BEFORE THE COLORADO AIR QUALITY CONTROL COMMISSION
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

PREHEARING STATEMENT OF
THE LOCAL GOVERNMENT COALITION

IN THE MATTER REGARDING PROPOSED REVISIONS TO OZONE STATE IMPLEMENTATION PLAN (SIP), REGULATION NUMBER 3, REGULATION NUMBER 7, REGULATION NUMBER 21, COMMON PROVISIONS, AND AIR QUALITY STANDARDS, DESIGNATIONS, AND EMISSION BUDGETS

The Local Government Coalition (LGC), by and through the undersigned counsel, and pursuant to the Notice of Rulemaking Hearing issued by the Air Quality Control Commission (Commission) on September 15, 2022, hereby submits its Prehearing Statement in the above-captioned matter.

EXECUTIVE SUMMARY

The LGC generally supports the Colorado Air Pollution Control Division's (Division) proposed amendments to the ozone state implementation plan (SIP), Regulations Numbers 3, 7, and 21, Common Provisions, and Air Quality Standards, Designations, and Emissions Budgets, as noticed by the Notice of Rulemaking Hearing on September 15, 2022. If adopted, the Division's proposed revisions will help to limit future emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_X) from a variety of source sectors in the Denver Metro/North Front Range (DM/NFR) ozone nonattainment area (NAA), as well as methane and VOCs from the oil and gas sector statewide. Such reductions are critical to addressing the continued violations of the federal ozone standards in the DM/NFR and meeting Colorado's clean air and climate goals.

Unfortunately, the proposed Moderate ozone SIP's attainment demonstration shows that the area will not attain the 2015 ozone National Ambient Air Quality Standards (NAAQS) by the attainment date of 2024. The Commission should disapprove that attainment demonstration and the associated motor vehicle emissions budgets in the proposed SIP, approve the remainder of the SIP elements, and submit those to the Environmental Protection Agency (EPA) for approval.

As local governments who have prioritized protecting air quality and responding to the climate crisis, we are very concerned about the lack of sufficient progress in meeting the federal ozone NAAQS. And while we appreciate the various efforts the state has taken to date to reduce emissions, and recognize that emissions have decreased in most cases, the health-based ozone NAAQS have been established and lowered in recent years because research is increasing our understanding of ozone's negative impacts to public health at even lower concentrations. As a region, we must match the federal government's commitment to protecting public health and go further towards greater emissions reductions to maximize the benefits to DM/NFR residents.

Regarding the specific regulatory changes proposed for this rulemaking and the scope of the proposed documents:

- **Ozone Moderate Nonattainment Area SIP Attainment Demonstration and Motor Vehicle Emissions Budgets**: Regarding the proposed ozone Moderate nonattainment area SIP for the 2015 NAAQS, the LGC recognizes that this document is required under the federal Clean Air Act and EPA's requirements for nonattainment areas, but the LGC also recognizes that this proposed SIP does not "model attainment" of the 2015 ozone NAAQS. The Commission should disapprove the SIP's attainment demonstration and the motor vehicle emissions budgets and submit the remaining elements of the SIP to EPA to fulfill the Commission's administrative obligation.

- **Ozone SIP Control Measures**: Because of the continued nonattainment problem, additional control measures should be included in this SIP in order to attain the 2015 ozone NAAQS. The LGC includes a list of viable control measure options in this prehearing statement and specifically demonstrates that additional oil and gas section NO_X reductions are critical and demonstrates that these reductions are cost-effective.

- **Equity, Racial Equity and Environmental Justice**: The potential negative or positive impacts of this ozone SIP to equity, racial equity, and environmental justice have not been addressed with this proposal.

- **Nitrogen Deposition at Rocky Mountain National Park**: Due to concerns over the negative impacts from nitrogen deposition at Rocky Mountain National Park, the Commission passed a resolution in 2019 to ensure that future rulemakings would consider these impacts. Despite this resolution, nitrogen deposition at the national park is not mentioned in any of the ozone SIP documents submitted to the Commission for this rulemaking.

This Prehearing Statement includes:

- Statement of factual and legal issues in response to the Division's proposal;

- Identification of the issues to be resolved;

- Request for time at the hearing, with reservation of the right to request additional time;

- List and copies of exhibits that may be introduced or relied on at the hearing, including summaries of voluminous exhibits; and

- List of witnesses that the LGC may introduce at the hearing, including identification of the exhibits they will rely on.

