (state and private) in the United States (in which case the indirect GHG emissions would be similar), or overseas, in which case the GHG emissions would likely be higher, to the extent environmental protection requirements for production are less vigorous, and the produced energy would need to be physically transported into the United States. There may also be substitution of other energy resources to meet energy demand. These substitution patterns will be different for oil and gas because oil is primarily used for transportation, while natural gas is primarily used for electricity production and manufacturing, and to a lesser degree by residential and commercial users (EIA 2023a). Coal and renewable energy sources are stronger substitutes for natural gas in electricity generation. The effect of substitution between different fuel sources on indirect GHG emissions depends on the replacement energy source. For example, coal is a relatively more carbon intense fuel than natural gas and hydroelectricity is the least carbon intense energy source (see Table 10-3 of the Annual GHG Report (BLM 2023b)). In the transportation sector, alternatives to oil are likely to be less carbon intensive.

Finally, substitution across energy sources or oil and gas production from other locations may not fully meet the energy needs that would otherwise have been realized through production from leases. Price effects may lower the market equilibrium quantity demanded for some fuel sources. This would lead to a reduction in indirect GHG emissions. These three effects are likely to occur in some combination under the no action alternative, but the relative contribution of each is unknown. Regardless, GHG emissions under the no action alternative are not expected to be zero.

2.2.2.3 Cumulative Effects

The analysis of GHGs contained in this EA includes estimated emissions from the lease as described above. An assessment of GHG emissions from other BLM fossil fuel authorizations, including coal

leasing and oil and gas leasing and development, is included in the Annual GHG Report in Chapter 7. The Annual GHG Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the fiscal year, as well as the best estimate of emissions from ongoing production, and development of parcels sold in previous lease sales. It is, therefore, an estimate of cumulative GHG emissions from the BLM fossil fuel leasing program based on actual production and statistical trends.

The Annual GHG Report provides an estimate of short-term and long-term GHG emissions from activities across the BLM’s oil and gas program. The short-term methodology presented in the Annual GHG Report includes a trends analysis of (1) leased federal lands that are held-by-production ⁷(2) approved applications for permit to drill (APDs), and (3) leased lands from competitive lease sales occurring over the next annual reporting cycle (12 months), to provide a 30-year life of lease projection of potential emissions from all Federal oil and gas lease actions over the next 12 months. The long-term methodology uses oil and gas production forecasts from the Energy Information Administration (EIA) to estimate GHG emissions out to 2050 that could occur from past, present, and future development of Federal fluid minerals. For both methodologies, the emissions are calculated using life-cycle-assessment data and emission factors. These analyses are the basis for projecting GHG emissions from lease parcels that are likely to go into production during the analysis period of the Annual GHG Report and represent both a hard look at GHG emissions from oil and gas leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales.

Table 2.13 shows the aggregate GHG emissions estimate that would occur from Federal leases, existing and foreseeable, between the years 2022 and 2050, using the methodology described above. A detailed explanation of the short-term and long-term emissions estimate methodologies are provided in sections 6.6 and 6.7 of the Annual GHG Report.

Table 2.13 GHG Emissions from Past, Present, and Reasonably Foreseeable Federal Onshore Lease Development (Mt CO₂e)

State	Existing Wells (Report Year)	Existing Wells (Projected)	Approved APDs	New Leasing	Short-Term Totals	Long-Term Totals
AL	0.51	7.56	0.00	0.18	7.74	15.28
AK	1.31	19.47	23.13	34.70	77.31	39.67
AZ	0.00	0.00	0.00	0.00	0.00	0.00
AR	0.55	8.72	0.24	0.24	9.19	16.63
CA	4.92	67.90	5.93	2.13	75.96	151.15
CO	46.16	399.35	30.80	23.95	454.10	1,395.90
ID	0.00	0.00	0.00	0.29	0.30	0.01
IL	0.01	0.11	0.00	0.02	0.13	0.26
IN	0.00	0.00	0.00	0.02	0.02	0.00
KS	0.26	3.81	0.00	0.11	3.92	7.80
KY	0.01	0.07	0.00	0.03	0.10	0.25

⁷ held-by-production - A provision in an oil or natural gas property lease that allows the lessee to continue drilling activities on the property as long as it is economically producing a minimum amount of oil or gas. The held-by-production provision thereby extends the lessee's right to operate the property beyond the initial lease term.

LA	3.84	48.54	44.95	13.11	106.60	115.95
MD	0.00	0.00	0.00	0.00	0.00	0.00
MI	0.07	1.36	0.00	0.58	1.94	2.11
MS	0.12	1.59	0.38	0.38	2.35	3.62
MT	2.52	25.68	0.42	12.63	38.73	77.12
NE	0.02	0.22	0.00	0.03	0.25	0.47
NV	0.13	1.01	0.01	0.19	1.22	4.07
NM	326.00	2,318.83	745.21	119.12	3,183.17	9,961.81
NY	0.00	0.01	0.00	0.00	0.01	0.01
ND	33.32	279.03	57.62	3.57	340.22	1,020.91
OH	0.40	3.83	0.00	4.64	8.47	12.20
OK	1.25	12.23	0.95	1.66	14.83	37.81
OR	0.00	0.00	0.00	0.12	0.12	0.00
PA	0.00	0.06	0.00	0.67	0.72	0.12
SD	0.11	1.77	0.11	0.11	1.98	3.23
TN	0.00	0.00	0.00	0.00	0.00	0.00
TX	3.31	36.52	19.00	1.97	57.49	99.95
UT	13.90	175.34	16.33	36.75	228.41	421.63
VA	0.01	0.14	0.00	0.03	0.16	0.27
WV	0.00	0.06	0.00	0.59	0.65	0.14
WY	103.34	920.76	178.16	317.98	1,416.91	3,134.55
Total Onshore Federal	542	4,334	1,123	576	6,033	16,523

Source: BLM Annual GHG Report, Section 7

As detailed in the 2022 Annual GHG Report, which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the Model for the Assessment of Greenhouse Gas Induced Climate Change (MAGICC)⁸ (see Section 9.0 of the Annual GHG Report). BLM conducted MAGICC runs evaluating potential contributions to global climate change and related values for two climate change projection scenarios. These two scenarios were chosen because they most closely approximate or frame the desired outcomes of the Paris Climate Accord and would also reflect the greatest contribution as a percent of BLM’s authorized cumulative emissions relative to the global emissions levels contained in the scenarios. IPCC’s most optimistic scenario evaluates global CO₂ emissions cut to net zero around 2050. This is the only scenario that meets the Paris Agreement’s goal of keeping global warming to around 1.5 degrees Celsius above pre-industrial temperatures. The second “middle of the road” scenario leaves global CO₂ emissions around current levels before starting to fall by 2050 but does not reach net-zero by 2100. In this scenario, temperatures rise 2.7 degrees C by the

⁸ See <https://magicc.org>.

end of the century. The maximum BLM fossil fuel (oil, gas and coal) contribution to global temperature increases under these two scenarios is 0.015 C and 0.013 C, respectively.

As this is an assessment of what BLM has projected could come from the entire federal fossil fuel program, including the projected emissions from the proposed action, over the next 30 years, the reasonably foreseeable lease sale emissions contemplated in this EA are not expected to substantially affect the rate of change in climate effects, bring forth impacts that are not already identified in existing literature, or cause a change in the magnitude of impacts from climate change at the state, national, or global scales.

The most recent short-term energy outlook (STEO) published by the EIA (<https://www.eia.gov/outlooks/steo/>) (EIA 2023c) predicts that the world's oil and gas supply and consumption will increase over the next 18-24 months. The latest STEO projections are useful for providing context for the cumulative discussion as the global forecast models used for the STEO are not dependent on whether the BLM issues onshore leases but are based on foreseeable short-term global supply and demand and include oil and gas development /operations on existing U.S. onshore leases. The most recent STEO includes the following projections for the next two years:

- U.S. liquid fuels consumption is projected to increase to 20.35 million barrels per day (b/d) in 2024 up from 20.15 million b/d in 2023.
- U.S. crude oil production is expected to average 12.9 million b/d in 2023 and rise to 13.5 million b/d in 2024.
- U.S. natural gas consumption is expected to average 89.42 Bcf/d in 2023, decreasing slightly to 89.0 Bcf/d in 2024.
- U.S. LNG exports are expected to increase from 11.8 billion cubic feet/day (Bcf/d) in 2023 to 12.29 Bcf/d in 2024.
- U.S. Coal production is expected to total 585 million short tons (MMst) in 2023 and 480 MMst in 2024 and decrease to 15% of total U.S. electricity generation in 2024 compared to 16% in 2023 driven by on-going retirement of coal-fired generating plants.

Generation from renewable sources will make up an increasing share of total U.S. electricity generation, rising from 22% in 2023 to 24% in 2024. Recent events, both domestically and internationally, have resulted in abrupt changes to the global oil and gas supply. EIA studies and recent U.S. analyses (associated with weather impacts, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near-term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States (EIA 2023c). Recent global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve in order to meet consumer demand and curb price surges.

