DEQ
Montana Department of Environmental Quality

Air, Energy & Mining Division

Westmoreland Rosebud Mining, LLC

SURFACE MINING PERMIT C1984003B

ROSEBUD AREA B

AMENDMENT 5

COLSTRIP, MT

January 28, 2026

Final Supplemental Environmental Assessment

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ACRONYMS

AM5	Amendment 5, Proposed Lee Coulee Expansion of the Rosebud Mine
AR	Assessment Report
ARM	Administrative Rules of Montana
BLM	Bureau of Land Management
CH_4	Methane
CO_2	Carbon Dioxide
DEQ	Montana Department of Environmental Quality
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESGC	United States Environmental Protection Agency Simplified Greenhouse Gas Calculator
FEIS	Final Environmental Impact Statement
FLIGHT	Facility Level Information on Greenhouse Gases Tool
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use, Land-Use Change, and Forestry
MAGICC	Methods for Attributing Climate Impacts of GHG Emissions
MCA	Montana Code Annotated
MEPA	Montana Environmental Policy Act
N_2O	Nitrous Oxide
RCP	Representative Concentration Pathway
SIT	State Inventory Tool

PROJECT OVERVIEW

COMPANY NAME:	Westmoreland Rosebud Mining, LLC
Supplemental EA DATE:	October 16, 2025
PROJECT:	Rosebud Area B
PERMIT/LICENSE:	C1984003B
AMENDMENT #:	AM5

Location

Latitude, Longitude: -106.70436 W; 45.84759 N County: Rosebud

SURFACE OWNERSHIP: FEDERAL ☐ STATE ☒ PRIVATE ☒

MINERAL OWNERSHIP: FEDERAL ☒ STATE ☒ PRIVATE ☒

Compliance with the Montana Environmental Policy Act

Under the Montana Environmental Policy Act (MEPA), Montana agencies are required to prepare an environmental review for state actions that may have an impact on the Montana environment. The proposed action is considered to be a state action that may have an impact on the Montana environment and, therefore, the Department of Environmental Quality (DEQ) must prepare an environmental review. This Supplemental Environmental Assessment (Supplemental EA) adds to the Final Environmental Impact Statement (FEIS) for Rosebud Mine Area B AM5 issued May 9, 2022, and will examine the proposed action and alternatives to the proposed action and disclose potential impacts that may result from the proposed and alternative actions. DEQ will determine the need for additional environmental review based on consideration of the criteria set forth in Administrative Rules of Montana (ARM) 17.4.608. DEQ may not withhold, deny, or impose conditions on the permit based on the information contained in this Supplemental EA § 75-1-201(4), Montana Code Annotated (MCA).

Purpose and Need

DEQ's purpose and need in conducting this environmental review is to act upon Westmoreland Rosebud Mining, LLC's application for a permit to conduct coal mining and reclamation in compliance with the Montana Strip and Underground Mine Act.

On September 16, 2025, a voluntary remand without vacatur was granted by the Montana Sixteenth Judicial Court, Rosebud County, MT, ordering DEQ to publish a supplemental climate analysis for the purpose of notifying the public and providing the opportunity for public comment. GHGs are the primary drivers of anthropogenic climate change, and emissions of GHGs are used as an indicator of potential climate change impacts (United States Environmental Protection Agency, 2025c). This Supplemental EA is disclosing the impacts of the potential GHG emissions from the proposed action.

Date	Event
February 17, 2017	Application for Area B AM5 (C1984003B) is received by DEQ.
May 24, 2017	DEQ determines that Application C1984003B (Permit Area B AM5) is complete and that an EIS is needed.
May 9, 2022	DEQ completes the Final Environmental Impact Statement and makes it available to the public.
May 27, 2022	DEQ approves the Area B AM5.
July 26, 2025	Montana Environmental Information Center and Sierra Club filed a complaint for declaratory relief (case no. DV 22-25) with the Montana Sixteenth Judicial Court, Rosebud County, MT, alleging DEQ violated MEPA and its implementing regulations by failing to rationally evaluate the direct, secondary, and cumulative effects of AM5.
September 16, 2025	Montana Sixteenth Judicial Court, Rosebud County, MT, orders on remand the preparation of a voluntary Supplemental EA assessing greenhouse gas emissions. The Court ordered the following voluntary remand schedule: • 30 days following this Court's remand, DEQ shall publish a draft of its supplemental climate analysis for purposes of notifying the public and providing opportunity for public comment; • 75 days following this Court's remand, the public comment period shall be closed; and • 135 days following the Court's remand, DEQ shall publish its final supplemental climate analysis.

Proposed Action

Western Energy, now Westmoreland Rosebud Mining LLC (Westmoreland Rosebud), a subsidiary of Westmoreland Mining, LLC (Westmoreland), submitted an application to the Montana Department of Environmental Quality (DEQ) on February 17, 2017, for a proposed fifth amendment (AM5) to the operating permit (C1984003B) for Area B at the Rosebud Mine, an existing surface coal mine near Colstrip, Montana. DEQ deemed the AM5 Application complete on February 24, 2021, and approved, in part, the AM5 Application in May of 2022. AM5 would increase the Area B permit area by 9,108 acres, making the total Area B acreage 15,153 acres. These 15,153 acres, also known as Area B, are hereafter referred to as the Project area in this document. The Project also includes an updated Area B operations plan and an updated reclamation plan that would add mine passes and areas of reclamation,

respectively. In total, the Proposed Action would add 5,478 acres of mineable coal. In the FEIS (Department of Environmental Quality, 2022a), the proposed action is listed as Alternative 3 – Lee Coulee Only in Appendix E (Department of Environmental Quality, 2022b). Alternative 3 is summarized below in **Table 1**. Alternative 3 was the action approved with the issuance of AM5 to the mine permit in 2022.

Under the proposed action for AM5 (Alternative 3), Westmoreland Rosebud would extract an additional 42.9 million tons of coal from the Project Area (Department of Environmental Quality, 2022b). At Westmoreland Rosebud's proposed rate of production, the Project would extend active mining in the Area B permit area by about 6 years and the life of the entire Rosebud Mine complex by 4 years.

No Action Alternative

Under the No Action Alternative, AM5 would not be approved, and mining of the 5,478 acres included in the modification would not occur. There would be no greenhouse gas emissions from developing, operating, or reclaiming the AM5 portion of the Westmoreland Rosebud Mine, and no AM5-related emissions from hauling or otherwise transporting coal from that acreage at the Colstrip Power Plant. In other words, all mining- and transportation-related GHG emissions associated with AM5 would be avoided entirely under the No Action Alternative, because the coal would remain in place and no extraction or movement of that coal would occur.

If AM5 were not approved, however, coal from an alternative source would be provided to the Colstrip Power Plant by Westmoreland under its existing contract with the Colstrip Power Plant. The portion of Area B previously permitted, and not part of AM5, would continue to be mined at the Rosebud Mine, which was previously cited as approximately 19.4 million tons of recoverable coal (Department of Environmental Quality, 2022a). The Colstrip Power Plant is projected to operate until 2042 (NorthWestern Energy, 2026), and DEQ based the No Action Alternative on that published information. Thus, under the No Action Alternative, there would be no meaningful change to the greenhouse gas emissions from combustion at Colstrip, because coal from alternative sources (e.g. other previously permitted mine cuts at the Westmoreland Rosebud Mine) would still be available for combustion and total plant operations are expected to remain the same.

Some commenters assert that the No Action Alternative incorrectly assumes the Colstrip Power Plant would continue to operate and emit GHGs through the 2040s even if AM5 is not approved, arguing that remaining usable coal is principally located in Areas B and F and that Area F coal requires blending. DEQ, however, based its No Action Alternative on published information indicating that Colstrip Units 3 and 4 are expected to operate until approximately 2042, including NorthWestern Energy's 2026 Integrated Resource Plan and related public statements. Under that projection, and in light of Westmoreland's existing contractual obligation to supply coal from alternative sources if AM5 is not approved, it is reasonable to assume that plant-level combustion-related GHG emissions would continue on a similar trajectory with or without AM5, while the direct and indirect emissions associated with mining and transporting AM5 coal would be avoided under No Action.

Accordingly, the No Action Alternative would remove possible GHG emissions associated with mining and transporting AM5 coal from the cumulative emissions profile for the mine and related activities, but it would not be expected to result in a material change in regional or global combustion-related GHG emissions, because Colstrip's projected operating life and fuel demand remain unchanged.

In response to commenters' suggestion that AM5 not be approved, DEQ notes that its decision on whether to issue, deny, or condition a permit is governed by the substantive standards in the Montana Strip and Underground Mine Reclamation Act (MSUMRA) and its implementing rules, not by MEPA. Under MSUMRA, once an application is found complete and the applicant has affirmatively demonstrated compliance with applicable performance and protection standards, DEQ is required to issue the permit rather than deny it based on preferences unrelated to those standards. Within that framework, this Supplemental EA's No Action Alternative is used to inform DEQ and the public about the greenhouse gas implications of not approving AM5; it does not itself create new legal grounds to deny a permit that otherwise satisfies MSUMRA's criteria.