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I. STATEMENT OF FACTUAL AND LEGAL ISSUES & THE LGC'S POSITION

A. Ozone Levels in the Denver Metro/North Front Range Nonattainment Area Continue to Be a Major Health Threat

1. *Regional Ozone Causes a Variety of Negative Health Impacts*

Breathing ground-level ozone causes symptoms such as coughing, throat irritation, pain, burning, tightness or discomfort in the chest, and wheezing or shortness of breath. Long-term exposure to ozone causes more frequent and severe asthma attacks, increased hospitalizations, and higher rates of illness and death. Ozone is particularly concerning during the current COVID-19 pandemic, as it can increase the risk of respiratory infection.[1] While it is a regional pollutant potentially affecting large swaths of Colorado's population, ozone particularly impacts minority and low-income populations that statistically already suffer disproportionately from asthma, cardiovascular disease, and COVID-19. We cannot allow the harms of ozone to continue to accrue to residents already disadvantaged by socioeconomic stressors.

The Denver metropolitan area has a long history of nonattainment with the various ozone NAAQS over the years: the six-county metropolitan area (Adams, Arapahoe, Boulder, Denver, Douglass, and Jefferson Counties) was designated nonattainment with the first ozone standard in 1978. In 2004, the ozone nonattainment area was expanded to include the northern Front Range area as well, when all except the northern portions of Larimer and Weld Counties were included in the 1997 8-hour nonattainment area (Broomfield County was also included). In 2012, the DM/NFR was first designated nonattainment with the 2008 8-hour ozone NAAQS of 75 parts per billion (ppb). Due to continued high ozone concentrations, in 2018 the DM/NFR was designated nonattainment for the more stringent 2015 ozone NAAQS. In 2021, EPA modified the nonattainment area boundary for the 2015 standard to include the entirety of Weld County. Due to continued violations, the DM/NFR was reclassified as Severe nonattainment, effective November 7, 2022, based on 2018-2020 air monitoring data.[2] With this reclassification, the State of Colorado is required to take further measures to reduce ozone precursor pollutants, specifically, VOCs and NO_X.

Protecting Colorado's residents from the adverse health impacts of ozone is of utmost importance. The DM/NFR accounts for almost 58% of the state's population, with over 3.3 million people residing in the area. Denver ranks among the top 10 U.S. metropolitan areas for number of asthma attacks and is the eighth most ozone-polluted city in United States.[3] There is already a clear

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[1] L.B. Ware, *et al.*, American Journal of Respiratory and Critical Care Medicine, Vol. 193, No. 10, "Long-Term Ozone Exposure Increases the Risk of Developing the Acute Respiratory Distress Syndrome" (May 15, 2016), at p. 1145–46, *available at* https://www ncbi nlm nih.gov/pmc/articles/PMC4872663/#:~:text=Conclusions%3A%20Long%2Dterm%20ozone%20exposure,environmental%20risk%20factor%20for%20ARDS.

[2] 87 Fed. Reg. 60926 (Oct. 7, 2022); 87 Fed. Reg. 60897 (Oct. 7, 2022).

[3] L. Fleischman, *et al.*, Clean Air Task Force, "Gasping for Breath: An analysis of the health effects from ozone pollution from the oil and gas industry" (Aug. 2016), at p. 10, *available at* http://www.catf.us/wp-content/uploads/2018/10/CATF_Pub_GaspingForBreath.pdf.

correlation between these pollutants and respiratory morbidity,[4] with greater impact on low-income communities.[5] The current COVID-19 crisis tightens our focus on the critical importance of air quality to respiratory health. The Centers for Disease Control and Prevention has cited asthma as a risk factor for poor COVID-19 outcomes.[6] While improvements in air quality have been made in some areas, these improvements have generally not been felt as much in marginalized and low-income communities as in more privileged areas.

The EPA's Clean Air Scientific Advisory Committee (CASAC) has been recommending for a number of years that the ozone standard be set to a lower concentration. In 2006, the CASAC unanimously recommended a more protective, lower 8-hour ozone NAAQS of between 60 and 70 ppb.[7] And again in 2022, the CASAC recommended a revised NAAQS between 60 and 70 ppb, issuing the following statement:

> The CASAC advises that, based on the scientific evidence, a level of 70 ppb provides little margin of safety for the protection of public health, particularly for sensitive subpopulations. In this regard, our advice differs from that offered by EPA staff in the Second Draft [Policy Assessment for the Review of the Ozone NAAQS]. At 70 ppb, there is substantial scientific evidence of adverse effects as detailed in the charge question responses, including decrease in lung function, increase in respiratory symptoms, and increase in airway inflammation. Although a level of 70 ppb is more protective of public health than the current standard, it may not meet the statutory requirement to protect public health with an adequate margin of safety.[8]

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[4] B.L. Alman, *et al.*, Environmental Health, Vol. 15, No. 64, "The association of wildfire smoke with respiratory and cardiovascular emergency department visits in Colorado in 2012: a case crossover study" (June 4, 2016), *available at* https://ehjournal.biomedcentral.com/articles/10.1186/s12940-016-0146-8; E.M. Lipner, *et al.*, GeoHealth, Vol. 3, No. 6, "The Associations Between Clinical Respiratory Outcomes and Ambient Wildfire Smoke Exposure Among Pediatric Asthma Patients at National Jewish Health, 2012–2015" (Apr. 9, 2019), at p. 4, *available at* https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GH000142; J.C. Liu, *et al.*, Environmental Research Letters, Vol. 11, No. 12, "Future respiratory hospital admissions from wildfire smoke under climate change in the Western US" (Dec. 8, 2016), *available at* https://iopscience.iop.org/article/10.1088/1748-9326/11/12/124018.