The EIA 2023 Annual Energy Outlook (<https://www.eia.gov/outlooks/aeo/>) (EIA 2023a) projects energy consumption increases through 2050 as population and economic growth outweighs efficiency gains. As a result, U.S. production of natural gas and petroleum and liquids will rise amid growing demand for exports and industrial uses. U.S. natural gas production increases by 15% from 2022 to 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050. As electricity generation

shifts to using more renewable sources, domestic natural gas consumption for electricity generation is expected to decrease by 2050 relative to 2022. As a result, energy-related CO₂ emissions are expected to fall 25% to 38% below 2005 level, depending on economic growth factors. Further discussion of past, present and projected global and state GHG emissions can be found in Chapter 5 of the Annual GHG Report.

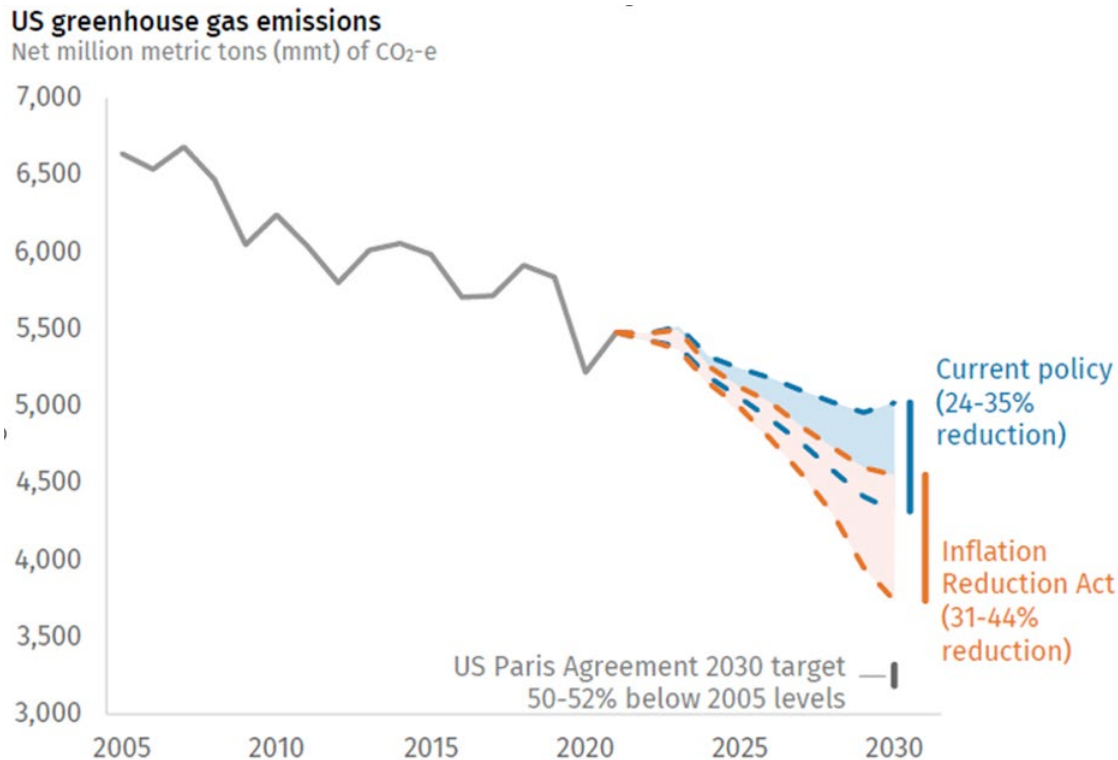
Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad” (January 27, 2021), directs the executive branch to establish policies or rules that put the United States on a path to achieve carbon neutrality, economywide, by no later than 2050. This goal is consistent with IPCC’s recommendation to reduce net annual global CO emissions between 2020 and 2030 in order to reach carbon neutrality by mid-century. Federal agencies are still in the process of developing policies that align with a goal of carbon neutrality by 2050. In the short-term, the order has a stated goal of reducing economy wide GHG emissions by 50 to 52% relative to 2005 emissions levels no later than 2030.

Carbon budgets estimate the amount of additional GHGs that could be emitted into the atmosphere over time to reach carbon neutrality while still limiting global temperatures to no more than 1.5°C or 2°C above preindustrial levels (see section 9.1 of the Annual GHG Report) (BLM 2023b). The IPCC Special Report on Global Warming of 1.5°C is the most widely accepted authority on the development of a carbon budget to meet the goals of the Paris Agreement. None of the global carbon budgets or pledges that countries have committed to stay within as part of the Paris Agreement are binding. At present, no national or Federal agency carbon budgets have been established, primarily due to the lack of consensus on how to allocate the global budget to each nation, and as such the global budgets that limit warming to 1.5 °C or 2.0 °C are not useful for BLM decision making, particularly at the lease sale stage, as it is unclear what portion of the budget applies to emissions occurring in the United States.

The Council on Environmental Quality discourages Federal agencies from comparing emissions from an action to global or domestic levels as “such comparisons and fractions also are not an appropriate method for characterizing the extent of a proposed action's and its alternatives' contributions to climate change because this approach does not reveal anything beyond the nature of the climate change challenge itself (CEQ 2023).” However, stakeholders and members of the public have requested that the BLM consider comparing the estimated Federal oil and gas emissions in the context of global carbon budgets. In the interest of public disclosure, Table 9-1 in the Annual GHG Report (BLM 2023b) provides an estimate of the potential emissions associated with Federal fossil fuel authorizations in relation to IPCC carbon budgets. Total Federal fossil fuel authorizations including coal, natural gas and oil represents approximately 1.37 % of the remaining global carbon budget of 380 GtCO₂ needed to limit global warming to 1.5 C.

While continued fossil fuel authorizations will occur over the next decade to support energy demand and remain in compliance with the leasing mandates in the Inflation Reduction Act (IRA) passed in 2022, the U.S. Energy Information Administration International Energy Outlook expects renewable energy consumption to double between 2020 and 2050 and nearly equal liquid fuels consumption by 2050. The U.S. has committed to the expansion of renewable energy through infrastructure investments in clean energy transmission and grid upgrades include in the Bipartisan Infrastructure Investment and Jobs Act as well as clean energy investments and incentives included in the Inflation Reduction Act.

Figure 2. Projected Short-Term Emissions Reductions Associated with the IRA



Source: Rhodium Group. The range reflects uncertainty around future fossil fuel prices, economic growth, and clean technology costs. It corresponds with high, central, and low emissions scenarios detailed in Taking Stock 2022 (<https://rhg.com/research/taking-stock-2022/>). Under the central scenario (not shown), the IRA accelerates emissions reductions to a 40% cut from 2005 levels (BLM 2023b).

EMISSION CONTROL MEASURES CONSIDERED IN THE ANALYSIS

The relationship between GHG emissions and climate impacts is complex, but a project’s potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual GHG Report provides a more detailed discussion of GHG mitigation strategies.

Several federal agencies work in concert to implement climate change strategies and meet United States emissions reduction goals all while supporting U.S. oil and gas development and operations. The EPA is the federal agency charged with regulation of air pollutants and establishing standards for protection of human health and the environment. The EPA has issued regulations that will reduce GHG emissions from

any development related to the proposed leasing action. These regulations include the New Source Performance Standard for Crude Oil and Natural Gas Facilities, 49 C.F.R. § 60, Subpart OOOOa, which imposes emission limits, equipment design standards, and monitoring requirements on oil and gas facilities. The new EPA Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review will sharply reduce emissions of methane and other harmful air pollution from oil and natural gas operations. The final action includes NSPSs to reduce methane and smog-forming VOCs from new, modified and reconstructed sources (EPA 2023g). A detailed discussion of existing regulations and Executive Orders that apply to BLM management of federal lands as well as current Federal and state regulations that apply to oil and gas development and production can be found in Chapter 2 of the Annual GHG Report.

At the state level, New Mexico's EMNRD published the NMOCD Statewide Natural Gas Capture Requirements (Waste Prevention Rule), NMAC 19.15.27, on May 25, 2001, as part of the New Mexico statewide enforceable regulatory framework to secure reductions in oil and gas sector emissions and to prevent natural gas waste from new and existing sources. Key provisions include prohibition of unnecessary venting and flaring of waste natural gas where it is technically feasible to route the gas to pipeline or to use this gas for some other beneficial purpose (such as on-site fuel consumption). In all cases, operators must flare rather than vent natural gas except where this is technically infeasible or would pose a safety risk. These provisions will reduce VOC emissions due to stringent limitations on natural gas venting which results in un-combusted VOC emissions. Additionally, it proposes that natural gas be recovered and reused rather than flared, which would result in reductions of VOCs, NO_x, CO, SO₂, GHGs, and PM emissions. The NMED developed the "Oil and Natural Gas Regulation for Ozone Precursors," NMAC 20.2.50, published on July 26, 2022 with an effective date of August 5, 2022. Approximately 50,000 wells and associated equipment will be subject to this regulation. It is anticipated that the regulation will annually reduce VOC emissions by 106,420 tons, nitrogen oxide (NO) emissions by 23,148 tons, and CH₄ emissions by 200,000 to 425,000 tons. The regulation includes emissions reduction requirements for compressors, engines and turbines, liquids unloading, dehydrators, heaters, pneumatics, storage tanks, and pipeline inspection gauge launching and receiving. A description of federal and state rules and regulations can be found in Section 2 of the Air Resources Technical Report (BLM 2023a), incorporated by reference.