Table 1. Proposed Action as presented in Table E-1 in the Final AM5 EIS (Department of Environmental Quality, 2022b)

Component	Proposed Action
Operations Plan	
Operational life of Area B1[1]	20 years from approval of AM5[2] (6 additional years beyond current Area B permit)
Operational life of the Rosebud Mine	4 additional years
Area B permit area	15,153 acres
Area B total disturbance area[3]	8,194 acres
Mining area	5,478 acres
AM5 disturbance only	2,658 acres of new Project-related disturbance within the Alternative 3 8,194-acre disturbance area
Coal recovery[4]	42.9 million tons (AM5)
Reclamation Plan	
Reclamation of haul roads	Within 2 years of cessation of mining (estimated to be 2044)
Delay of reclamation in existing Area B permit area	Up to 6 years later than currently permitted
Delay in reclamation of mine support facilities in other permit areas	Up to 4 years later than currently permitted

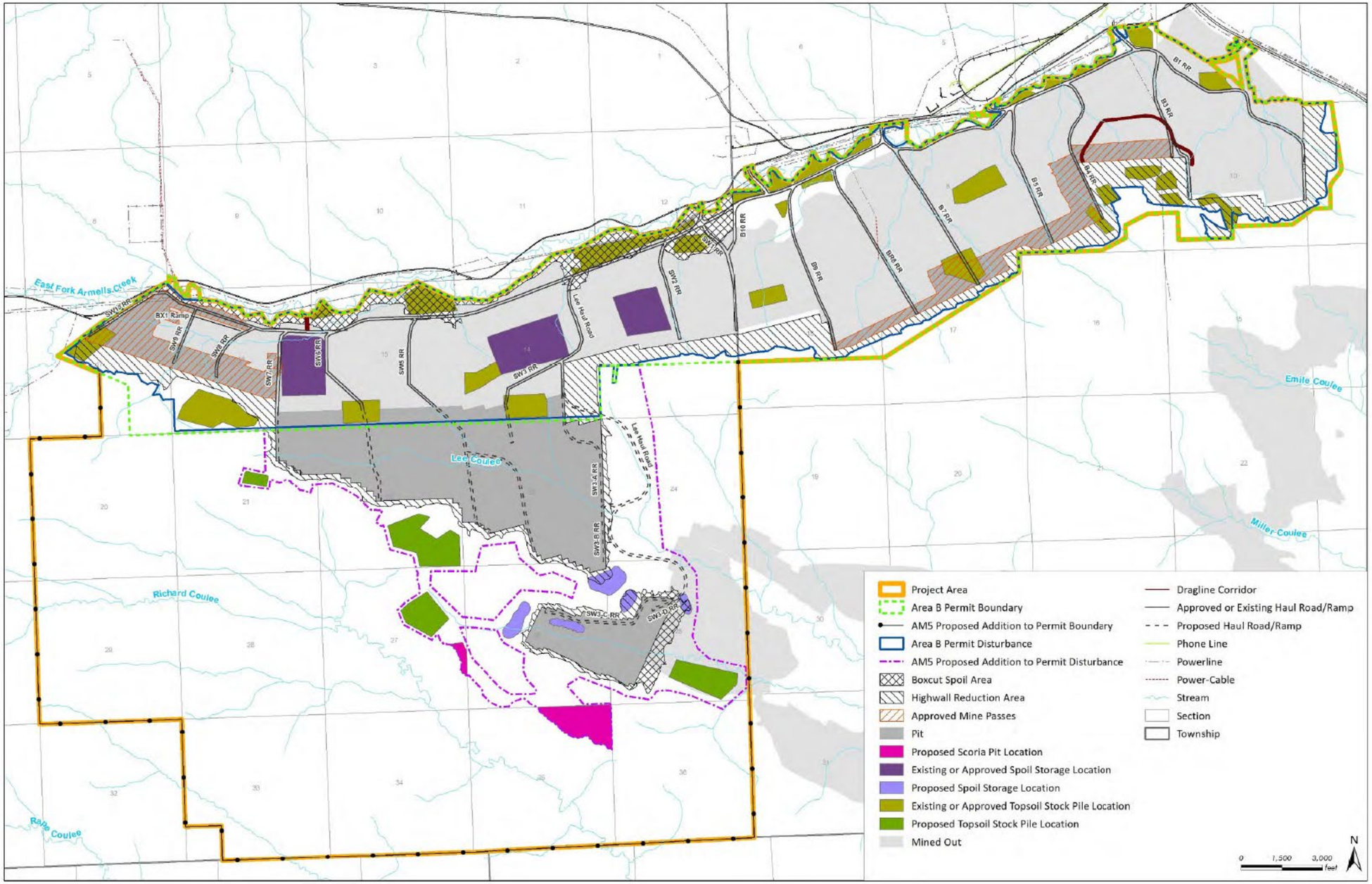
[1] Based on Table 303-2 from Westmoreland Rosebud's October 6, 2021 deficiency response.

[2] Table E-1 in the EIS lists 21 years, but the currently approved coal conservation plan lists 20 years of AM5 mined coal

[3] Based on Table 303-1 from Westmoreland Rosebud's October 6, 2021 deficiency response. Acreages are rounded to the nearest whole number.

[4] Based on Table 322-2 from Westmoreland Rosebud's October 6, 2021 deficiency response.

Figure 1: AM5 Alternative 3 project area as presented in the Final EIS Figure E-1 (Department of Environmental Quality, 2022b). AM5 pits are shown in dark grey.



SUMMARY AND SCOPE OF POTENTIAL IMPACTS

Direct, Secondary, and Cumulative Impacts

The impact analysis will identify and estimate whether the impacts are direct or secondary impacts. Direct impacts occur at the same time and place as the action that causes the impact. Secondary impacts are a further impact to Montana's environment that may be stimulated, or induced by, or otherwise result from a direct impact of the action (ARM 17.4.603(18)). MEPA excludes upstream, downstream, or other indirect actions that occur independently or are caused in part or exclusively by the proposed action per 75-1-220(10)(b)(i), MCA. Where impacts would occur, the impacts will be described.

Cumulative impacts are the collective impacts on Montana's environment within the borders of Montana of the Proposed Action when considered in conjunction with other past and present actions related to the Proposed Action by location and generic type. Related future actions must also be considered when these actions are under concurrent consideration by any state agency through pre-impact statement studies, separate impact statement evaluation, or permit processing procedures.

GHG Emission Impacts on Climate Systems and Intergovernmental Panel on Climate Change (IPCC) Climate Context

This Supplemental EA is limited to a GHG assessment and will assess how additional GHGs from AM5 may contribute to changes in climate systems. Climate is defined as the long-term weather patterns (typically over a period of 30 years or longer) of a region, and climate change is an identifiable (i.e., statistically significant) and persistent change in long-term climate (IPCC, 2021). Variables such as temperature, precipitation, relative humidity, and sea level are often used to identify climate change trends. In brief, climate change is governed by the relationship between incoming and outgoing heat in the Earth's atmosphere (Denning, June 21, 2017).

The greenhouse effect is the trapping of heat by GHGs, a specific set of gases including carbon dioxide (CO_2) that reflect this radiation emitted by the Earth back to the Earth's surface. While the greenhouse effect occurs naturally and is essential for keeping Earth's temperatures habitable, the intensity of this effect increases with the increase of the GHGs in the atmosphere. Higher concentrations of GHGs mean more infrared radiation gets absorbed and re-radiated back to the surface, leading to enhanced warming and higher global surface temperatures (Department of Environmental Quality, 2026b).

The lifetime of CO_2 cannot be represented with a single value because the gas is not destroyed over time. The gas instead moves between air, ocean, and land mediums with atmospheric carbon dioxide remaining in the atmosphere for thousands of years, due in part to the very slow process by which carbon is transferred to ocean sediments. Methane gas (CH_4) remains in the atmosphere for approximately 12 years. Nitrous oxide (N_2O) has the potential to remain in the atmosphere for about 109 years (United States Environmental Protection Agency, 2025c).

The IPCC's Sixth Assessment Report (Working Group I) finds that human influence on the climate system is "unequivocal" and that observed warming of about 1.1 °C above 1850–1900 is already driving widespread changes in the climate system, including more frequent and intense heat extremes, heavy precipitation, and some types of drought in many regions (IPCC, 2021). The IPCC 2021 Report also explains that human activity led to atmospheric warming of 1.07 ± 0.23 °C from 1850 to 2019 (IPCC, 2021).