[5] P.M. Shrestha, *et al.*, International Journal of Environmental Research and Public Health, Vol. 16, No. 19, "Impact of Outdoor Air Pollution on Indoor Air Quality in Low-Income Homes during Wildfire Seasons" (Oct. 2019), at p. 16, *available at* https://www.ncbi nlm nih.gov/pmc/articles/PMC6801919/.

[6] Centers for Disease Prevention and Control (CDC), "People with Certain Medical Conditions" (updated Oct. 19, 2022), *available at* https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html; CDC, "People with Moderate to Severe Asthma" (updated Apr. 7, 2022), *available at* https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/asthma.html#.

[7] Letter from R. Henderson, Clean Air Scientific Advisory Committee, to S. Johnson, U.S. Envtl. Prot. Agency, "Clean Air Scientific Advisory Committee's (CASAC) Peer Review of the Agency's 2nd Draft Ozone Staff Paper" (Oct. 24, 2006), at p. 2, *available at* https://earthjustice.org/sites/default/files/library/references/casac-07-001.pdf.

[8] LGC_PHS_EX-001, Letter from H. Christopher Frey, Clean Air Scientific Advisory Committee, to G. McCarthy, U.S. Envt'l Prot. Agency, "CASAC Review of the EPA's Second Draft Policy Assessment for the Review of the Ozone National Ambient Air Quality Standard" (June 26, 2014), at p. ii, *available at* https://blogs.edf.org/climate411/files/2014/11/CASAC-review-of-EPA-2nd-Draft-Ozone-Policy-Assessment-Cov-Ltr-JUN-14.pdf.

These recommendations eventually led to the 2015 8-hour ozone NAAQS of 70 ppb, for which the DM/NFR is also designated nonattainment. But the fact that this area still struggles to achieve the less stringent 75 ppb NAAQS means that many of the state's residents have been living with unhealthy levels of ozone for too many years.

On a larger scale, tropospheric ozone is a greenhouse gas that hastens climate change, which worsens ozone pollution, thus creating a cyclical reinforcement between ozone and the climate crisis.[9] Communities that are already experiencing higher rates of infection and disruption from COVID-19 in Colorado are also more vulnerable to other negative health impacts of air pollution and ultimately suffer more from climate change.

Specifically, oil-and-gas-related air pollution is a concern to Coloradans throughout the state. Studies have identified elevated levels of atmospheric VOCs in Colorado's North Front Range as a result of oil and natural gas emissions and the potential for significant ozone production from these emissions.[10] And ozone monitors in areas within the state, but outside the DM/NFR, are approaching the 2015 NAAQS of 70 ppb. According to the Division's September 30, 2022, running ozone update, the design values (i.e., the three-year average of the fourth maximum recorded 8-hour concentration) for 2020-2022 were violating or approaching the 2015 NAAQS at several locations, as shown in Table 1 below.

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9 University Corporation for Atmospheric Research, "Ozone in the Troposphere" (2014), *available at* https://scied.ucar.edu/ozone-troposphere; *see also* U.S. Envt'l Prot. Agency, Climate Change Adaptation Resource Center (ARC-X), "Climate Adaptation – Ground-Level Ozone and Health" (updated Oct. 5, 2022), *available at* https://www.epa.gov/arc-x/climate-adaptation-ground-level-ozone-and-health.

10 G. Pétron, *et al*., Journal of Geophysical Research: Atmospheres, Vol. 117, No. D4, "Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study" (Feb. 21, 2012), at p. 17-18, *available at* https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2011JD016360; J.B. Gilman, *et al*., Environmental Science & Technology, Vol. 47, "Source Signature of Volatile Organic Compounds from Oil and Natural Gas Operations in Northeastern Colorado" (Jan. 14, 2013), *available at* https://pubs.acs.org/doi/abs/10.1021/es304119a; R.F. Swarthout, *et al.*, Journal of Geophysical Research: Atmospheres, Vol. 118, No. 18, "Volatile organic compound distributions during the NACHTT campaign at the Boulder Atmospheric Observatory: Influence of urban and natural gas sources" (Aug. 12, 2013), at p. 10,635-36, *available at* https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/jgrd.50722.