The majority of GHG emissions resulting from federal fossil fuel authorizations occur outside of the BLM's authority and control. These emissions are referred to as indirect emissions and generally occur off-lease during the transport, distribution, refining, and end-use of the produced federal minerals. The BLM's regulatory authority is limited to those activities authorized under the terms of the lease, which primarily occur in the "upstream" portions of natural gas and petroleum systems. This decision authority is applicable when development is proposed on public lands and the BLM assesses the specific location, design, and plan of development. In carrying out its responsibilities under NEPA, the BLM has developed BMPs designed to reduce emissions from field production and operations. BMPs may include limiting emissions from stationary combustion sources, mobile combustion sources, fugitive sources, and process emissions that may occur during development of the lease parcel. Analysis and approval of future development may include the application of BMPs within BLM's authority, included as COAs, to reduce or mitigate GHG emissions. Additional measures proposed at the project development stage may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits. Additional information on mitigation strategies, including emissions controls and offset options, are provided in Chapter 10 of the Annual GHG Report.

CHAPTER 3: CONSULTATION AND COORDINATION

Information related to the BLM's consultation and coordination efforts with Tribes, individuals, organizations, and agencies conducted for the proposed leasing actions can be found in the original EA in Chapter 4. This chapter discloses efforts surrounding Tribal consultation, State Historic Preservation Office consultation, and Tribal Historic Preservation Office consultation. In addition to the effort outlined in the original EA, in accordance with the settlement agreement in *Diné CARE 3*, the BLM re-initiated government-to-government consultation under NEPA for the same leases (including this lease) via consultation letters on April 12, 2022. No new information or specific concerns related to this lease sale were raised through that process. No additional consultation efforts were completed for this supplemental analysis. The BLM will remain available to engage with tribes and Pueblos and respond to any consultation requests.

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CHAPTER 5: APPENDICES

APPENDIX A – REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

Table 5.1. Estimated Landscape Disturbance Associated with Environmental Trends and Planned Actions within the Analysis Area

Analysis Areas	-	Acreage
FFO Planning Area	-	7,828,509
RPFO Planning Area	-	9,500,000
Mancos-Gallup Formation Analysis Area**	-	4,800,000
Disturbance Trends within the Mancos Gallup Formation Analysis Area	Number of Wells	Acreage
FFO existing oil and gas disturbance (construction of oil and gas well pads and associated access roads and pipeline infrastructure ¹)	37,300	56,500
RPFO existing oil and gas disturbance (construction of oil and gas well pads and associated access roads and pipeline infrastructure ¹)	919	590
Other development and surface use (mining, grazing, roads, transmission lines, and urban expansion)	-	74,500 ¹
Total past and present surface use (disturbance)	38,219	131,590
Mancos-Gallup RFD (2018–2037) ¹	3,200	18,500
RPFO RFD (2020–2039) ¹	200	2,160
Other development and surface use	-	5,000
Total Planned Actions*	3,400	25,660
Estimated Total Landscape Disturbance	41,619	157,250
Contribution of the Proposed Action to Planned Actions	1 (0.029%)	4.35 (0.017%)
Contribution of the Proposed Action to Total Estimate Landscape Disturbance within the MGFAA	0.0024% of total wells	0.003% of disturbance acres

¹ This number is likely an underestimate of total non-oil and gas-related disturbance in the analysis area. No study calculating existing disturbance for the analysis area was available at the time of writing. This value was estimated based on acreages reported in BLM (2015b).

**Mancos-Gallup Formation analysis area encompasses lands overlaying the Mancos-Gallup Formation of the San Juan Basin within the counties of San Juan, Rio Arriba, McKinley and Sandoval. To account for variability in data sources, this analysis assumes that all disclosed planned action surface disturbance would occur within the MGFAA. BLM acknowledges this is likely an overestimate of MGFAA specific reasonably foreseeable environmental trends and planned actions as land uses such as other development and urban expansion may occur within the FFO, but outside of the MGFAA.

APPENDIX B – RESPONSE TO PUBLIC COMMENTS

COMMENT RECEIVED	BLM RESPONSE
<p>BLM should stop approving any further fossil fuel development. The attached IPCC report summarizes the enormous threat posed by the worsening climate crisis. This crisis is already causing serious ecological damage on the public lands that BLM manages. It would be evil to increase short-term oil company profits while sacrificing long-term public and planetary health.</p>	<p>The Bureau of Land Management (BLM) analyzes potential impacts, including cumulative impacts, from climate change and greenhouse gases (GHGs) in detail in the supplemental analyses December 2023 sections 2.2.1 and 2.2.2. The EA incorporates by reference information from the recently published <i>2022 BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas</i> (BLM 2023b) and <i>2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends</i> (BLM 2023a). The emissions used in this analysis are estimated using the 2023 BLM Lease Sale Emissions Tool and evaluated with the U.S. Environmental Protection Agency (EPA) GHG equivalency calculator (EPA 2023s). The BLM also includes a monetized social cost of carbon analysis for the estimated emissions associated with future potential development.</p> <p>Estimating the economic benefits (change in social welfare) associated with oil and gas leasing is not feasible, nor is it required for the National Environmental Policy Act (NEPA). The BLM analyzes the impacts associated with the alternatives using the best available information, which is typically not monetized estimates of benefits or costs.</p> <p>Pursuant to the Mineral Leasing Act of 1920 (MLA) and the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, the BLM makes mineral resources, such as oil and gas, available for development. See EA Sections 1.2 and 1.4 for information regarding the BLM’s requirements under MLA, FLPMA, and other statutes and regulations.</p> <p>Chapter 2 of the <i>2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends</i> (BLM 2023a) discusses the relationship between BLM’s coal, oil, and gas leasing programs and other laws and policies at the federal and state level.</p> <p>In addition, Executive Order (EO) 2019-003 and EO-14008 are also addressed in Section 18 (mitigation) of the <i>2022 BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas, and Kansas</i> (BLM 2023b) which is incorporated by reference into the EA.</p>
<p>The suspension of this [the Resource Management Plan Amendment] yearslong process, as well as the concurrent Honoring Chaco Initiative, indicates the need for the BLM to re-evaluate all oil and gas leasing and development with substantial public input and a thorough analysis of the cumulative impacts of oil and gas drilling on human health, traditional cultural properties, and air, land, and water health.</p>	<p>The BLM may rely on an existing RMP-EIS to support the NEPA analysis for a new, proposed oil and gas action.</p> <p>The BLM does not have a duty to halt development while revising an RMP. <i>Theodore Roosevelt Conservation P’ship v. Salazar</i>, 605 F. Supp. 2d 263, 280 (D.D.C. 2009), aff’d, 616 F.3d 497 (D.C. Cir. 2010), citing <i>ONRC Action v. BLM</i>, 150 F.3d 1132, 1139 (9th Cir.1998) (defining as “unfounded” an argument that outdated RMPs cannot be existing program plans under NEPA and finding no “clear duty of when to revise the plans, [or] to cease actions during such revisions”); see also See 43 C.F.R. § 46.160 (“During the preparation of a program or plan NEPA document, the Responsible Official may undertake any major Federal action in accordance with 40 C.F.R. § 1506.1 when that action is within the scope of, and analyzed in, an existing NEPA document supporting the current plan or program, so long as there is adequate NEPA documentation to support the individual action.”).</p> <p>The BLM is operating under an existing RMP while that RMP is being revised, and the existing RMP addresses oil and gas development in addition to the analyses provided in the EA and supplemental analysis.</p>
<p>The BLM violated NEPA by failing to take a hard look at cumulative greenhouse gas (GHG) emissions and resulting impacts, at the direct and cumulative health impacts to nearby communities, at environmental justice impacts, and at the</p>	<p>The BLM discussed cumulative GHG emissions in section 2.2.2 of the supplemental analyses December 2023, which incorporates by reference additional analysis in the <i>2022 BLM Specialist Report</i> and the <i>2022 Air Resources Technical Report</i>.</p>