The IPCC Working Group II report on impacts, adaptation and vulnerability concludes that climate change has already caused "substantial damages and increasingly irreversible losses" in terrestrial, freshwater, and marine ecosystems, and that risks increase rapidly as warming exceeds 1.5 °C (IPCC, 2022). The report further finds that limits to adaptation are being reached in some ecosystems and human systems, meaning that additional warming can lead to losses that cannot be fully avoided even with adaptation measures (IPCC, 2022). As noted by commenters, it also finds that climate impacts are distributed unevenly, with people and communities that are more exposed and vulnerable—including Indigenous peoples, rural communities, and those with limited resources—experiencing disproportionate risks (IPCC, 2022). Regional analyses, including Climate Change and Human Health in Montana (Adams, 2021) and the Montana Climate Assessment (Whitlock, 2017) conclude that increasing extreme heat, degraded air quality from more frequent and severe wildfires, and changes in runoff and water availability can contribute to premature mortality, hospitalizations, and long-term cardiopulmonary and mental-health outcomes.

The concept of a finite remaining global carbon budget is used in IPCC assessments to describe how much CO_2 can still be emitted while maintaining a given probability of limiting warming to a specified level. Recent analyses assessed in AR6 indicate that, for a 50 percent chance of limiting warming to 1.5 °C, the remaining carbon budget is a few hundred gigatons of CO_2—roughly equivalent to less than a decade of current global CO_2 emissions—subject to substantial scientific uncertainty (IPCC, 2021); (IPCC, 2018). Exceeding this budget increases the likelihood of crossing certain climate "tipping points" (such as large-scale ice-sheet loss or abrupt ecosystem change) and cascading impacts (IPCC, 2022). Though some commenters request that DEQ analyze GHG carbon budgets and tipping points, MEPA does not assign DEQ authority to set or enforce a specific global or Montana-specific "carbon budget share" for individual projects, and this Supplemental EA therefore evaluates AM5's emissions by disclosing their magnitude and duration, comparing them to Montana and regional emissions, and qualitatively describing how additional emissions fit within the already degraded climate context, rather than by determining whether the project alone is or is not consistent with international temperature-limit goals.

The impacts of climate change throughout the Northern Great Plains include changes in flooding and drought, rising temperatures, and the spread of invasive species (Bureau of Land Management (BLM), 2024). Regional assessments for the Northern Great Plains, including eastern Montana, project continued warming, increased evaporative demand, shifts in snowpack and runoff timing, and changes in the frequency and severity of drought, with consequences for surface water and groundwater availability, water quality, agriculture, rangelands, and ecosystems. (Derner, 2015) (Knapp, 2023) (Whitlock, 2017). These regional projections are consistent with concerns raised in public comments regarding hydrology and water quality impacts in Montana.

GHGs are the primary drivers of anthropogenic climate change, and emissions of GHGs are used as an indicator of potential climate change impacts. Climate change can be attributed to both natural and anthropogenic causes but has been largely driven by the significant increase in global GHG emissions from anthropogenic fossil fuel combustion since pre-industrial times (Department of Environmental Quality, 2026d).

Scope of Supplemental Environmental Assessment

This Supplemental EA analyzes the direct, secondary and cumulative impacts of GHG emissions from the proposed action. Consideration of GHG emissions and corresponding climate impacts had previously been prohibited in environmental reviews since 2011 by a provision of MEPA (known as the MEPA Limitation). The MEPA Limitation was amended by the state legislature in 2023 to more explicitly prohibit "an evaluation of greenhouse gas emissions and corresponding impacts to the climate in the state or beyond the state's borders."

In December 2024, the Montana Supreme Court in *Held v. State of Montana,* 2024 MT 312, ruled that the prior prohibition violates Montanans' constitutional right to a clean and healthful environment. In January 2025, *MEIC v. DEQ,* 2025 MT 3, further held that in the absence of a prohibition on DEQ considering GHG emissions under MEPA, it would be arbitrary and capricious for the agency to not consider GHG impacts from a generating station expected to emit a large amount of GHG emissions. The 2025 Montana Legislature responded by passing Senate Bill 221 (SB221), signed into law on May 1, 2025, which requires state agencies to evaluate GHG impacts for fossil fuel projects while limiting analysis to proximate impacts (i.e., close in time and place) on Montana's environment. SB221 language embodies the legal standard long governing MEPA, which does not require agencies to analyze remote and speculative impacts that are not closely tied to the state action that is being approved.

Per 75-1-201(2), MCA, agencies are required to conduct a GHG impact analysis for fossil fuel activities. Fossil fuel activities, defined in § 75-1-220, MCA, as amended by SB221, means a proposed action that authorizes the mining of coal, drilling for oil or natural gas, production of oil or natural gas, compression of oil or natural gas, or burning of coal, oil, or natural gas to generate energy for electricity. Pursuant to SB 221, in January 2026 the Department of Environmental Quality released final guidance for state agencies conducting GHG analyses, titled *Guidance for Greenhouse Gas Impact Assessments Under the Montana Environmental Policy Act* ("GHG Guidance Document") (Department of Environmental Quality, 2026a). The GHG Guidance Document provides a summary of current methods and data sources for evaluating GHG emissions and their immediate and far-reaching impacts, and it is referenced throughout this Supplemental EA as a key resource for structuring the GHG assessment.

Generally, for purposes of DEQ's MEPA review, as recognized in SB221, ARM 17.4.603(18), and Montana and U.S. Supreme Court precedent, *see, e.g., MEIC v. DEQ,* 2025 MT 3, ¶ 51; *Seven County Infrastructure v. Eagle Cnty.*, 145 S. Ct. 1497 (2025), the scope of impacts DEQ must analyze are limited to those that are caused by the specific project or approval, and do not incorporate separate, downstream impacts caused by different projects, even if those projects may be stimulated or induced by the project or

approval before the agency. Accordingly, here, impacts from GHG emissions, as with any impact, is appropriately limited to the mining of coal. Important policy considerations underpin the typical scope of an analysis, as these separate upstream or downstream projects may not necessarily fall under the purview of the agency, leading to speculative analyses, particularly when it is unknown if such separate projects have or will be approved. Further, because separate projects may be subject to their own accounting of emissions, it can lead to double counting of GHGs, rendering any analyses of emissions inaccurate, redundant, or overbroad.

For purposes of this limited voluntary remand, DEQ has decided to consider GHG emissions from not only mining of coal, the only project or proposal that's before the agency, but also from transportation and combustion. To address the comment that this Supplemental EA goes too far under MEPA in evaluating up- and down-stream coal mining impacts, DEQ recognizes it may not be legally required to assess the separate permitting actions of transportation and combustion, but has nevertheless elected to do so because this is a mine mouth coal plant (i.e., a generating station built adjacent to the coal mine supplying its fuel) and there is substantial public interest in understanding the impacts of coal mining and combustion. Furthermore, because DEQ regulates the air quality permit associated with the combustion of this coal and seeks to capture the principal emissions sources from the larger project, DEQ has, in this unique remand context, chosen to evaluate transportation- and combustion-related GHG emissions in this Supplemental EA, even though neither SB 221 nor current MEPA and National Environmental Policy Act caselaw uniformly require agencies to extend their review that far for every permit decision. This tailored, issue-focused analysis should not be read as a concession that DEQ must, in all future permitting actions, broaden the scope of review to include downstream combustion and transportation impacts whenever coal or other fossil fuels are involved, but rather as a reasonable exercise of discretion in this specific proceeding.

Therefore, to clarify the scope of analysis, this Supplemental EA, consistent with MEPA, evaluates (1) direct GHG emissions from AM5, including on-site fuel use and other mine emissions and all secondary impacts felt therefrom, (2) emissions from mine-related activities, such as additional diesel consumption associated with mine operations and on-site combustion of AM5 coal, and (3) emissions of AM5 in combination with other past, present, and future actions, including combustion of coal at the Colstrip Power Plant, that affect overall GHG emissions and climate conditions. Mine-wide GHG emissions and the maximum amount of diesel combusted at Rosebud are included to ensure that DEQ and the public have comprehensive understanding of all emission sources and environmental impacts that are related to the AM5 expansion.

Greenhouse Gas Assessment

Affected Environment, Analysis Area and Methods

For the purpose of this analysis, DEQ has defined greenhouse gas emissions as the following gas species: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and many species of fluorinated compounds. The range of fluorinated compounds includes numerous chemicals which are used in many household and industrial products. Water vapor is also technically a greenhouse gas, but its properties are

controlled by the temperature and pressure within the atmosphere, and it is not considered an anthropogenic species.