Table 1: Colorado Ozone Monitoring Sites Outside the DM/NFR with Possible Oil and Gas Influence (2018-2020 data in ppb)[11]

Monitoring Site[12]	2020	2021	2022	Design Value (2020-2022 3-Year Average 4th Maximum Value)
Black Hawk	77	82	68	75
Palisade	65	68	60	64
Cortez	63	65	60	62
Shamrock - USFS	63	66	63	64
Ignacio - Southern Ute	66	66	67	66
Rocky Mountain NP - NPS	73	77	67	72
Mesa Verde NP - NPS	67	67	64	66
Rangely	65	69	62	65

Since 2004, the Commission has enacted regulations to reduce emissions from the oil and gas sector across Colorado, including additional controls for sources in the DM/NFR ozone nonattainment area. Nonetheless, the nonattainment area was reclassified to Severe nonattainment for continued failure to attain the ozone standards. These emissions directly affect ozone nonattainment and must be addressed.

2. *Regional Ozone Disproportionately Impacts DI Communities*

Ozone, a regional pollutant, affects a majority of Colorado's population, including many of our most vulnerable residents. Colorado counties with significant oil and gas development are plagued with such high levels of ozone that they received an "F" grade for ozone from the American Lung Association once again in 2021. Several of these areas are highlighted for strong association with pediatric and adult asthma, cardiovascular disease, people of color, and people meeting the U.S. Census estimates of poverty.[13] Furthermore, climate change worsens ozone, in a feedback that is felt most strongly in areas that are home to higher percentages of Hispanic/Latino residents, children living in limited-income households, and residents with health conditions and/or lacking health insurance.[14] Despite ozone forecasts and guidance issued by local governments and state air agencies to help residents avoid ozone exposure, disproportionately impacted (DI) community residents are more likely to work outdoors during high-ozone times and to have fewer occupational protections from ambient air pollution.

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[11] Colorado Air Pollution Control Division, "Summary Table: 2022 Running O3" (updated Sept. 30, 2022), *available at* https://www.colorado.gov/airquality/html_resources/ozone_summary_table.pdf.

[12] The non-Division monitors are noted with the operating agency after their name.

[13] American Lung Association: State of the Air, "Report Card: Colorado" (2022), *available at* https://www.lung.org/research/sota/city-rankings/states/colorado.

[14] LGC_PHS_EX-002, J.L. Crooks, *et al.*, Journal of Exposure Science & Environmental Epidemiology, "The ozone climate penalty, NAAQS attainment, and health equity along the Colorado Front Range" (Sept. 10, 2021), at p. 551, *available at* https://www.nature.com/articles/s41370-021-00375-9.

On October 5, 2022, EPA published a proposed disapproval of the San Joaquin Valley SIP for the 2012 fine particulate ($PM_{2.5}$) NAAQS in part because the SIP failed to address environmental justice (EJ) and civil rights issues. Under the disapproval, California's San Joaquin Valley Air Quality Management District (AQMD) is required to demonstrate that it is compliant with Title VI of the Civil Rights Act of 1964, 42 U.S.C. §§ 2000d, *et seq.*, which requires recipients of EPA funding to ensure that their actions are nondiscriminatory. San Joaquin AQMD also must factor in EJ considerations in the $PM_{2.5}$ nonattainment area when it submits a revised SIP.[15] In their notice, EPA acknowledges that they are working on, but have not yet issued, national guidance on Title VI and "disparate impacts on the basis of race, color, or national origin in the context of the SIP program,"[16] and so suggests that in the interim, the California Air Resources Board and San Joaquin AQMD will continue to use existing Title VI resources from EPA and the Department of Justice. We urge Colorado to do the same in their consideration of the ozone SIP for the DM/NFR. The proposed SIP does not provide any additional protections for DI communities and does not describe any additional impacts to DI communities or address racial equity in any meaningful way.

B. The Climate and Ozone Connection

Ozone pollution amplifies the impacts of climate change, and climate change amplifies the impacts of ozone pollution. Tropospheric ozone is a greenhouse gas that hastens climate change, which worsens ozone pollution, thus creating a cyclical reinforcement between ozone and the climate crisis.[17] Colorado communities that have already experienced disruption from COVID-19 are also more vulnerable to other negative health impacts of ozone pollution and ultimately suffer more from climate change.

Climate change will increase air pollution causing severe consequences for human health. Higher temperatures lead to increased production of ozone, which causes premature deaths, hospital visits, lost school days, and acute respiratory symptoms.[18] At the October 19, 2022, joint meeting of the Commission and the Colorado Board of Health, Commission member Dr. Anthony Gerber, MD, Ph.D., a pulmonologist at National Jewish Health, reviewed the health risks of ozone and concluded that elevated levels of ozone cause acute worsening of asthma and other lung disease as well as a higher acute risk of stroke, and long term exposure to ozone causes emphysema.[19] While the literature on the interplay between COVID-19, morbidity, mortality, and air pollution is still developing, air pollution is closely linked to negative outcomes from similar respiratory diseases.[20]

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[15] LGC_PHS_EX-003, Clean Air Plans; 2012 Fine Particulate Matter Serious Nonattainment Area Requirements; San Joaquin Valley, California, 87 Fed. Reg. 60,494, 60,527 (Oct. 5, 2022), *available at* https://www.govinfo.gov/content/pkg/FR-2022-10-05/pdf/2022-21492.pdf.