<p>indirect and cumulative impacts to cultural sites; and violated FLPMA by failing to take action to avoid unnecessary or undue degradation of public lands.</p>	<p>The comment is non-substantive with regard to health impacts, environmental justice, and cultural resources both because it fails to assert a deficiency in the analysis and because it is outside the scope of the analysis provided for this public comment period.</p> <p>The BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p> <p>The BLM’s analysis of health impacts is detailed in section 2.1.1 of the supplemental analysis July 2022, its analysis of environmental justice is detailed in section 2.1.3 of the supplemental analysis July 2022, and its analysis of cultural resources and Native American traditional cultural and religious properties are detailed in AIB-13 and AIB-14, respectively, of the original FFO EA.</p>
<p>BLM must comply with its duties under Section 106 of the NHPA.</p>	<p>The BLM’s compliance with Section 106 is detailed in section 4.3 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023). This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>BLM must make a “reasonable and good faith effort” to identify traditional cultural properties (TCPs) and other historic properties with the area potentially affected by the protested leases.</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Generally, the BLM’s analysis of cultural resources and Native American traditional cultural and religious properties are detailed in AIB-13 and AIB-14, respectively, of the original FFO EA. Consultation efforts are detailed in section 4.2 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023).</p> <p>This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>BLM must account for specific TCPs identified by the APCG within the landscape surrounding Chaco Culture NHP.</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Generally, the BLM’s analysis of cultural resources and Native American traditional cultural and religious properties are detailed in AIB-13 and AIB-14, respectively, of the original FFO EA. Consultation efforts are detailed in section 4.2 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023). This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>BLM must account for specific TCPs identified by the All Pueblo Council of Governors within the landscape surrounding Chaco Culture NHP.</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Generally, the BLM’s analysis of cultural resources and Native American traditional cultural and religious properties are detailed in AIB-13 and AIB-14, respectively, of the original FFO EA. Consultation efforts are detailed in section 4.2 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023). This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>BLM must fully assess the potential for adverse effects on Chaco Culture NHP, including Pueblo Pintado, the Great North Road, and other significant cultural resources in the landscape</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Generally, the BLM’s analysis of cultural resources and Native American traditional cultural and religious properties are detailed</p>

<p>surrounding Chaco Culture NHP including visual, auditory, and cumulative effects.</p>	<p>in AIB-13 and AIB-14, respectively, of the original FFO EA. Consultation efforts are detailed in section 4.2 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023). This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>BLM must comply with the National Environmental Policy Act. BLM is required, at a minimum, to take the required “hard look” at potential environmental impacts under the National Environmental Policy Act (NEPA). Under NEPA, BLM must evaluate the “reasonably foreseeable” site-specific impacts of oil and gas leasing, prior to making an “irretrievable commitment of resources.”</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Reasonably foreseeable actions are covered in 3.3 of the original EA.</p>
<p>BLM must take the necessary “hard look” at impacts on Tribal communities in and around the proposed lease parcels, including environmental justice communities. The BLM should implement measures to avoid or reduce impacts, including impacts to low-income or minority populations in terms of air and water quality and equitable economic gain for communities impacted by development.</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis. Generally, the BLM analyzes potential impacts, including cumulative impacts, to environmental justice communities in section 2.1.3 of the July 2022 analysis. Table 2.3 the EJ analysis includes a summary comparison of conclusions from analysis of other issues, including air and water. This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p>
<p>The proposed sale would violate the Federal Land Policy and Management Act. Under FLPMA, BLM is required to manage the public lands on the basis of multiple use and sustained yield.</p>	<p>This comment is non-substantive because it fails to assert a deficiency in the analysis.</p> <p>Under FLPMA, the BLM must manage public lands, resources, and resource values according to its multiple-use sustained-yield mandate in a manner that will best meet the present and future needs of the public, and in accordance with an approved land use plan or resource management plan (RMP).</p> <p>The parcels available for lease under the Proposed Action are designated as open to oil and gas leasing in the approved RMP, as amended. These parcels are subject to certain stipulations to protect other resources the BLM manages for.</p>
<p>The BLM must defer all parcel until they properly re-contact the Bureau of Indian Affairs for permission to lease and provide a pivotal element for the Section 102 process.</p>	<p>The BLM’s compliance with consultation requirements is detailed in section 4.2 of the original EAs and Chapter 3 of both supplemental analyses (July 2022 and December 2023). This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, the BLM sent a letter to BIA requesting consent to lease the Rio Puerco FO parcel (29) on March 5, 2019. The BIA provided consent to lease on July 22, 2019. At this time, the BIA provided two stipulations BIA-1 and BIA-3 to attach to the parcel. Because the Farmington FO parcel is BLM surface, no BIA consent was required to lease it. Based on the analysis in the EA, the decisionmaker has the option of reaffirming the sale of all, some, or none of the leases.</p>
<p>The BLM must consider the health impacts of people being near oil and gas development, and in particular the impacts of particulate pollution described in studies in the New England Journal of Medicine and American Journal of Epidemiology.</p>	<p>The BLM has reviewed and considered the studies listed by the commenter regarding the potential risks to human health from particulate pollution in the categories PM10 and PM 2.5 as part of its overall analysis of risks from air pollution from the proposed oil and gas activity. Regarding PM, the BLM relies on the NAAQS, which are health-based standards, that are managed by the Environmental Protection Agency. These risks are considered and analyzed in the supplemental analysis July 2022 section 2.1.1 (human health and safety), supplemental analyses section 2.2.1 (Air Quality), and further in the 2022 Air Resources Technical Report, which is incorporated by reference. The studies do not contradict BLM’s analysis or conclusions. They do not present any additional risk factors or provide additional impact indicators that are not already considered. Therefore, the BLM has concluded that the risks are adequately evaluated in the analysis as described above and further in the 2022 Air Resources Technical Report. The BLM will continue to monitor publicly available sources and will incorporate scientific sources as they are published.</p>

	<p>In addition, the BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p>
<p>Air pollution impacts are shown across a multicounty region. This essentially erases the significance of the locally relevant impacts.</p>	<p>Data for air quality design values, National Emissions Inventory (NEI) data, and EPA’s Air Toxics Screening Assessment (AirToxScreen), are published at the county level in the Supplemental Analysis December 2023 and the 2022 Air Resource Technical Report, which is incorporated by reference.</p>
<p>Table 2.1 indicates that all the parcels are in moderate to heavy oil and gas development. However, this is not true. Township 20N4W has no current oil/gas activity.</p>	<p>The BLM addressed this comment in Appendix C of the July 2022 Supplemental Analysis, https://eplanning.blm.gov/projects/1500871/200330182/20064989/250071171/Rio%20Puerco%20Field%20Office_February%202020%20Competitive%20Oil%20and%20Gas%20Lease%20Sale_Supplemental%20Analysis_2022_508%20(1).pdf.</p> <p>Contrary to the commenter’s synthesis, the single parcel analyzed in the Farmington Field Office contains a single residence and is surrounded by lands that are rural, sparsely populated, and include moderate oil and gas development. The single parcel analyzed in the Rio Puerco Field Office contains one residence and at least one residence just outside the western boundary. Lands surrounding that lease parcel are rural, sparsely populated, and include low to moderate oil and gas development.</p>
<p>The Environmental Justice section should do locally relevant analysis of economic impacts, air pollution, transportation, public safety, and ground water impacts. Analyzing increases in short- and long-term pollution emissions from where they currently exist would be needed by the decision maker to understand the significance and intensity of the action as would be experienced by the local EJ community. BLM should provide a locally relevant analysis of economic impacts (or lack of economic impacts) from oil/gas development. BLM did not provide any mitigations up front to reduce or ease the disproportionate impacts it has identified.</p>	<p>The BLM’s analysis of Environmental Justice impacts is detailed in 2.1.3 of the July 2022 Supplemental Analyses. This section was not revised in the analysis issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>Section 2.1.3 of the Supplemental Analyses July 2022:</p> <p>RPF0 - https://eplanning.blm.gov/projects/1500871/200330182/20064989/250071171/Rio%20Puerco%20Field%20Office_February%202020%20Competitive%20Oil%20and%20Gas%20Lease%20Sale_Supplemental%20Analysis_2022_508%20(1).pdf.</p> <p>FFO - https://eplanning.blm.gov/projects/1500868/200330149/20064979/250071161/Farmington%20Field%20Office_February%202020%20Competitive%20Oil%20and%20Gas%20Lease%20Sale_Supplemental%20Analysis_2022_508%20(1).pdf.</p>
<p>The Chapter suggested that the BIA utilize the BIA-5 No Surface Occupancy stipulation for all parcels as a minimum protection.</p>	<p>When BIA provided BLM consent to lease the RPF0 parcel (29) they provided the stipulations shown in Appendix A of the original EA. BIA-5 was not attached by the BIA.</p>
<p>The Rio Puerco Management Committee (RPMC) is not discussed within the document. In addition, BLM should take a hard look at erosion as its own topic considering the sensitivity of the area and the need to reduce sediment loads within the Rio Puerco.</p>	<p>The BLM’s analysis of soil impacts was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, the RPMC (inactive) is not a regulatory entity and is not relevant in the context of this analysis. Erosion is addressed within AIB-2 (surface water quality) within the original EA.</p>
<p>The Chapter is concerned that an impact from development may change the composition of plant communities within the area</p>	<p>The BLM’s analysis of impacts from non-native and invasive plants was not revised in the supplemental documentation issued for this public</p>