The affected environment describes the existing conditions of the GHG emissions in the state of Montana. DEQ has determined the GHG emissions are not a localized impact and have chosen to include an analysis of Montana's GHG emissions. The assessment area for GHG emissions is focused on the activities regulated by the issuance of the coal permit, including construction, operation and reclamation (i.e., mining) of the area encompassed by the request to expand mining operations within and outside of the current Rosebud Area B permit. Also included in the direct impacts are fugitive emissions from exposed coal. DEQ has determined EPA's Scope 1 GHG impacts as defined in the Inventory Guidance for Greenhouse Gas Emissions are appropriate direct impacts under MEPA for this Proposed Action. Scope 1 emissions are defined as direct GHG emissions that occur from sources that are controlled or owned by the organization (United States Environmental Protection Agency, 2025b). The secondary impacts are those impacts felt later in time and space but caused by the same action being approved: here, the actual mining of coal and not the transportation or combustion. The combustion of AM5 coal at the Colstrip Power Plant, however, has been identified as a secondary impact for purposes of this analysis for the reasons described above. Cumulative impacts, for purposes of this analysis, include the direct impacts of AM5 (construction, operation, and reclamation), the combustion of AM5 coal at the Colstrip Power Plant, and the existing GHGs output of the state of Montana in 2022.

DEQ used the EPA Simplified GHG Calculator (ESGC) September 2024 version (United States Environmental Protection Agency, 2025) for the assessment of GHG emissions. DEQ has calculated GHG emissions using the ESGC September 2024 version for the purpose of totaling GHG emissions. This tool totals carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) and reports the total as CO_2 equivalent (CO_2e) in metric tons CO_2e. The calculations in this tool are widely accepted to represent reliable calculation approaches.

DEQ used the MAGICC reduced-complexity climate model and RCP/SSP scenarios as a contextual, order-of-magnitude illustration of the relationship between additional emissions and global temperature, not to precisely attribute a specific temperature change to AM5. (Department of Environmental Quality, 2026b). (See the *Secondary and Cumulative Impacts* section for additional explanation of MAGICC modeling). Global-scale scenarios are not designed to assign exact temperature contributions to individual projects, and any single project will appear small when compared directly to global totals. The significance of AM5's emissions is therefore evaluated primarily based on total lifecycle emissions, comparison to Montana and facility-scale emissions, and qualitative assessment of climate impacts in Montana and the Northern Great Plains, with MAGICC outputs used only as supporting context.

Although commenters request that DEQ use social cost of greenhouse gases (SC-GHG) assumptions in analyzing the economic consequences of the Proposed Action, this Supplemental EA does not monetize greenhouse gas emissions using SC-GHG values. As explained more fully in the GHG Guidance Document, Appendix 4, MEPA does not require quantitative economic forecasts of environmental impacts, and current SC-GHG estimates are global, assumption-dependent values that are highly

sensitive to modeling and discount-rate choices and are not specific to Montana or this project. (Department of Environmental Quality, 2026c); (Interagency Working Group, 2021). Discount rates are the annual percentage rates used in economic analysis to calculate the present value of future costs and benefits. In SC-GHG calculations, discount rates determine how much weight is given to climate damages occurring decades in the future compared to immediate costs. (Department of Environmental Quality, 2026c). And, "[w]hile predicting the magnitude of climate damages is fraught with uncertainty, climate damage estimates become even more speculative above 3–4 ◦C." (Howard, 2017). Existing climate damage studies are few, inconsistent, and very sensitive to the methods used, so any SC-GHG number based on their work is too uncertain and high-level to be treated as a precise dollar estimate. (Howard, 2017).

MEPA commenters have historically pointed to federal use of SC-GHG metrics, but those values are developed for broad national regulatory analyses and do not assign Montana-specific or project-specific damages. The limitations and uncertainties associated with a SC-GHG valuation is detailed by the Environmental Protection Agency in its 2022 *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*. (United States Environmental Protection Agency, 2022). Further, as noted by the New York State Energy Research and Development Authority, working with Resources for the Future, there are multiple ways to place a dollar value on GHG emissions—such as the SC-GHG and marginal abatement cost curves— explicitly treating these as alternative options rather than prescribing any single required method, underscoring that there is no one accepted approach for valuing GHG emissions. (New York State Energy Research and Development Authority (NYSERDA) and Resources for the Future (RFF), 2020 (Rev. 2021)). Because MEPA does not single out SC-GHG or any other monetary tool as required, DEQ has, for this project-level review, determined that quantifying AM5's emissions in physical units (metric tons of CO_2e), comparing those emissions to Montana and facility-scale inventories, and qualitatively evaluating their implications for climate risks in Montana and the Northern Great Plains provides an appropriate and objective basis for assessing the significance of potential impacts.

Cumulative Impact Considerations

Cumulative impacts are defined as collective impacts on Montana's environment from the Proposed Action when considered in conjunction with other past and present actions related to the Proposed Action by location or generic type. GHG emissions sources and trends occur at global, national, and state, and regional scales (Office of Surface Mining Reclamation and Enforcement (OSMRE), 2025). The cumulative impact section of this Supplemental EA focuses on the Montana environment. **Table 2** and **Table 3** identify the past and present cumulative activities of this analysis area.

The EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT) provides GHG emissions data from facilities that emit more than 25,000 metric tons of CO_2e per year (EPA 2024b). This tool includes public information from facilities in nine industry groups that directly emit more than 25,000 metric tons of CO_2e per year as well as suppliers of certain fossil fuels, reported under the EPA's Greenhouse Gas Reporting Program. FLIGHT can provide baseline facility-level GHG emissions data to identify and quantify emissions from existing and past industrial sources within Montana (**Table 2**) (Department of Environmental Quality, 2026d).

Table 2. FLIGHT GHG emissions (metric tons CO2e) from 2019-2023 for large facilities located in Montana.

	Emissions (metric tons of CO_2e)				
Facility Name	**2019**	**2020**	**2021**	**2022**	**2023**
Colstrip	14,277,559	8,340,434	10,035,340	10,740,663	10,967,111
Phillips 66 Billings Refinery	966,133	940,006	976,787	834,083	967,045
CHS Inc Laurel Refinery	979,598	976,385	934,398	1,013,794	918,021
Yellowstone Energy Limited Partnership	852,198	871,923	804,628	791,799	830,005
Par Montana, LLC Billings Refinery	726,587	661,227	712,571	621,037	719,769
Hardin Generating Station	212,250	73,621	692,184	730,172	663,072
Colstrip Energy Ltd Partnership	380,050	373,440	491,021	439,647	474,565
Calumet Montana Refining, LLC	311,235	299,723	283,600	260,293	427,371
Dave Gates Generating Station	153,664	126,595	174,370	254,471	330,090
Ash Grove Cement Company – Montana City	301,601	320,046	316,495	342,055	323,958
Graymont Western U.S. Inc. Indian Creek	322,197	304,550	320,028	318,796	276,271
Trident	277,001	251,350	305,309	299,006	250,489
Billings City Landfill	112,979	117,906	132,607	137,524	143,249
Culbertson Station	66,168	25,841	51,892	82,391	137,957
Western Sugar Cooperative	109,378	104,364	117,000	113,595	122,996
Montana Waste Systems - Highplains Sanitary Landfill	73,539	78,011	80,756	83,945	85,786
Basin Creek Plant	76,921	28,344	59,476	69,263	55,610
Gallatin County Logan Landfill	42,027	45,078	47,120	51,204	55,531
Weyerhaeuser Nr-Columbia Falls	35,995	33,020	35,530	36,382	40,706
Rec Silicon	33,499	31,006	32,620	32,753	35,245

Table 2. FLIGHT GHG emissions (metric tons CO2e) from 2019-2023 for large facilities located in Montana.

	Emissions (metric tons of CO_2e)				
Facility Name	**2019**	**2020**	**2021**	**2022**	**2023**
Lewis & Clark County Landfill	29,810	31,113	32,419	33,857	34,916
Malteurop North America Inc	31	27,301	30,481	29,063	29,063
Cabin Creek Compressor Station	29,901	22,471	28,283	23,967	28,933
Missoula Landfill	28,316	30,692	18,347	22,770	27,790
Northwestern Energy/GTS	25,356	25,210	25,524	26,051	26,289
Hiland Partners Bakken Gathering Plant	22,545	18,263	-	27,967	26,275
Crusoe Energy Systems - Kraken CDP	-	-	-	35,923	22,915
Lewis & Clark	352,646	317,241	90,127	882	10,054
Northwestern Energy, SD LDC	7,164	7,155	7,191	7,211	7,329
Northwestern Energy NE LDC	4,121	4,071	4,050	3,827	3,835
Sidney Sugars Incorporated	96,553	126,731	109,977	110,570	2,690
Total	**20,907,022**	**14,613,118**	**16,950,131**	**17,539,038**	**18,022,021**

Source: (Department of Environmental Quality, 2026d)

DEQ has decided to use the U.S. Environmental Protection Agency State Inventory Tool (SIT) to provide a sector-based statewide GHG emissions inventory. The EPA SIT is an interactive spreadsheet model designed to help states develop and update inventories of GHG emissions and sinks (EPA 2025). The EPA SIT provides default data for each state for the most recent years of available data but allows for state-specific customizations in the modules. It enables users to estimate emissions in 11 industry-level modules (Agriculture; CO_2 from Fossil Fuels; Coal; Electricity Consumption; Industrial Processes; Land Use, Land-Use Change, and Forestry (LULUCF); Mobile Combustion; Natural Gas and Oil; Solid Waste; Stationary Combustion; and Wastewater). The methodologies and sectors accounted for in the EPA SIT align with those in the U.S. GHG Inventory and use emission factors from the Inventory of U.S. Greenhouse Gas Emissions and Sinks (EPA 2024a). SIT (updated January 2025) has default emissions data updated through 2022. DEQ updated Montana's statewide GHG emissions using the EPA SIT with updated LULUCF, stationary combustion, and mobile combustion data (Department of Environmental Quality, 2026d).