[16] *Id.* at 60,530 (Oct. 5, 2022).

[17] *See* University Corporation for Atmospheric Research and U.S. Envtl. Prot. Agency, Climate Change Adaptation Resource Center (ARC-X), *supra* note 9.

[18] *See* L. Fleischman, *et al.*, *supra* note 3, at p. 4.

[19] A. Gerber, MD, PhD, Air Quality Control Commission/Board of Health Joint Meeting, "Health Effects of Ground Level Ozone: A brief summary" (Oct. 19, 2022), at p. 13, *available at* https://drive.google.com/drive/u/0/folders/1_lAZ7ZjGhPsdDtQFBdnZBGcYYXrEBO_q.

[20] K. Clay, J. Lewis & E. Severenini, The Journal of Economic History, Vol. 87, No. 4, "Pollution, Infectious Disease, and Mortality: Evidence from the 1918 Spanish Influenza Pandemic" (May 2018), at p. 1179-1209, *available at*

Even this past summer, when wildfire contributions were much lower than in prior years, ozone levels in the DM/NFR remained above the 70 ppb NAAQS standard. Hotter temperatures increase ozone levels and July and August 2022 were the second and third hottest months on record, respectively, in Colorado.[21]

Climate change also disproportionately affects minority, low-income, tribal, and indigenous populations. Per the Environmental Justice Act (HB21-1266), the Colorado Department of Public Health and Environment (CDPHE) facilitated the Environmental Justice Action Task Force (Task Force) to address the means of assessing and addressing impacts to these communities as well as to engage these communities in policy affecting environmental justice. The Task Force's fourth draft of recommendations recognizes the need for coordinated equity analysis and consistency in prioritizing environmental justice across agencies. The Task Force also acknowledges the need to better understand the overlapping and cumulative effects that multiple pollutants (such as ozone and associated pollutants) have on health and equity; therefore, the Task Force recommends that agencies use centralized and transparent Cumulative Impacts Analyses (EECIA) in decision-making affecting the environment or public health in a community.[22] Lastly, the Task Force's recommendations are further recognition of the need to ensure the centrality of equity through all Commission regulations that affect greenhouse gases (GHGs) and other air pollutants that are disproportionately harming our most vulnerable residents.

1. *Global Impacts of Climate Change*

On a broader scale, during 2021 and 2022, the Intergovernmental Panel on Climate Change (IPCC) released its Sixth Assessment Report, with unequivocal conclusions that "humans have warmed the planet to an extent that widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred," and that "the scale of recent changes across the climate system . . . are unprecedented over many centuries."[23] "Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. . . Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt."[24]

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https://www.nber.org/papers/w21635; Y. Cui, *et al*., Environmental Health, Vol. 2, No. 15, "Air pollution and case fatality of SARS in the People's Republic of China: an ecologic study" (Nov. 20, 2003), at p. 2, *available at* https://doi.org/10.1186/1476-069X-2-15; E.L. Landguth, *et al.*, Environment International, Vol. 139, "The delayed effect of wildfire season particulate matter on subsequent influenza season in a mountain west region of the USA" (June 2020), *available at* https://www.sciencedirect.com/science/article/pii/S0160412019326935.

21 W. Vicars & S. Landes, Briefing to the Colorado Air Quality Control Commission and Colorado Board of Health, "2022 Summer Ozone Season Review" (October 19, 2022), *available at* https://drive.google.com/drive/u/0/folders/1_lAZ7ZjGhPsdDtQFBdnZBGcYYXrEBO_q.

22 Colorado Department of Public Health and Environment, "Environmental Justice Action Task Force Recommendations Draft 4" (2022), *available at* https://docs.google.com/document/d/1ISZ-imO5vFe_R_7P3SFJmu3dAx9CzJaF/edit?usp=sharing&ouid=100345953038471676497&rtpof=true&sd=true

23 Intergovernmental Panel on Climate Change, "Sixth Assessment Report: Headline Statements from the Summary for Policymakers" (2021), at p. 1-2, *available at* https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Headline_Statements.pdf.

24 *Id.* at p. 1.