<p>(via the introduction of weeds and disturbance of grounds) and is specifically concerned with potential genetic shifts by the introduction of non-local plant seed stocks for reclamation. Mitigations need to be developed to help protect against such impacts.</p>	<p>comment period, and this comment is therefore outside the scope of the analysis.</p> <p>Nevertheless, the impacts associated with the introduction and or spread of noxious weeds and invasive plants as disclosed in the original EA in AIB-5.</p> <p>Analysis and approval of future development may include application of BMPs within BLM’s authority, as COAs, to reduce or mitigate the concerns raised. At the APD stage, reclamation is intended to restore previously disturbed sites to a properly functioning natural ecological state. The effectiveness of reclamation efforts varies based upon several factors such as soil type, precipitation, herbicide treatments, and additional disturbance. Once physical reclamation of the site has taken place, seeding of native species is intended to reestablish the native plant community and protect the disturbed area from potential establishment of noxious weeds.</p>
<p>Potential drainage of allotment minerals should at least be acknowledged within the planning document and additional mitigations (such as extended setbacks) should be considered. For example, a minimum of a 1320-foot setback (or larger) from Allotment minerals could be required to prevent drainage situations.</p>	<p>The BLM would evaluate any potential drainage issues at the APD stage if development is proposed near parcels with trust mineral estate. The BLM follows the processes set forth in 43 C.F.R. § 3162.2-2 to prevent uncompensated drainage of Indian mineral resources.</p>
<p>The Chapter is concerned about the impacts upon the viewshed from future development within the lease sale parcels.</p>	<p>The BLM’s analysis of visual impacts was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, impacts to visual resources are disclosed within AIB-12 (Visual Resources) of the original EA.</p> <p>Visual resources on BLM lands are managed using four Visual Resource Management (VRM) classes: VRM Class I, II, III, and IV. Oil and gas development is not compatible with VRM Class I designated areas, is often not compatible with VRM Class II designated areas, is generally compatible with VRM Class III designated areas, and is compatible with VRM Class IV designated areas. The nominated lease parcel is located within VRM IV. Standard terms and conditions allow the BLM to consider further mitigation for visual resources at the time of proposed lease development. Measures could include siting of well sites, roads, and associated infrastructure to follow the contour of the landform and mimicking the lines in vegetation to screen and hide locations. In addition, per Onshore Order 1 (OO1 – XII. Abandonment, B. Reclamation), interim reclamation (reclamation of surface disturbance not necessary for production) and final reclamation (reclamation following well plugging and abandonment) is required within six months of well completion and well plugging, respectively.</p>
<p>Leasing would limit choice of reasonable alternative actions for the Draft RMP/EIS. The decision to lease would limit the decision space of the revised Draft RMP/EIS. Additionally, current stipulations are insufficient for protecting Navajo communities. The decision to move forward with leasing RPFO parcels in this area would appear to be arbitrary in nature.</p>	<p>The BLM may rely on an existing RMP-EIS to support the NEPA analysis for a new, proposed oil and gas action. See 43 C.F.R. § 46.160 (“During the preparation of a program or plan NEPA document, the Responsible Official may undertake any major Federal action in accordance with 40 C.F.R. § 1506.1 when that action is within the scope of, and analyzed in, an existing NEPA document supporting the current plan or program, so long as there is adequate NEPA documentation to support the individual action.”). The BLM is operating under an existing RMP while that RMP is being revised, and the existing RMP addresses oil and gas development, in addition to the analyses provided in this NEPA document.</p>
<p>The Chapter suggests an alternative that defers all parcels.</p>	<p>The parcels considered in the Proposed Action are designated as open to oil and gas leasing in the approved RMP, as amended. As informed by the issues-based analysis in the EA, the BLM Authorized Officer retains the discretion to reaffirm the sale of all, some, or none of the leases.</p>
<p>BLM should not authorize further oil and gas leasing or development in the Greater Chaco region, in either field office—including the proposed affirmation of its leasing decisions with respect to the parcels at issue here— under the outdated 2003 FFO and 1986 RPFO RMP/EISs, neither of which takes into</p>	<p>The BLM may rely on an existing RMP-EIS to support the NEPA analysis for a new, proposed oil and gas action.</p> <p>The BLM does not have a duty to halt development while revising an RMP. <i>Theodore Roosevelt Conservation P’ship v. Salazar</i>, 605 F. Supp.</p>

<p>account the effects of horizontal drilling and fracking and neither of which takes into account the changes that BLM says have taken place in the San Juan Basin.</p>	<p>2d 263, 280 (D.D.C. 2009), aff'd, 616 F.3d 497 (D.C. Cir. 2010), citing <i>ONRC Action v. BLM</i>, 150 F.3d 1132, 1139 (9th Cir.1998) (defining as “unfounded” an argument that outdated RMPs cannot be existing program plans under NEPA and finding no “clear duty of when to revise the plans, [or] to cease actions during such revisions”); see also See 43 C.F.R. § 46.160 (“During the preparation of a program or plan NEPA document, the Responsible Official may undertake any major Federal action in accordance with 40 C.F.R. § 1506.1 when that action is within the scope of, and analyzed in, an existing NEPA document supporting the current plan or program, so long as there is adequate NEPA documentation to support the individual action.”).</p> <p>The BLM is operating under an existing RMP while that RMP is being revised, and the existing RMP addresses oil and gas development in addition to the analyses provided in the EA and supplemental analysis.</p>
<p>BLM should also consider how its authorization of this lease sale and reasonably foreseeable development of the leases could exacerbate water quality-related health impacts associated with PFAS contamination. For example, a new report by Physicians for Social Responsibility (PSR) reveals the staggering amount of these health-harming “forever chemicals” known to be used in oil and gas operations in New Mexico—not to mention additional PFAS chemicals that are likely present but not disclose due to trade secret protections. The BLM should take this report and the concerns it raises into account in its analysis and decision-making with respect to health impacts and potential impacts to groundwater and drinking water.</p>	<p>The BLM’s analysis of water quality impacts was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, impacts to water resources are disclosed within section 2.2.3 of the supplemental analyses July 2022, AIB-1 (groundwater) of the original EA, and the BLM NM Water Support Document which is incorporated by reference into the analysis. Additionally, the BLM further analyzes the risk of spills, casing failures, and groundwater contamination in the <i>BLM Water Support Document for Oil and Gas Development in New Mexico</i>.</p> <p>Developers who install and operate oil and gas wells, facilities, and pipelines are responsible for complying with the applicable laws and regulations governing hazardous materials and for following all hazardous spill response plans and stipulations. Purchasers of oil and gas leases are required to comply with all applicable federal, state, and local laws and regulations, including obtaining all necessary permits prior to any lease development activities. This includes, but is not limited to, BLM and state regulations regarding hydraulic fracturing, including casing specifications, monitoring and recording, and management of recovered fluids. The BLM is also required to comply with all applicable federal, state, and local laws and regulations, as well as Department of Interior policies when leasing mineral estate and responding to EOLs. The BLM is not required to judge the adequacy of applicable laws and regulations.</p>
<p>We also urge BLM to engage in a more transparent and participatory process for its supplemental analyses. These supplemental analyses are not on the same schedule as the public comment and protest periods for quarterly lease sales, and the public comment periods for them often overlap significantly with the winter holidays when many members of the public are away and may not even see an announcement on ePlanning until nearly halfway through an already relatively short 30-day comment period.</p>	<p>The 30-day public comment period for this supplemental analysis comports with BLM policy as described in IM 2023-010, although public comment is not required for EAs. <i>Greater Yellowstone Coal. v. Flowers</i>, 359 F.3d 1257, 1279 (10th Cir. 2004).</p> <p>This supplemental analysis is updating the NEPA for a lease that was held in February 2020. This update to the analysis occurred outside of the on-going quarterly lease sale process. The comment period for the supplemental analysis occurred from 12/20/23-1/19/24 which overlapped ongoing oil and gas lease sale public involvement periods by a single day.</p>
<p>We also urge BLM to take this opportunity to truly “Honor Greater Chaco” by fully analyzing and accounting for the landscape-level and cumulative impacts of its leasing decisions, including but not limited to health, environmental justice, and cultural impacts. We ask that, throughout the process, BLM ensure ongoing, meaningful involvement of frontline and Indigenous people and communities, meaningful Tribal consultation, and Free, Prior and Informed Consent (FPIC), beyond a mere box-checking approach to minimum legally-required participation under NEPA and the Federal Land Policy and Management Act (“FLPMA”), and consultation under the</p>	<p>The BLM’s analysis of cultural and environmental justice issues was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, the BLM analyzes potential impacts, including cumulative impacts, to human health and safety and environmental justice communities in section 2.1.1 of the July 2022 supplemental analysis and section 2.1.3 of the July 2022 analysis, respectively.</p>