Table 3. Montana's statewide CO2e from the EPA SIT Tool.

Emissions (million metric tons of CO_2e)	2020	2021	2022	2020-2022 Average
Energy	28.66	30.81	31.94	30.47
CO_2 from Fossil Fuel Combustion	26.03	28.20	29.35	27.86
Stationary Combustion	0.17	0.19	0.22	0.19
Mobile Combustion	0.10	0.11	0.11	0.11
Coal Mining	0.42	0.44	0.43	0.43
Natural Gas and Oil Systems	1.93	1.87	1.83	1.88
Industrial Processes	1.41	1.42	1.42	1.42
Agriculture	11.55	10.95	10.00	10.84
Land Use, Land-Use Change, and Forestry	10.03	5.00	7.00	7.34
Waste	0.67	0.68	0.68	0.68
Municipal Solid Waste	0.57	0.58	0.58	0.58
Wastewater	0.10	0.10	0.10	0.10
Indirect CO_2 from Electricity Consumption	6.37	7.47	7.68	7.18
Gross Emissions	**52.32**	**48.87**	**51.04**	**50.74**

Note: Emissions from electricity consumption are not included in totals to avoid double counting with Fossil Fuel Combustion estimates. (Department of Environmental Quality, 2026d)

Other present cumulative impacts

Related future actions under cumulative impacts must also be considered when these actions are under concurrent consideration by any state agency through preimpact statement studies, separate impact statement evaluation, or permit processing procedures under MEPA. DEQ would consider projects within the scope of the related future actions that are not part of **Table 2** and **Table 3**, GHG emissions would be the natural gas generating plant proposed by NorthWestern Energy-Laurel Generating Station, now the Yellowstone County Generating Station under the Montana Air Quality Permit Application Number 5261-00 issued on September 8, 2021. The Yellowstone County Generating Station annual GHG emissions total from all engines at the facility would be approximately 695,195 metric tons of CO_2e (MT DEQ, 2025).

Direct Impacts:

The combustion of diesel fuel for the Proposed Action would release GHGs primarily being carbon dioxide (CO_2), nitrous oxide (N_2O) and much smaller concentrations of non-combusted fuel components including methane (CH_4) and other volatile organic compounds. For its analysis of direct impacts from GHGs at AM5, DEQ calculates potential GHG emissions and provides a narrative description of GHG

impacts rather than assess GHGs in quantitative economic terms. This approach is consistent with Montana Supreme Court precedent. *See Belk v. Mont. DEQ*, 2022 MT 38, ¶ 29.

The Proposed Action would authorize the use of various equipment and vehicles to mine and process coal and reclaim the site. Surface coal mines typically use large-scale equipment such as draglines, electric or hydraulic shovels, front-end loaders, haul trucks, bulldozers, and drilling and blasting equipment to remove overburden and extract coal efficiently. The expected duration of the project proposed in AM5 is approximately 22 years.

Reclamation timing for the permit area aligns with a 2-year window post mining required in ARM 17.24.501(6)(b) stating, "Backfilling and grading must be completed within two years after coal removal from each pit has been concluded. For the purpose of this provision, 'each pit' means any continuous dragline pass within a particular permit area." Historic annual fuel utilization was assigned entirely to the 2-years after mining has concluded to account for reclamation efforts.

The amount of diesel fuel utilized at this site may be impacted by several factors including seasonal weather impediments and equipment malfunctions. Some commenters ask how the maximum amount of fuel combusted at the site was determined. To ensure a comprehensive assessment, DEQ assumed the maximum amount of diesel combusted at the combined Rosebud mines from 2016 to 2021 to calculate an annual average amount (4,148,797 gallons/year) to assess the amount of greenhouse gas emissions resulting from mobile sources in the proposed AM5. The yearly fuel consumption includes associated transport of coal to transfer facilities for delivery to the Colstrip Power Plant. This methodology allowed for assignment of diesel gallons necessary per ton of coal extracted (0.544 gallons/ton). Total fuel consumption was provided by the applicant from 2016 through 2021 and compared against total coal produced throughout the entire Rosebud site to achieve an average rate of fuel consumed per ton of coal mined. This average rate was then applied to annual coal production to achieve an estimated fuel consumption and associated GHG emissions by year. To account for impacting factors, DEQ has calculated the range of emissions using a factor of +10% of the estimate calculated using the predicted diesel fuel usage for on-site equipment provided by the Applicant. The emissions from workers daily commute between the Rosebud Mine and their residences would be included into the range factor of +10% of the estimate calculated of on-site equipment. By assuming maximum fuel use, any additional GHG emissions from incidental use of gasoline or other vehicles during operation of the mine would be accounted for within the GHG emission assessment.

The exposing of the coal seam produces fugitive methane emissions, and some commenters asked DEQ to explain the science behind these fugitive emissions. In their 'U.S. Surface Mine Emissions Assessment', the EPA describes methane emissions from surface mine coal seams stating: 'The gas in coal and associated strata may be released during different stages in mining. Excavated coal will release methane as it is broken and removed from the highwall face, transported on site, and crushed and sized for transportation off-site"; therefore, GHG impacts during this stage of extraction are appropriately included in the direct impact analysis.' (United States Environmental Protection Agency, 2005). Fugitive methane emissions of all AM5 coal mined were included in the analysis utilizing a methane production rate of 33.1 standard cubic feet/ton (United States Environmental Protection Agency, 2005) and a methane density of 0.0477 lb/ft^3 (0.7168 kg/m^3) at standard temperature and pressure (The Engineering

Toolbox, 2025). The methane production rate of 33.1 cubic feet/ton was taken from the highest recommended gas content for the Rocky Mountains region; the same EPA publication suggests sub-bituminous Montana and Wyoming coal may be closer to 20 cubic feet/ton (United States Environmental Protection Agency, 2005). All coal produced in the AM5 permit area was calculated to produce 0.0188 CO2e/short ton. Emission values from this direct impact could be variable, though DEQ is utilizing a conservative assumption to ensure potential environmental impacts are not underestimated.

Blasting emissions were calculated into the overall carbon dioxide equivalent (CO_2e) with nitrous oxide (N_2O) being the primary fugitive gas impacting calculations. Explosives used in the permit area are assumed to align with products used at neighboring permit sites within Rosebud properties. An EPA publication for explosive emission factors was used in analyzing overall blasting impacts within the permit areas (United States Environmental Protection Agency, 2025a). Powder factors utilized in calculations for coal and overburden were provided by Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud, 2025).

Operation of diesel/gasoline-fueled vehicles throughout the life of the proposed project would produce exhaust fumes containing GHGs. Using data provided by Westmoreland Rosebud Mining, LLC (Westmoreland Rosebud, 2025), DEQ estimates that approximately 0.544 gallons of fuel would be utilized per short ton of coal mined. To account for variability, DEQ has calculated the range of emissions using a factor of +10% of the baseline estimate. Using the ESGC mobile sources, approximately 1.733 metric tons (1,733 kilograms) of CO_2e would be produced per short ton of coal mined.

Commenters have requested that DEQ explain how it arrived at the annual tonnage projection for years 11-20. Total AM5 coal was assigned based on Table E-1 'Comparison of Action Alternative Components' reported in Appendix E of the original EIS, which lists AM5 coal recovery at 42.9M tons for 'Alternative 3 – Lee Coulee Only'. The annual production values for the calculations utilized reported values listed in Table E-2 'Alternative 3 – Estimated Annual Production in Area B (as Modified by AM5) by Year and Acres Disturbed.' This was compared to the currently approved mine plan within the permit which reports all coal within Area B being mined from AM5 after year 10. To account for the blend of AM5 coal with non-AM5 coal, the total coal production in years 1-10 were reduced to 4.2M tons (the difference of 42.9M tons total less 38.7M tons of AM5 coal mined in years 11-20).

Table 4 provides a summary of direct impacts and CO_2e associated with each year of AM5 coal production and reclamation for the entire duration of the Proposed Action. The estimates in **Table 4** are based on Table E-2, Alternative 3 – Estimated Annual Production in Area B (as Modified by AM5) by Year and Acres Disturbed listed in the Final Environmental Impact Statement (Department of Environmental Quality, 2022b). Table E-2 includes production tons for AM5 and the remaining tons in the Area B permit; years 1 through 10 of active mining were adjusted to remove production values not specific to AM5. All coal produced from Area B after year 10 is identified in Westmoreland's life of mine timetable to be only from the AM5 permit area (Westmoreland Rosebud Mining, 2023).