Additionally, in an October 2022 report, UNICEF detailed the impacts of the rapidly accelerating climate crisis on heatwaves, which are becoming longer, stronger, more widespread, and more frequent.[25] Already, around 559 million children are exposed to high heatwave frequency, and by 2050, virtually every child on earth–over 2 billion children–is forecast to face more frequent heatwaves, regardless of whether the world achieves a low GHG emission scenario or a very high GHG emission scenario—the difference between scenarios is the degree of heatwave severity.[26]

2. *Impacts of Climate Change in Colorado*

The IPCC outlined the major impacts that we can expect to see in Colorado and the West:

- Strong declines in glaciers, permafrost, and snow cover are observed and will continue in a warming world
- Increases in drought and fire weather will continue to increase in the future, particularly at higher warming levels
- Projected increase in extreme precipitation
- Projected increase in river and pluvial flooding[27]

In Colorado, these changes are already starkly evident. The state's three largest wildfires in the historical record all occurred in 2020, followed by the most damaging wildfire in 2021 in terms of property loss. Heavy rainfall falling on the burn scars has caused deadly flash floods and erosion that forced the closure of major highways and fouled drinking water sources during the height of the summer tourism season. Flooding in the Front Range has resulted in permanent displacement of DI communities and a disproportionate loss of affordable housing.[28] Heatwaves threatened lives, particularly in low-income neighborhoods, and air quality warnings became a daily event due to wildfire smoke and ozone cooked by extreme heat. A regionwide megadrought has worsened to the driest in at least 1,200 years, leading to the prospect of unprecedented reductions in water allocations in the Colorado River Basin.

Such rapid changes are driving up local governments' long-term infrastructure and operational costs, leaving less for crucial services, including to residents in greatest need. Stronger storms bringing greater rainfall can overload urban drainage systems and cause local flooding. Higher

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[25] UNICEF Division of Global Communication and Advocacy, "The coldest year of the rest of their lives: Protecting children from the escalating impacts of heatwaves" (Oct. 2022), *available at* https://www.unicef.org/media/129486/file/UNICEF-coldest-year-heatwaves-children-exec-summ-EN.pdf.

[26] *Id.*

[27] Intergovernmental Panel on Climate Change, "Sixth Assessment Report: Regional fact sheet – North and Central America" (2021), at p. 1-2, *available at* https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_North_and_Central_America.pdf.

[28] J. Aguilar, The Denver Post, "Lessons from Lyons: Will Marshall fire victims rebuild or move on?" (Jan. 18, 2022), *available at* https://www.denverpost.com/2022/01/18/marshall-fire-rebuild-homes-lyons-floods/.

temperatures will cause asphalt on roads to degrade more quickly, requiring more frequent maintenance and repairs, and bridges may suffer damage that requires adaptation and repair.[29]

In June 2021, one of the most extreme heat waves ever observed in the western U.S. set hundreds of records while simultaneously worsening a historically severe drought, intensifying fires, and degrading air quality. About 40 million Americans endured triple-digit heat and more than 50 million were under excessive-heat warnings.[30] According to the National Oceanic and Atmospheric Administration, the average temperature for the six-month period from July through December 2021 was the hottest recorded in Colorado, exceeding the next-highest six-month average temperature during the 1930s Dust Bowl era.[31]

Scientists who study drought and climate change say that we can expect to see more of the same in coming years.[32] Under a continued high-emissions trajectory, the hottest daily temperatures of the year are expected to increase at least 5°F in most areas of the U.S. by mid-century, rising to 10°F or more by late-century.[33]

A recent report paints a picture of a drastically altered future climate in the North Front Range nonattainment area. With continued high heat-trapping emissions, the Denver metro area is projected to experience an average seven days per year at 100°F or hotter in typical years by mid-century, and a full month's worth—34 days per year—by 2100.[34] The fact that about 30% of Denver's housing stock is without air conditioning, largely in low-income neighborhoods, places vulnerable populations severely at risk.[35]

The risks of overloading the electric grid due to increased use of air conditioners due to hotter summers has caught the attention of Colorado energy managers and regulators. Colorado Energy

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[29] State of Colorado, "Colorado Climate Plan: State Level Policies and Strategies to Mitigate and Adapt" (2018), at p. 48–49, *available at* https://dnrweblink.state.co.us/cwcb/0/doc/205387/Electronic.aspx?searchid=4fdc6e80-96ca-44b1-911c-57fe7793e3f6.

[30] J. Samenow & D. Leonard, The Washington Post, "'Mega-heat wave' is peaking in the West, breaking records and intensifying drought, fires," (June 17, 2021), *available at* https://www.washingtonpost.com/weather/2021/06/17/heat-wave-southwest-fires-drought/.

[31] C. Swanson, The Denver Post, "Colorado had hottest six months in history, new data shows" (Jan. 13, 2022), *available at* https://www.denverpost.com/2022/01/13/colorado-climate-average/.