<p>National Historic Preservation Act (“NHPA”)—and in so doing, to help facilitate a just transition away from the settler colonial legacies and ongoing harms of pollution, extraction, and environmental racism.</p>	<p>The BLM analyzes potential impacts, including cumulative impacts, to cultural resources and Native American traditional cultural and religious properties in AIB-13 and AIB-14, respectively, of the original FFO EA. The AIB analysis contains sufficient information to meet the BLM's public disclosure and informed decision-making requirements and provides sufficient evidence to reach a FONSI.</p> <p>Consultation efforts are detailed in section 4.2 of the original EA and Chapter 3 of both supplemental analyses (July 2022 and December 2023).</p>
<p>The BLM has neither updated its analysis nor offered any new evidence or justification for its prior conclusions that EJ impacts will not be significant.</p>	<p>The BLM’s analysis of cultural and environmental justice issues was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, generally, the BLM’s analysis of environmental justice is detailed in section 2.1.3 of the supplemental analysis July 2022.</p>
<p>BLM Still Fails to Take a Hard Look at Health and Safety Impacts. BLM continues to take only a cursory look at health impacts in the December 2023 Draft Supplemental EAs, and only in its discussion of air quality impacts. The BLM has not updated its analysis of health impacts associated with these leases since its June-July 2022 Supplemental Analyses. BLM should update its analysis of health impacts and incorporate an ever-growing body of research on the health impacts of fracking into its analysis. In particular, the BLM should consider the 2023 review of literature on the health impacts of fracking by Physicians for Social Responsibility (PSR).</p>	<p>The BLM’s analysis of health and safety impacts related to hydraulic fracturing was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, potential human health impacts are analyzed in section 2.1.1 of the supplemental analysis July 2022. These analyses include direct, indirect, and cumulative health and safety effects on reproductive, respiratory, and cardiovascular health, risks of cancer, motor vehicle injuries, fatalities, and air pollutants, and injuries and fatalities from fires, spills and leaks. The EA analysis describes the relevant social determinants of risk for affected communities and discusses how air pollutants associated with oil and gas activities can cause various health effects for people of all ages.</p> <p>In addition, the BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p> <p>Human health and safety effects to environmental justice communities are further analyzed in section 2.1.3 in the supplemental analyses of July 2022. Water quality impacts are disclosed in section 2.2.3 of the supplemental analyses July 2022 and in the BLM NM’s water support document incorporated by reference to the analysis.</p>
<p>BLM Still Fails to Take a Hard Look at Air Quality Impacts— Particularly Air Quality and Health Impacts including not only direct impacts, but also cumulative risks and impacts and historical patterns of multiple and cumulative exposures. Specifically, BLM should analyze asthma-related effects in relation to existing asthma rates and related impacts in the communities adjacent to and counties encompassing the proposed lease sales.</p>	<p>Potential human health impacts are analyzed in section 2.1.1 of the supplemental analysis July 2022 and section 2.2.1 (Air Quality) of the supplemental analyses of December 2023. These analyses include direct, indirect, and cumulative health and safety effects on reproductive, respiratory, and cardiovascular health, risks of cancer, motor vehicle injuries, fatalities, and air pollutants, and injuries and fatalities from fires, spills and leaks. The analysis and information within the supplements and the 2022 Air Resources Technical Report describe the relevant social determinants of risk for affected communities and discusses how air pollutants associated with oil and gas activities can cause various health effects for people of all ages.</p> <p>In addition, the BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from</p>

	<p>federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p>
<p>We do appreciate that BLM lists some groups of people who are most at risk of ozone exposure and its adverse health impacts. RPFO and FFO Draft Supplemental EAs at 7-8. However, BLM fails to connect those exposure risks to any analysis of specific emissions and impacts, or specific groups or populations associated with these leases.</p>	<p>Potential Air Quality Impacts are addressed in section 2.2.1 (Air Quality) of the supplemental analyses December 2023.</p> <p>As stated in the analysis “Under the Proposed Action, the additional NO_x and VOC emissions (quantified in Table 2.3) from the potential wells would incrementally add to O₃ levels within the analysis area. However, based on the current rate of development (below the projected RFD) and the RFD projections compared to the CARMMS 2.0 modeling (discussed in the cumulative effects section), the corresponding CARMMS 2.0 low modeling scenario, which represents a conservative estimate of federal impacts through 2025, indicates that the emissions from this project would not be expected to result in any exceedances of the NAAQS or NMAAQs for any criteria pollutants in the analysis area.</p> <p>Exposure risks and health impacts for specific groups and populations are discussed in sections 2.1.1 (Human Health and Safety), Section 2.1.2 (Quality of Life) and Section 2.1.3 (Environmental Justice) of the supplemental analyses July 2022. In July 2022, in response to public comments, the analysis was revised to include additional discussion of existing social vulnerabilities that affect populations in the analysis area, and how those social vulnerabilities may increase the risk and magnitude of adverse health effects.</p> <p>In addition, the BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p>
<p>BLM fails to analyze cumulative air pollutant emissions, fails to analyze the effects of these cumulative emissions—on health or otherwise—and fails to provide any metric by which BLM or the public can put these emissions in context or analyze their significance. BLM must analyze additive short and long-term emissions and their direct, indirect, and cumulative health effects from these lease sales—the impacts which result “from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions.” BLM calculates the % increase in emissions that would result from each lease sale (over the total existing emissions in the San Juan Basin) but fails to discuss potentially significant impacts of these emissions—including localized health impacts to those living near the lease parcels, particularly in light of other oil and gas wells and pollutant sources in the area.</p>	<p>Potential human health impacts are analyzed in section 2.1.1 of the supplemental analysis July 2022 and section 2.2.1 of the supplemental analysis December 2023. They are also analyzed within BLM New Mexico’s WSD and ARTR which are incorporated by reference into the analysis. The BLM considers quantified cumulative air emissions and health impacts in the area and uses the NAAQS and AQI standards to measure the impacts of air pollutants on human health. Potential impacts on environmental justice communities are considered and analyzed in section 2.1.3 of the supplemental analysis July 2022, which includes a summary comparison of conclusions from analysis of other issues in Table 2.3.</p> <p>In July 2022, in response to public comments, the analysis was revised to include additional discussion of existing social vulnerabilities that affect populations in the analysis area, and how those social vulnerabilities may increase the risk and magnitude of adverse health effects.</p> <p>In addition, the BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations</p>

	<p>together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p>
<p>BLM should incorporate the findings in the Counselor HIA-KBHIS into its analysis and decision-making, along with data from local health departments about things like asthma hospitalizations, childhood asthma rates, and other health impacts known to be associated with proximity to oil and gas extraction.</p>	<p>The study cited by the commentator is limited to a month of monitored data and only a 24-hr period of canister data. This is a very limited period of monitoring to draw any conclusions. Health concerns associated with PM emissions are included in the 2022 Annual Resource Technical Report, which has been incorporated by reference in this EA.</p> <p>Per EPA's Technical Assistance Document for the National Air Toxics Trends Stations Program (2016), "to adequately characterize the ambient air toxics concentrations over the course of a year, sample collection must occur every six days per the national sampling calendar for a 24-hour period beginning and ending at midnight local standard time (without correction for daylight savings time, if applicable)." This sample collection duration and frequency provides a sufficient number of data points to ensure that the collected data are representative of the annual average daily concentration at a given site.</p>
<p>BLM must not summarily dismiss health and safety impacts as temporary simply because some exposures (e.g., to emissions and fugitive dust from construction) are temporary. It is arbitrary, and contrary to scientific understanding, to assume that just because an exposure is temporary, so too are the effects resulting from that exposure. The health effects that can arise from environmental exposures, especially in conjunction with social determinants of health and environmental justice issues, may endure long after the acute exposure source is gone.</p>	<p>Section 2.2.1.2 of the supplemental analysis December 2023 distinguishes between short-term and lasting emissions of various pollutants. As noted in the section, primary NAAQS are set at a level to protect public health, including the health of at-risk populations, with an adequate margin of safety. Thus, it is assumed that at a regional level, air quality levels that are below the NAAQS will continue to protect public health.</p>
<p>BLM's discussion of hazardous air pollutant (HAP) emissions and impacts fails to link lease sale emissions to specific impacts (rather than general categories of health risks and impacts) and only discusses comparative cancer rates at the county levels, which tells BLM and the public little about cancer risks associated with these lease sales. This is the type of analysis of Hazardous Air Pollutants the Tenth Circuit rejected in <i>Diné CARE v. Haaland</i>, 59 F.4th at 1046-1047. Nor is BLM's citation of a 2019 Colorado study with respect to cancer risks from HAPs at varying distances from well pads dispositive or even particularly useful in analyzing HAP-related health risks and impacts associated with the February 2020 FFO and RPFO lease sales. And the study discusses simulated cancer risks to "average individuals" in the Colorado study—it doesn't address cumulative risks or impacts, cancer or otherwise, or the potential for disproportionate or adverse risks or impacts in certain populations (including for people and communities in the February 2020 lease sale area).</p>	<p>The BLM's analysis of cultural and environmental justice issues was not revised in the supplemental documentation issued for this public comment period, and this comment is therefore outside the scope of the analysis.</p> <p>However, the BLM analyzes potential impacts, including cumulative impacts, to human health and safety and environmental justice communities in section 2.1.1 of the July 2022 supplemental analysis and section 2.1.3 of the July 2022 analysis, respectively. The analysis describes the relevant social determinants of risk for affected communities and discusses how air pollutants associated with oil and gas activities can cause health effects for people of all ages, including but not limited to compromises to immune and reproductive systems, birth defects, and developmental disorders.</p> <p>The BLM has developed new HAPs analysis tools to enhance the contextual analysis of HAP emissions, and that analysis has now been added to the supplemental analysis. The oil and gas cancer risk from federal sources (existing and new) and from all mineral designations together from the combination of benzene, ethylbenzene, and formaldehyde are included in this supplemental analysis. The non-adjusted (70-year) cancer risk from all oil and gas sources for San Juan, McKinley, Sandoval, and Rio Arriba Counties is less than 30 in a million (maximum of 27.48 in San Juan County). The maximum total oil and gas residency exposure-adjusted cancer risk for San Juan, McKinley, Sandoval, and Rio Arriba Counties is 5.69, 0.55, 1.76, and 5.83, respectively.</p> <p>As stated in 2.2.1 of the supplemental analysis December 2023, the 2019 AirToxScreen analysis reveals that the total cancer risk (defined as the probability of contracting cancer over the course of a 70-year lifetime, assuming continuous exposure) in San Juan, Sandoval, Rio Arriba, and McKinley Counties as 17.6, 18.7, 12.3, 11.1 cases per 1 million people,</p>