Table 4. Summary of direct impacts of CO2e for each year of AM5 coal production and reclamation.

Year of Active Mining	Coal Production (short tons/year)	Greenhouse Gas Emissions (metric tons/year) (CO_2e)				
		Mining Production	Reclamation	Exposed Coal	Blasting	Total Emissions (metric tons/year) (CO_2e)
1	367,928	2,310	0	6,913	2,064	11,287
2	379,648	2,384	0	7,133	2,130	11,647
3	818,616	5,140	0	15,380	4,593	25,113
4	272,872	1,713	0	5,127	1,531	8,371
5	355,920	2,235	0	6,687	1,997	10,919
6	272,872	1,713	0	5,127	1,531	8,371
7	261,008	1,639	0	4,904	1,464	8,007
8	320,328	2,011	0	6,018	1,797	9,826
9	605,064	3,799	0	11,368	3,394	18,561
10	545,744	3,427	0	10,254	3,062	16,743
11	4,500,000	28,256	0	84,547	25,245	138,048
12	3,200,000	20,093	0	60,122	17,952	98,167
13	4,400,000	27,628	0	82,668	24,684	134,980
14	2,200,000	13,814	0	41,334	12,342	67,490
15	3,500,000	21,977	0	65,759	19,635	107,371
16	4,200,000	26,372	0	78,910	23,562	128,844
17	3,500,000	21,977	0	65,759	19,635	107,371
18	6,600,000	41,441	0	124,002	37,027	202,470
19	3,900,000	24,488	0	73,274	21,879	119,641
20	2,700,000	16,953	0	50,728	15,147	82,828
21	0	0	47,863	0	0	47,863
22	0	0	47,863	0	0	47,863

As depicted in **Table 3,** Montana's statewide Coal Mining contributes about 430,000 metric tons of CO_2e year. While the Proposed Action's direct impacts from coal mining would contribute a low of 8,317

metric tons of CO2e to a high of 202,470 metric tons of CO_2e (**Table 4**). Coal production numbers fluctuate and would contribute differently each year.

Because the effects of GHG emissions—warming temperatures and accompanying environmental consequences—are necessarily felt later in time and even, potentially, in a different location, there are no direct impacts expected with the release of GHG emissions. When GHGs are emitted by the Proposed Action, they become well-mixed globally due to their long lifetimes in the atmosphere (i.e., tens of years for methane to thousands of years for carbon dioxide) and atmospheric mixing, primarily driven by differential heating and synoptic-scale weather patterns, which distribute the gases throughout the planet, leading to a relatively uniform concentration of these gases across the globe. These factors could contribute to an overall negligible increase of greenhouse gas concentrations in the global atmosphere, not local airsheds, causing a marginal global greenhouse effect. Localized industrial source GHG emissions do not have a direct impact on climate, public health and associated impacts to the affected human environment on a local scale.

Secondary and Cumulative Impacts:

Secondary impacts mean a further impact to the Montana environment that may be stimulated or induced by or otherwise result from a direct impact of the Proposed Action under MEPA. All coal produced each year of active mining is assumed to be combusted at the at the Colstrip Power Plant. As described above, for purposes of this remand, DEQ is including the combustion of the coal from the Proposed Action at the Colstrip Power Plant as a secondary impact; emissions for each year are quantified by CO_2e metric tons in **Table 5**.

Table 5. Secondary impacts of the combustion of coal at the Colstrip Power Plant of the Proposed Action mined coal.

Year of Active Mining	Coal Production (short tons/year)	Greenhouse Gas Emissions (metric tons/year) (CO2e)
		Total Combustion of Proposed Action Coal at Colstrip Power Plant
1	367,928	625,478
2	379,648	645,402
3	818,616	1,391,647
4	272,872	463,882
5	355,920	605,064
6	272,872	463,882
7	261,008	443,714
8	320,328	544,558
9	605,064	1,028,609
10	545,744	927,765
11	4,500,000	7,650,000
12	3,200,000	5,440,000
13	4,400,000	7,480,000
14	2,200,000	3,740,000
15	3,500,000	5,950,000
16	4,200,000	7,140,000
17	3,500,000	5,950,000
18	6,600,000	11,220,000
19	3,900,000	6,630,000
20	2,700,000	4,590,000

GHG emissions contribute to changes in atmospheric radiative forcing, resulting in climate change impacts. 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 (Bureau of Land Management (BLM), 2024).

A tool used to assist in the analysis of secondary climate impacts from project-level emissions is the Methods for Attributing Climate Impacts of GHG Emissions (MAGICC) (Climate Resource, 2022) model to calculate the secondary impacts of GHGs. The MAGICC model is a peer-reviewed reduced-complexity model created to integrate various climate system interactions, including the carbon cycle, climate feedback loops, and radiative forcing to simulate the effects of changing GHG emissions on atmospheric composition, radiative forcing, and global mean temperature change (Meinshausen, Raper, & Wigley, 2011). MAGICC is particularly advantageous because it emulates the complex and computationally intensive climate models efficiently (Department of Environmental Quality, 2026d).

Commenters suggest that the MAGICC model is flawed in evaluating project-specific impacts from GHGs and have requested DEQ to elaborate on how it relied on MAGICC modeling in its analysis. DEQ disagrees that the model is unreliable, but DEQ presents further explanation of its usage. MAGICC uses representative concentration pathways (RCPs) to emulate future scenarios with varying degrees of GHG emission mitigation that result in predicted future changes in radiative forcing in terms of watts per square meter (W/m^2). For example, RCP2.6 is representative of a sustainable GHG mitigation scenario that results in a radiative forcing increase of 2.6 W/m^2 between the years 1750 and 2100. In contrast, RCP8.5 is representative of a high GHG emission scenario that results in a radiative forcing increase of 8.5 W/m^2 between the years 1750 and 2100. For this analysis, DEQ chose to evaluate secondary impacts using both the RCP2.6 and RCP8.5 pathways because these scenarios span a range from high to low GHG emission mitigation, respectively. Importantly, testing two scenarios with significantly different GHG mitigation ensures that the nonlinear nature of induced climate impacts is conservatively estimated. In other words, the variable atmospheric concentration of GHGs over time affects the magnitude of impacts from a new source of emissions, as does the timing of the release of new GHG emissions from the proposed source. For example, the impacts of a GHG emission source are often greater in a sustainable (high mitigation) scenario such as RCP2.6 because the scenario assumes that global GHG emission rates decrease over time to a greater degree than most higher emission scenarios. The proposed source of emissions is therefore more impactful because it may represent an increasingly greater share of global emissions.

To estimate future surface temperature change resulting from the Proposed Action's emissions, DEQ ran the MAGICC model for each RCP using both unmodified (base) emission scenarios and modified emission scenarios with the Proposed Action's emissions subtracted. By comparing the results of the base and modified scenarios, it's possible to estimate an order of magnitude change in surface temperature that is attributable to the Proposed Action's emissions. This modeled temperature increment is used as contextual information to illustrate scale and is not the sole or determinative measure of significance; this Supplemental EA evaluates significance based on projected temperature change, total lifecycle emissions, comparison to Montana and facility-level emissions, and qualitative assessment of climate risks in Montana and the Northern Great Plains.

First, the total CO_2e emissions in **Table 4** and **Table 5** were summed by year and subtracted from the RCP2.6 and RCP8.5 base scenarios. DEQ determined emissions from mining and reclamation (**Table 4**) would be so low relative to emissions from the combustion of the coal (**Table 5**) that it was decided to

combine these emission sources rather than evaluate their secondary impacts separately with the MAGICC model. It was assumed that the 20 years of active mining and 2 years of reclamation emissions correspond to the years 2022 to 2043. The emission input files for the online version of MAGICC contain global GHG emissions by GHG species for every decade rather than every year between 2020 and 2100, so the CO_2e emissions in were temporally allocated using a forward-looking 10-year average. For example, the Proposed Action's emissions for 2020 to 2029 were averaged and assumed to be representative of the 2020 emission anchor point in the model.

After the temporally allocated emissions were subtracted from the base scenarios, the model was run using probabilistic mode with the modified RCP2.6 and RCP8.5 emission input files. Running the model in probabilistic mode iterates the model run more than 100 times with slightly different internal parameters, resulting in a distribution of results. The default model output provides the predicted surface temperature increase above the 1850 to 1900 baseline period for every year between 1995 and 2100, and the annual temperature value produced is equal to the median value of the results distribution for that year. The base RCP2.6 and RCP8.5 scenarios (i.e., no emissions subtracted) were also run using probabilistic mode.