[32] A. Snow, AP News, "Heat wave grips US West amid fear of a new, hotter normal" (June 16, 2021), *available at* https://apnews.com/article/co-state-wire-heat-waves-science-environment-and-nature-b751329e85003afb2ef314a8321748ea?utm_campaign=Hot%20News&utm_medium=email&_hsmi=134415943&_hsenc=p2ANqtz-_nXgmaEAUtd9bZnnlQxkF42mDQjAKo-zNTc_3jZz2imz4YaRzd35cZ70gM82z24hydBsVH8BUSswsjuHOMRsNaZVPn_w&utm_content=134415943&utm_source=hs_email.

[33] U.S. Global Change Research Program, "Climate Science Special Report for the Fourth National Climate Assessment: Chapter 6: Temperature Changes in the United States" (2017), at 6.3.2, *available at* https://science2017.globalchange.gov/chapter/6/.

[34] S. Saunders, T. Easley, & M. Mezger, Rocky Mountain Climate Organization, "Future Extreme Heat in the Denver Metro Area" (June 2017), at p. 1, *available at* https://www.rockymountainclimate.org/images/DenverHeatExtremes.pdf.

[35] Denver Office of Climate Action, Sustainability, and Resilience, "The Energize Denver Renewable Heating and Cooling Plan: Resilient Existing Building and Homes" (2021), at ES1, *available at* https://www.denvergov.org/files/assets/public/climate-action/documents/hpbh/renewable-hampc/denver-renewable-heating-and-cooling-plan_june-2021_executive-summary.pdf.

Office Director Will Toor acknowledges that so far, electricity grids have proved relatively resilient, but utility managers need to ramp up programs to help manage peak needs.[36] In June, the Public Utilities Commission explored with electric utility managers their ability to meet increased summer electricity demands and risks around plant outages, tight regional electricity markets, and the near-term completion of certain solar projects.[37]

Local governments also bear the burden of increases in fire frequency and intensity. While the federal government and other organizations may shoulder a large portion of short-term expenses, such as fire suppression and immediate economic relief, local and state governments, individuals, and taxpayers foot the bill for long-term expenses, which are generally greater than short-term expenses and last for years.[38] Private insurance increasingly does not cover these damages, and recent disasters have shown that federal aid is also not adequate to cover the costs.[39] The strain of disaster response and recovery is expected to increase in a context of state budget shortfalls and climate-influenced economic uncertainty.

Mega-fires in Colorado since 2000 vividly bring home the impacts of climate change. The devastating Marshall Fire in Boulder County in late December 2021 followed an abnormally dry and warm fall and early winter.[40] In just a few hours, 1,084 residential structures were destroyed and another 146 damaged, and seven commercial structures were destroyed and an additional 30 damaged,[41] making it the most destructive in Colorado history when it comes to the number of homes burned,[42] and causing over a half billion dollars in damage.[43]

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36 B. Finley, The Denver Post, "Colorado used to be AC-optional. Heat wave prompts look at whether electric grid is ready for the future" (June 15, 2022), *available at* https://www.denverpost.com/2022/06/15/heatwave-electricity-colorado-ac/?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter.

37 *Id.*

38 Headwaters Economics, "The Full Community Costs of Wildfire" (May 2018), at p. 28–29, *available at* https://headwaterseconomics.org/wp-content/uploads/full-wildfire-costs-report.pdf.

39 Z. Colman, Politico, "Insurance for When FEMA Fails," (Jul. 14, 2020), *available at* https://www.politico.com/news/agenda/2020/07/14/climate-change-fema-insurance-341816.

40 According to the Western Water Assessment's December 3, 2021 Intermountain West Climate Dashboard, 97% of all Western states were in some level of drought; in Colorado, over half of the state was in at least a severe drought status, and streamflows in far western Colorado were much below normal. *See* Cooperative Institute for Research in Environmental Sciences, "Western Water Assessment: December 3, 2021 Intermountain West Climate Dashboard: December 3, 2021 (CO, UT, WY)" *available at* https://wwa.colorado.edu/resources/intermountain-west-climate-dashboard/briefing/december-3-2021-co-ut-wy.

41 Boulder County, "Marshall Fire Recovery Dashboard," *available at* https://bouldercounty.gov/disasters/wildfires/marshall/marshall-fire-recovery-dashboard/.

42 O. Prentzel, D. Gilbert & T. Vo, The Colorado Sun, "Marshall fire officially becomes Colorado's most destructive, with 991 homes and businesses burned, officials confirm" (Jan. 1, 2022), *available at* https://coloradosun.com/2022/01/01/marshall-fire-snow-displaced-residents-power-outage/.

43 C. Flynn, FOX31 Denver, "Nearly 1,100 homes destroyed in Marshall Fire, valued at over $500 million" (Jan. 1, 2022), *available at* https://kdvr.com/news/local/more-than-1000-homes-destroyed-in-marshall-fire-valued-at-over-500-million/amp/.