	<p>respectively, which is lower than the nationwide level (25.5 cases per 1 million people) and in the same range as the state of New Mexico (19.1 cases per 1 million people). The contribution of the oil and gas industry to the cancer risk in San Juan, Sandoval, Rio Arriba, and McKinley Counties is 2.06, 0.01, 0.04 and 0.01 cases in a million, respectively (BLM 2023a). The total cancer risk is within the acceptable range of risk published by the EPA of 100 in 1 million as discussed in 40 C.F.R. § 300.430 (e)(2)(i)(A)(2) and the Residual Risk Report to Congress, EPA- 453/R-99-001 (EPA 1999).</p> <p>In response to the study referenced by the commenter, the CSU study presents HAP concentrations and associated exposure levels during various stages of well development and production at oil and gas extraction facilities in Colorado. AirToxScreen is a cumulative HAP assessment based on total HAP emissions from all sources contained in the NEI. Per the AirToxScreen Technical Support Document, this national-scale assessment (AirToxScreen) is consistent with EPA’s definition of a cumulative risk assessment, as stated in EPA’s Framework for Cumulative Risk Assessment, as “an analysis, characterization, and possible quantification of the combined risks to health or the environment from multiple agents or stressors” (EPA 2003; EPA 2022b). The BLM Cumulative Hazardous Air Pollutants Modeling – Final Report (Ramboll and BLM 2023) and the BLM Summary of Cumulative Oil and Gas Hazardous Air Pollutant Analysis for the FFO (Ramboll and BLM 2024), incorporated by reference to this supplemental analysis, summarize the actions the BLM has undertaken to address to court’s holding in regards to analysis of cumulative HAP emissions and the associated effects on public health from oil and gas leasing and development.</p>
<p>The Draft Supplemental EAs and the 2022 BLM Specialist Report Fail NEPA’s “Hard Look” test with regard to analyzing climate impacts of resuming federal oil and gas leasing. BLM still fails to analyze the effects of these emissions on the global climate crisis or put them into context. BLM improperly segments its proposed affirmation of its decision to offer portions of the federal mineral estate for fossil fuel development, including in the Supplemental analyses at issue here.</p>	<p>The BLM analyzes potential impacts from climate change and GHGs in detail in the EAs (see supplemental analysis December 2023 section 2.2.2). The documents also incorporate by reference the 2022 Air Resources Technical Report as well as the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends which provides a more detailed assessment of cumulative emissions, climate change impacts, and reputable climate science sources.</p> <p>NEPA allows agencies to prepare an EA “on any action at any time in order to assist agency planning and decision-making” (43 C.F.R. § 1501.3; see also 43 C.F.R. § 1508.9 [defining “environmental assessment”]). An agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM is consistent with the purpose and requirements of NEPA.</p> <p>Additionally, the concurrent offering of leases across multiple states does not constitute a connected action for purposes of NEPA analysis for several reasons: 1) The individual lease sales are not part of or dependent on a larger proposed action to proceed 2) The concurrent timing of the lease sales does not represent a connected action that authorizes concurrent development, or any development, to occur. The timing, scale, and locations of development that may occur as a result of the leasing actions are not interdependent, and therefore do not represent similar connected actions for the purposes of NEPA analysis.</p>
<p>BLM used EPA’s greenhouse gas equivalency calculator to express the estimated annual GHG emissions from the lease sale in terms of the GHG emissions produced from gas-fueled vehicles driven for one year, or the emissions that could be avoided by operating wind turbines as an alternative energy source or offset by the carbon sequestration of forest land, RPFO and FFO Draft Supplemental EAs at 25. We request BLM contextualize the GHG emissions of all 2024 lease sales by using the EPA GHG equivalency calculator to consider the GHG emissions over the average 30-year production life of the leases. We also request BLM contextualize the cumulative GHG emissions from the federal fossil fuel program using EPA’s GHG equivalency calculator.</p>	<p>The BLM provided a wide range of potential impact contexts in the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends, which was incorporated by reference into each analysis. The Specialists Report presents the life-cycle representation of the federal onshore mineral estate GHG emissions relative to various state, national and global emissions, and context of impacts. The analysis (see section 2.2.2 of the supplemental analyses December 2023) includes discussions of projected emissions from these leases in the context of both the Social Cost of Greenhouse Gases (SC-GHG) and Carbon Budgeting.</p> <p>The BLM has a wide decision space under NEPA in which to employ the methodologies best suited to its analysis. <i>WildEarth Guardians v. Bernhardt</i>, 501 F. Supp. 3d 1192, 1209 (D.N.M. 2020) (“nothing in</p>

	<p>[NEPA’s] text and nothing in its associated regulations specifically mandates that agencies perform a particular analysis or subscribe to a particular methodology. . . . NEPA requires that the agency assess the direct and indirect impact on the environment, and agencies have wide discretion in how to perform those tasks.”). Therefore, the BLM’s determination to not use the GHG equivalency calculator at this time is within the agency’s discretion.</p>
<p>Even though BLM has added a section to the Supplemental EAs listing the social cost of carbon for the proposed projects, BLM failed to provide any analysis of the decision making pursuant to those numbers, or how those numbers factor into the economic analyses BLM does elsewhere. Additionally, because BLM improperly segments its analysis from an analysis of all proposed 2024 leasing, the Supplemental Draft EAs only provides the social cost of GHGs for each individual lease sale. We request the BLM contextualize the cumulative GHG emissions from the entire federal fossil fuel program using the social cost of GHGs. BLM must be clear that the SC-GHG is a measure of impacts to the human environment (reflected in 2020 U.S. dollars) that BLM is obligated to evaluate pursuant to NEPA regardless of whether or not BLM conducts a complete or partial cost-benefit analysis of the proposed lease sales.</p>	<p>The BLM analyzes potential impacts from climate change and GHG in detail in the EAs (see supplemental analysis December 2023 section 2.2.2). The EAs incorporate by reference information from the 2022 BLM Air Resources Technical Report. The emissions used in this analysis are estimated using the 2022 BLM Lease Sale Emissions Tool and evaluated with the EPA GHG equivalency calculator. The BLM also includes a monetized social cost of carbon analysis for the estimated emissions associated with future potential development. Until such time as the BLM develops further tools to analyze the relative impact of its activities nationwide, the BLM can disclose the SC-GHG, and provide context and analysis for those costs; the agency cannot determine significance for a proposed action based on SC-GHG amounts alone.</p> <p>Estimating the economic benefits (change in social welfare) associated with oil and gas leasing is not feasible, nor is it required for NEPA. The BLM analyzes the impacts associated with the alternatives using the best available information, which is typically not monetized estimates of benefits or costs.</p> <p>Various laws, including the MLA and the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, require the BLM to make mineral resources, such as oil and gas, available for development. See EA Sections 1.2 and 1.4 for information regarding the BLM’s requirements under the MLA, FLPMA, and other statutes and regulations.</p> <p>Chapter 2 of the 2022 BLM Specialist Report on Annual GHG Emissions and Climate Trends discusses the relationship between BLM’s coal, oil, and gas leasing programs with other laws and policies and the federal and state level.</p>
<p>BLM improperly omitted carbon budget analysis of the United States’ share of the global carbon budget.</p>	<p>The BLM analyzes potential impacts from climate change and GHGs in detail in the EAs (see supplemental analysis December 2023 section 2.2.2). In addition, The BLM provided a wide range of potential impact contexts in the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends, which was incorporated by reference into each analysis. The Specialists Report presents the life-cycle representation of the federal onshore mineral estate GHG emissions relative to various state, national and global emissions, and impact contexts. The report presents emissions from pre-industrial times to present, with a summary of the anthropogenic changes to atmospheric GHGs since pre-industrial times.</p> <p>A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the 2022 BLM Specialist Report on Annual GHG Emissions and Climate Trends. These chapters describe currently observed climate impacts globally, nationally, and in each state, and present a range of projected impact scenarios depending on future GHG emission levels.</p>
<p>Throughout the 2021 BLM Specialist Report and the Draft EA for the proposed lease sale, BLM mischaracterizes its duty and authority to address climate change programmatically and in the context of project level actions. BLM’s mischaracterizations misinform the public and decision makers and prejudice its NEPA analysis and conclusions.</p> <p>Examples of BLM’s mischaracterizations include:</p> <ul style="list-style-type: none"> • BLM “has limited ability to provide for meaningful or measurable mitigations actions in the context of cumulative climate change resulting from global emissions.” 	<p>To the extent the comment purports to interpret legal authorities that speak for themselves, the BLM considers the comment non-substantive.</p> <p>The BLM regulations at 43 C.F.R. Sections 3101.1–2, 3101.1–3, and 3162.5–1 authorize the agency to prescribe reasonable mitigation measures within its discretion and its technical judgment. Supplemental Analyses December 2023 section 2.2.2 discuss mitigation strategies designed to reduce GHGs and incorporates by reference information from the 2022 BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas as well as the 2022 BLM Specialist Report on Annual GHG Emissions and Climate Trends. Analysis and approval of future development may include application of BMPs within BLM’s authority, as COAs, to reduce or mitigate GHG emissions. Additional measures proposed at the project</p>

• The BLM’s decision space for mitigating climate impacts from fossil fuels development is currently limited by authorization in statutes such as FLPMA and the MLA.