For each RCP scenario, the surface temperature results by year in the modified emission scenario were subsequently subtracted from the base emission scenario results, resulting in the increase above baseline future temperature change (ΔT) that can be attributed to the Proposed Action (**Table 6**). The final results for mid-century (2050), end-of-century (2100), and maximum impacts are displayed, indicating that the Proposed Action may result in maximum warming up to 0.00004 °C, or 0.000072 °F. This maximum ΔT value corresponds to the year(s) in each scenario when the difference between the base and modified emission scenarios is expected to be greatest (i.e., when the Proposed Action's emissions have the greatest impact). Due to the extremely marginal differences between base and modified emission scenarios and the probabilistic nature of the results, the maximum ΔT value may occur multiple times over a range of years. Thus, results indicate that the maximum ΔT value may occur as early as 2045 and as late as 2072 (**Table 6**).

Table 6. MAGICC Model Surface Temperature Results

Scenario	ΔT by 2050 (°C)	ΔT by 2100 (°C)	ΔT Maximum (°C)	ΔT Max Year*
RCP2.6	0.000035	0.000030	0.000040	2045-2072
RCP8.5	0.000030	0.000030	0.000040	2065

*The year(s) that the Proposed Action's maximum temperature impacts (ΔT °C) occur

Montana recently used the EPA SIT to develop a greenhouse gas inventory in conjunction with preparation of a possible grant application for the Community Planning Reduction Grant program. This tool was developed by EPA to help states develop their own greenhouse gas inventories, and the tool relies upon data collected by the federal government through various agencies. The inventory specifically includes carbon dioxide, methane, and nitrous oxide and reports the total as CO_2e. The SIT

consists of eleven Excel based modules with pre-populated data that can be used with default settings or, in some cases, allows states to input their own data when the states believe their own data provides a higher level of quality and accuracy. Once each of the eleven modules is completed, the data from each module is exported into a final "synthesis" module which summarizes the data into a single file. Within the synthesis file, several worksheets display output data in various formats such as GHG emissions by sector and GHG emissions by type of greenhouse gas.

DEQ has determined that the use of the default data provides a reasonable representation of the GHG inventory for the various state sectors, and of the estimated total annual GHG inventory. The SIT data from EPA is currently updated through the year 2022, as it takes several years to validate and make new data available within revised modules. DEQ maintains a copy of the output results of the SIT. Presently, Montana emits approximately 51.04 million metric tons of CO_2 annually (Department of Environmental Quality, 2026d).

The AM5 project is estimated to contribute a low of 47,863 to a high of 7,614,980 metric ton of CO_2e as shown in **Table 7**, which uses the values and assumptions described for **Table 4**. This contribution results from the continued operation of the mine, which supplies coal to keep the Colstrip generating station at a fully utilized level. Coal combustion already accounts for a large portion of the state's total emissions, contributing approximately 25% (or 12.53 million metric tons) of Montana's annual CO_2e emissions. The emissions associated with AM5 primarily serve to extend the mine life and would maintain the existing level of coal-related CO_2e emissions already factored into the state's inventory, rather than represent a new increase in the coal sector's overall percentage share.

Table 7. Cumulative AM5 Greenhouse Gas Impact Summary.

Year of Active Mining	Coal Production (short tons/year)	Greenhouse Gas Emissions (metric tons/year) (CO_2e)					
		Mining Production	Reclamation	Exposed Coal	Blasting	Combustion	Total Emissions (metric tons/year) (CO_2e)
1	367,928	2,310	0	6,913	2,064	625,478	636,765
2	379,648	2,384	0	7,133	2,130	645,402	657,048
3	818,616	5,140	0	15,380	4,593	1,391,647	1,416,760
4	272,872	1,713	0	5,127	1,531	463,882	472,253
5	355,920	2,235	0	6,687	1,997	605,064	615,983
6	272,872	1,713	0	5,127	1,531	463,882	472,253
7	261,008	1,639	0	4,904	1,464	443,714	451,721
8	320,328	2,011	0	6,018	1,797	544,558	554,384
9	605,064	3,799	0	11,368	3,394	1,028,609	1,047,171
10	545,744	3,427	0	10,254	3,062	927,765	944,507
11	4,500,000	28,256	0	84,547	25,245	7,650,000	7,788,048
12	3,200,000	20,093	0	60,122	17,952	5,440,000	5,538,167
13	4,400,000	27,628	0	82,668	24,684	7,480,000	7,614,980
14	2,200,000	13,814	0	41,334	12,342	3,740,000	3,807,490
15	3,500,000	21,977	0	65,759	19,635	5,950,000	6,057,371
16	4,200,000	26,372	0	78,910	23,562	7,140,000	7,268,845
17	3,500,000	21,977	0	65,759	19,635	5,950,000	6,057,371
18	6,600,000	41,441	0	124,002	37,027	11,220,000	11,422,470
19	3,900,000	24,488	0	73,274	21,879	6,630,000	6,749,641
20	2,700,000	16,953	0	50,728	15,147	4,590,000	4,672,829
21	0	0	47,863	0	0	0	47,863
22	0	0	47,863	0	0	0	47,863
Total	**42,900,000**	**269,370**	**95,726**	**806,013**	**240,673**	**72,930,000**	**74,341,782**

As identified previously in this section, the MAGGIC model results indicate that the proposed action may result in warming up to 0.00004°C or 0.000072°F by 2045, or approximately 0.00002°C per decade. Montana's temperature has risen by approximately 2.5°F (1.4°C) from 1900 to 2020 (NOAA, 2022), and it's expected to increase approximately another 2.5°F (1.4°C) between 2020 and 2050 (Alder & Hostetler, 2013). This equates to roughly 0.46 °C of warming per decade over this future period in Montana. Therefore, the Proposed Action may account for on the order of roughly 0.004% of Montana's warming over the next decade. This projected temperature change is best interpreted as an order-of-magnitude estimate of the project's contribution to global warming, to be considered together with the qualitative discussion of how broader climate change may affect conditions in the project area.

To provide commenters with clearer context on climate impacts in Montana, DEQ has reviewed and synthesized findings from multiple recent reports and scientific studies focused on Montana and the broader Great Plains region. In Montana, the BLM Specialist Report states that higher global surface temperatures may result in hotter temperatures, longer growing seasons, decreases in snowpack, and drier forests resulting in increased likelihood of forest fires and insect outbreaks (Bureau of Land Management (BLM), 2024). Observed trends summarized in that report and in the 2017 Montana Climate Assessment (Whitlock, 2017) show that Montana has already warmed by approximately 2–3 °F since 1950, with winter and spring warming of about 3.9 °F, a growing season that has lengthened by roughly 12 days, and significant decreases in mountain snowpack since the mid-20th century, particularly at lower and mid-elevations. These assessments explain that longer, warmer summers and earlier spring snowmelt dry out forest soils, contributing to increased tree mortality, insect outbreaks, and a rise in wildfires and lengthening of the fire season in western Montana.

The Fifth National Climate Assessment, which encompasses Montana, Wyoming, North Dakota, South Dakota, and Nebraska states that the Great-Plains states are already experiencing climate impacts such as reduced peak streamflow, more intense spring storms, and increased localized drought. (Knapp, 2023). Specifically, Montana is experiencing decreases in peak streamflow and snow water equivalent in high-elevation basins from 1961–2020, increasing evapotranspiration, and has projections of more frequent moderate, severe, and extreme droughts—about 10% more often by 2050 and 20% more often by 2100—along with substantial increases in summer wildfire risk, dependent on the RCP used (e.g., RCP 4.5, RCP 6.0, RCP 8.5). (Knapp, 2023). Montana already experiences some of the highest per-capita mortality in the United States attributable to wildfire smoke, and further increases in wildfires are expected under future warming scenarios. (Knapp, 2023).

The Montana Climate Assessment (Whitlock, 2017) includes a special report, 2021 Climate Change and Human Health in Montana, that provides comprehensive data on Montana's current health profile, including how populations' health may be impacted. (Adams, 2021). Those health-related impacts on Montanans may include increased risk of heat exhaustion, heat stroke, and worsening of chronic conditions such as respiratory diseases, cardiovascular issues, and kidney disease (Adams, 2021). The 2021 report identifies outdoor workers exposed frequently to heat in agriculture, construction, and other sectors, older adults, young children, people with pre-existing heart and lung disease, and low-income and rural communities as especially vulnerable to heat and smoke-related health risks in Montana. Poor air quality may result from increased wildfires, creating harmful breathing conditions, especially for those with asthma. (Adams, 2021). In addition, longer growing seasons and higher

atmospheric CO_2 are expected to increase pollen production, which can worsen allergies and asthma, and chronic exposure to smoke and particulate matter is projected to worsen long-term cardio/pulmonary risks for many Montanans. (Adams, 2021).

Additionally, water quality may be impacted due to the increased risk of flood that could contaminate water sources, contributing to water-borne illness and decrease in species that communities rely on for food. (Adams, 2021). Earlier snowmelt, more intense precipitation events, and longer and more frequent droughts are projected to alter runoff patterns, reduce late-season water availability, and increase stress on surface- and groundwater supplies used by Montana communities. (Whitlock, 2017); (Knapp, 2023); (Adams, 2021). Regional vulnerability assessments for the Northern Plains also indicate that these hydrologic changes can intensify competition among agricultural, municipal, and ecosystem water uses, particularly during prolonged droughts. (Derner, 2015). These changes can affect water quality and habitat conditions for fish, wildlife, and traditional food sources that many Montanans rely on. (Adams, 2021).

Due to the inherent cumulative and global nature of climate change, it is difficult to link one source of GHG emissions to a specific environmental impact. As summarized in the GHG Guidance Document, carbon dioxide (CO_2) and other GHGs become well mixed in the atmosphere within a year due to atmospheric circulation, meaning that GHG emissions from one region are incorporated worldwide within that timeframe (NOAA, 2025; United States Environmental Protection Agency, 2025b; United States Environmental Protection Agency, 2025c). This global mixing blurs regional signals, making it very difficult to trace atmospheric concentrations back to specific emissions sources and is the reason GHGs cause widespread global climate effects independent of where they are emitted. Therefore, tracing specific local outcomes (e.g., a Montana heatwave) back to any single project is not possible with available technology. Nevertheless, every project's GHG emissions incrementally add to global GHGs and, thus, to cumulative climate impacts. However, due to the inherent cumulative and global nature of climate change, it is difficult to link one source of GHG emissions to a specific environmental impact. (Department of Environmental Quality, 2026b)

SIGNIFICANCE OF POTENTIAL IMPACTS

When determining whether the preparation of an environmental impact statement is needed, DEQ is required to consider the seven significance criteria set forth in ARM 17.4.608, which are as follows:

1. The severity, duration, geographic extent, and frequency of the occurrence of the impact.

The Proposed Action's individual contribution to climate change is determined to be not significant. As detailed in the cumulative impacts section, the action would account for a negligible fraction of the total warming in Montana over the next decade (roughly 0.46 °C), contributing only 0.004% (or approximately 0.00002°C). At the same time, the Supplemental EA recognizes that AM5's lifecycle greenhouse gas emissions would incrementally add to cumulative global concentrations and thereby contribute to climate-driven changes that affect Montana's environment and public health, including more frequent

and intense heat waves, drought, wildfires, and wildfire smoke, within an already stressed climate system. This is not to downplay the effects of GHG emissions. Rather, given the wide dispersion of greenhouse gas effects, the resulting climate impacts are globally indistinguishable and non-differentiable at the scale of a single project, and significance under MEPA is evaluated in light of context, intensity, and the nature of DEQ's decision rather than the fact that emissions are nonzero. Consequently, the Proposed Action's individual emissions do not cause a significant impact on climate systems. The severity, duration, geographic extent and frequency of the occurrence of the impacts are addressed in turn:

- Severity: The project's contribution of GHG emissions would not be distinguishable on a global or local scale. The estimate of global warming that would result from AM5 is approximately 0.00002°C per decade, or 0.004% of Montana's projected warming over the next decade. GHG emissions incrementally add to global GHGs and, thus, to cumulative climate impacts. Those cumulative impacts include regional stressors in the Northern Great Plains such as increased evaporative demand, changes in runoff, and greater drought and wildfire risk that can affect water resources, ecosystems, and human health in Montana, as summarized in the climate-context section. However, the Proposed Action would not induce attributable climate impacts that can be separated from broader global and statewide emissions, and its incremental contribution does not rise to the level of a significant impact under MEPA.

- Duration: While the GHG impacts are long-term (over decades and centuries), the Proposed Action's duration of 22 years is finite. The impact would not be permanent on the global climate system because global emission impacts are continuous and cumulative, and the Proposed Action's commencement or cessation would not meaningfully alter the long-term trend. The Supplemental EA therefore treats AM5 as one of many contributing sources within an already degraded climate system, rather than as a project that, by itself, determines future climate conditions.

- Geographic Extent: The emissions would originate in Montana, but their ultimate impact (change in climate systems) is global in nature. Because the impacts are not concentrated in the immediate AM5 area in Montana, the project's contribution of GHGs would be indistinguishable from the background of statewide and global GHG emissions, and the contribution would not alter the frequency or intensity of climate events in the AM5 area or Montana in a way that can be attributed to this single project. The Supplemental EA instead uses Montana and facility-scale emissions inventories, together with regional climate assessments, to place AM5's contribution in geographic context.

- Frequency of Occurrence: The emission of GHGs would occur continuously for the life of the mine (22 years), as long as coal is mined, transported, and combusted. While the activity is frequent, the resulting impact on climate systems would not be significantly increased by the Proposed Action because the project would not alter the frequency or intensity of climate events.

2. *The probability that the impact will occur if the proposed action occurs; or conversely, reasonable assurance in keeping with the potential severity of an impact that the impact will not occur.*

The probability that the proposed project would contribute to GHGs is certain. However, as discussed in the Cumulative Impacts section, the severity of the additional greenhouse gas contributions is low to the overall warming of Montana. The yearly addition of CO_2e from mining, combustion and transportation would result in an increase of Montana temperatures by approximately 0.00004°C over the lifespan (22 years) of the Proposed Action, based on an order-of-magnitude MAGICC illustration. DEQ recognizes that every additional ton of GHGs contributes incrementally to warming and associated harms, but, applying MEPA's factors, concludes that AM5's incremental contribution does not, by itself, create a risk of distinct additional climate impacts in Montana beyond those already projected from cumulative global emissions.

3. *Growth-inducing or growth-inhibiting aspects of the impact, including the relationship or contribution of the impact to cumulative impacts.*

The proposed mining activities by the applicant would not have any growth-inducing or growth-inhibiting aspects, or significant contribution to cumulative impacts. The Proposed Action's GHG emissions, which are primarily associated with the continued, full-capacity operation of an existing power plant (Colstrip) would not induce new regional or national growth. The Proposed Action maintains the current power generation output and existing economic activity tied to the facility. AM5's emissions contribute to cumulative global GHG concentrations and thus to cumulative climate risks, but the project does not, at the scale of this decision, meaningfully alter regional population, land use, or economic growth patterns that drive long-term emissions trajectories. The Proposed Action's contribution to global GHG concentrations does not meaningfully alter the probability or severity of climate-related events at a scale that would inhibit economic growth either locally or globally.

4. *The quantity and quality of each environmental resource or value that would be affected, including the uniqueness and fragility of those resources and values.*

The Proposed Action does not impact any resources that are considered unique or fragile within the context of the project area. The area where mining activities occur is part of an existing, long-term operational mine complex and is already subject to current disturbance and reclamation requirements. Regarding climate, the project's contribution to global climate change is marginal (0.00004°C of warming over the lifespan of the Proposed Action). The Supplemental EA acknowledges that Montana's climate and associated environmental life-support systems are already experiencing stress from cumulative climate change, and that additional emissions contribute incrementally to those stresses, but AM5's marginal contribution does not constitute a measurable, project-specific effect on the quantity and quality of a stable global climate system or on any localized resource that can be distinguished from broader GHG drivers.

5. *The importance to the state and to society of each environmental resource or value that would be affected.*

Although environmental resources and the value of a stable climate system are of the highest importance to the state and society, the Proposed Action, by maintaining the existing coal combustion baseline at the Colstrip Power Plant, has a marginal impact global GHG emissions. This Supplemental EA therefore identifies and discloses AM5's lifecycle emissions, places them in the context of Montana and facility-level inventories, and qualitatively describes their implications for climate risks in Montana and the Northern Great Plains, recognizing the importance of these values while finding that the project's incremental contribution is small in that broader context.

6. *Any precedent that would be set as a result of an impact of the proposed action that would commit the department to future actions with significant impacts or a decision in principle about such future actions.*

Issuance of an operating permit to the applicant does not set any precedent that commits DEQ to future actions with significant impacts or a decision in principle about such future actions. This supplemental EA conducted for this specific permitting action, including an analysis of coal combustion and transportation emissions, is performed pursuant to a voluntary remand. This voluntary analysis does not constitute a decision in principle or set a binding precedent requiring DEQ to analyze coal combustion or transportation emissions in its review of operating permit applications under the Montana Strip and Underground Mine Reclamation Act (MSUMRA). Specifically, DEQ is not currently required to analyze end-use coal combustion for MSUMRA operating permits, and this action does not commit or require DEQ to conduct such an analysis for other or future permit applications. If the applicant submits another operating permit, amendment, or revision application to conduct additional mining, DEQ is not committed to issuing those authorizations. Pursuant to MEPA, DEQ would conduct an environmental review for any subsequent authorizations sought by the applicant that require environmental review. DEQ would make a permitting decision based on the criteria set forth in the MSUMRA.

7. *Potential conflict with local, state, or federal laws, requirements, or formal plans.*

The Proposed Action would not have any growth-inducing or growth-inhibiting aspects that would conflict with any local, state, or federal laws, requirements, or formal plans. The Proposed Action is an addition to an operational mine, the scope of the regulatory review focuses primarily on the expansion area, which adheres to the same legally-mandated operational standards as the existing mine.

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