• No single authorized project level action can produce emissions with such significance that the action could be perceived as influencing the climate. However, all GHG emissions (big and small) contribute to changes in atmospheric radiative forcing and ultimately climate change.

Under FLPMA, BLM, has array of responsibilities, implicated by the impacts of climate change, when deciding whether to approve new oil and gas lease sales...To carry out these responsibilities in the context of oil and gas leasing, BLM has a corresponding array of authorities to address the impacts of oil and gas leasing and development. These authorities include choosing not to lease the federal mineral estate for oil and gas development, withdrawing federal minerals from leasing; prohibiting leasing in resource management plans and through resource management plan amendments, requiring conditions of approval in new authorizations of oil and gas leases, as well as managing the rate of oil and gas production in federal leases.

To BLM’s authority to choose not to lease the federal mineral estate, development of public lands is not required but must instead be weighed against other possible uses, including conservation to protect environmental values...As we indicated above, the court in *Louisiana v. Biden* confirmed that BLM is authorized to postpone lease sales to address NEPA and similar concerns tied to particular lease proposals...Under the Mineral Leasing Act (MLA), "the DOI Secretary enjoys wide discretion when it comes to determining which federal lands will be offered for oil and gas development."

Just as BLM can deny a project outright to protect the environmental uses of public lands, it can also condition a project’s approval on the commitment to mitigation measures that lessen environmental impacts.

BLM’s authority to mitigate environmental impacts is importantly related to BLM’s NEPA obligations to consider ways to avoid, minimize, and mitigate impacts in accordance with the mitigation hierarchy. 40 C.F.R. §§ 1508.8, 1502.14, 1502.16, 1508.20. Specifically, BLM must “include appropriate mitigation measures not already included in the proposed action or alternatives.” *Id.* §§ 1502.14(f), 1502.16(h). Thus, based on site-specific NEPA reviews that rationally connect to FLPMA’s mandates, BLM must impose constraints on new well approvals to avoid catastrophic climate change and protect and advance the public interest. This includes the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts.

The Mineral Leasing Act (MLA) also authorizes BLM to reduce the rate production over a defined period of time, limiting the amount of extraction and greenhouse gas pollution that would result. The MLA authorizes the Secretary of the Interior to “alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such a plan.” 30 USCA § 226(m). Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states that “Lessor reserves the right to specify rates of development and production in the public interest.” See U.S. Department of the Interior, Offer to Lease and Lease for Oil and Gas, Form 3100-11 (Oct. 2008). According to these authorizations, the Secretary and BLM could set a declining rate of production over time that provides for an orderly phase-out of onshore fossil fuel production.

BLM’s legal duty and authority provide a variety of mitigation actions BLM could take to meaningfully and measurably to address cumulative climate change resulting from global

development stage also may be incorporated as applicant-committed measures by the project proponent or added to necessary air quality permits. Additional information on mitigation strategies, including emissions controls and offset options, are provided in Chapter 10 of the 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends.

<p>emissions. We request BLM revise its NEPA analyses to correctly reflect its legal duties and authorities.</p>	
<p>The draft Supplemental EAs and the 2022 BLM Specialist Report omit analysis of the compatibility of new commitments of federal fossil fuels with the U.S. goal of avoiding 1.5°C warming. BLM’s assertions that no global carbon budgets or pledges under the Paris Agreement are binding, and that global budgets are not useful to BLM decision-making, particularly at the lease sale stage, ring hollow.</p> <p>BLM’s Draft Supplemental EAs omit analyzing and evaluating the estimated GHG emissions from the lease sales and cumulative GHG emissions within the context of the widening production gap (the difference between global fossil fuel production projected by governments and fossil fuel production consistent with the 1.5 C warming pathway and other pathways).</p>	<p>The analysis requested is included for informational purposes in section 9.1 of the 2022 BLM Specialist Report on Annual GHG Emissions and Climate Trends, which was incorporated by reference in the supplemental analysis December 2023, see section 2.2.2. This analysis includes information from the United Nations emissions gap report which shows the difference between global emissions pathways required to limit warming to 1.5C or 2.0C (i.e. carbon budgets) with the anticipated emissions based on national commitments to reduce GHG emissions. At this time, BLM has not developed a standard or emissions budget that it can apply uniformly to make a determination of significance based on climate change or GHG emissions. Until such time as the BLM develops further tools to analyze the relative emissions impact of its activities nationwide, the BLM can disclose GHG emissions and climate impacts, and provide context and analysis for those emissions and impacts; the agency cannot determine significance for a proposed action based on GHG emissions or climate impacts alone.</p>
<p>We request BLM consider, discuss, and evaluate the climate science regarding past and present impacts from climate change to further contextualize the climate impacts from the cumulative emissions of GHGs associated with the proposed lease sales and the federal fossil fuel program.</p>	<p>The 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends, incorporated by reference into the analysis, provides current climate trends (chapter 4) and projected climate trends (chapter 8) for each state, including New Mexico.</p>
<p>The BLM failed to properly complete a cumulative impacts analysis of the proposed action to affirm its leasing decisions in the context of proposed 2024 lease sales, including an assessment of the cumulative impact of greenhouse gas emissions from the federal fossil fuel program including recent and reasonably foreseeable federal offshore oil and gas lease sales and non-federal oil and gas leasing.</p> <p>BLM continues to improperly frame and weigh the context and intensity factors for assessing the significance of reasonably foreseeable GHG emissions from the proposed lease sales and their cumulative climate impacts. We request BLM include a more comprehensive comparison of the estimated GHG emissions associated with the proposed lease sale and the cumulative GHG emissions from the federal fossil fuel program to other emissions sources, including but not limited to other individual federal and non-federal fossil fuel leases, individual coal-fired and natural gas electric generating facilities, and individual concentrated animal feeding operations.</p>	<p>BLM recognizes the national and global impact potential of greenhouse gas (GHG) emissions and the likewise broad scope of climate change impacts related to them and has therefore prepared annual 2022 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends. This report accounts for current and projected future agency wide GHG emissions related to fossil fuel actions on Public Land, national and global GHG emission trends, and potential climate impacts related to these emissions. The report is specifically referenced in and incorporated into each State Office lease sale NEPA analysis and provides the information necessary to properly assess agency wide, nationwide, and global reasonably foreseeable cumulative impacts of each State Office lease sale.</p> <p>The BLM analyzes potential impacts from climate change and GHG in detail in section 2.2.2 of the supplemental analyses December 2023. The analysis incorporates by reference information from the 2022 BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas. The BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM takes a hard look at the environmental impacts of leasing, including quantifying and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use including the effects on climate change. To put the estimated GHG emissions for this lease sale in a relatable context, potential emissions that could result from development of the nominated lease parcels are compared with other common activities that generate GHG emissions and with emissions at the state and national level. To the extent that GHGs can influence changes in climates across various scales, the analysis and the associated Specialist Report on GHGs has analyzed and disclosed those relationships. As detailed in the Specialists Report on GHGs, which BLM incorporated by reference, the BLM also looked at other tools to inform its analysis, including the MAGICC model (see Section 9.0 of the Specialists Report).</p>

<p>The BLM must adequately address the impacts of methane waste from these sales both individually and collectively, and identify pathways to mitigate both the emission of methane and its impacts</p>	<p>The BLM analyzes potential impacts from climate change and GHG in detail in section 2.2.2 of the supplemental analyses December 2023. The BLM quantifies direct, indirect, and cumulative emissions from the combustion of oil and gas and discusses the significance of these emissions. The BLM reviewed environmental impacts of leasing, including quantifying, and forecasting aggregate GHG emissions from oil and gas development and addressing the environmental effects of downstream oil and gas use including the effects on climate change. The analysis in section 2.2.2 discusses mitigation strategies designed to reduce methane and GHGs. The EAs incorporate by reference information from the 2022 BLM Air Resources Technical Report for Oil and Gas Development in New Mexico, Oklahoma, Texas and Kansas.</p> <p>NEPA allows agencies to prepare an EA “on any action at any time in order to assist agency planning and decision-making” (43 C.F.R. § 1501.3; see also 43 C.F.R. § 1508.9 [defining “environmental assessment”]). An agency need not prepare an EIS if it determines the action will not have significant effect on the human environment or where such effects may be mitigated by adoption of appropriate measures. The level of environmental analysis conducted by the BLM is consistent with the purpose and requirements of NEPA.</p>
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