Eight of Colorado's 20 largest recorded fires hit after 2018 and all 20 occurred in the last two decades.[44] Moreover, the three largest recorded fires in Colorado–Cameron Peak, Pine Gulch, and East Troublesome–all occurred in 2020.[45] The East Troublesome Fire in Grand and Larimer Counties exhibited fire behavior never before witnessed in Colorado, spreading over 100,000 acres in one day and leaping the Continental Divide to threaten Estes Park. In just 48 hours, it *grew* by more acres than were burned by the 2002 Hayman Fire, which was the biggest fire recorded in Colorado before 2020.[46] A recent study found that such single-day extreme events will likely become more frequent due to climate disruption and that they "are projected to surpass anything witnessed yet," including the East Troublesome.[47]

The ongoing impacts that follow severe fires were dramatically illustrated in Glenwood Canyon where the Grizzly Creek Fire of 2020 burned. The loss of vegetation that is a natural control on erosion manifested in multiple mudslides throughout much of the 2021 summer. This included a massive slide caused by unprecedented monsoon rains that dumped as much as four inches of rain in an hour on the burn scar, burying the highway with up to 10 feet of debris. The highway was closed for two weeks and repair costs totaled over $100 million. The multiple highway closures throughout the heart of the summer tourism season wreaked havoc on the local economy.[48] Supply chains, already stressed by the pandemic, saw further disruption as the primary trucking route to the Front Range and beyond was cut off. In an already tight labor market, employees who live scattered on either side of the closure were unable to report to work. Local restaurants saw revenues

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[44] J. Ingold, The Colorado Sun, "Five Charts that Show Where 2020 Ranks in Colorado Wildfire History" (Oct. 20, 2020), *available at* https://coloradosun.com/2020/10/20/colorado-largest-wildfire-history/.

[45] *Id.*

[46] S. Brasch, CPR News, "Colorado's East Troublesome Wildfire May Signal A New Era of Big Fire Blow-ups" (Jan. 25, 2021), *available at* https://www.cpr.org/2021/01/25/colorados-east-troublesome-wildfire-may-signal-a-new-era-of-big-fire-blow-ups/; B. Finley, The Denver Post, "As Colorado Wildfires Burn, Fears that Climate Change is Causing 'Multi-level Emergency' Mount" (Oct. 25, 2020), *available at* https://www.denverpost.com/2020/10/25/colorado-wildfires-climate-change/; University of Nebraska – Lincoln, National Drought Mitigation Center, "U.S. Drought Monitor – Colorado" (accessed: Oct. 27, 2020), *available at* https://droughtmonitor.unl.edu/Maps/MapArchive.aspx; K. Plotner, The Denver Post, "The 20 largest wildfires in Colorado history by acreage burned, updated for 2020" (June 25, 2020), *available at* https://www.denverpost.com/2020/08/18/20-largest-wildfires-colorado-history-acreage/.

[47] S. Brasch, CPR News, "Study finds climate change could make rapid wildfire blowups like East Troublesome more frequent" (Apr. 11, 2022), *available at* https://www.cpr.org/2022/04/11/study-finds-climate-change-could-make-rapid-wildfire-blowups-like-east-troublesome-more-frequent/?utm_medium=email&utm_source=climate&utm_campaign=climate20220412.

[48] S. Weiser, Colorado Politics, "Glenwood Canyon I-70 closure wreaks havoc on travel and the economy" (Aug. 11, 2021), *available at* https://www.coloradopolitics.com/news/glenwood-canyon-i-70-closure-wreaks-havoc-on-travel-and-the-economy/article_51d50268-35cb-59f5-9819-ae027e021e0e html; K. Nicholson, The Denver Post, "I-70 through Glenwood Canyon reopens to traffic Saturday morning" (Aug. 14, 2021), *available at* https://www.denverpost.com/2021/08/14/i-70-glenwood-canyon-reopens/; O. Prentzel, The Colorado Sun, "Colorado seeks $116 million in federal aid for mudslide cleanup along I-70 in Glenwood Canyon" (Aug. 9, 2021), *available at* https://coloradosun.com/2021/08/09/colorado-seeks-federal-aid-mudslide-cleanup/?mc_cid=2d9b09b562&mc_eid=5c79949396.

fall by 25 percent and lodging by 50 percent.[49] In July 2021, a slide from the Cameron Peak burn scar killed four people when their house was swept into the Cache la Poudre River.[50]

Further, fire smoke is a public health threat, with particulate matter as the main constituent pollutant. Wildfire smoke now exposes millions of Americans each year to dangerous levels of fine particulate matter, lofting enough soot across parts of the West in recent years to erase much of the air quality gains made over the last two decades.[51] Wildfire smoke accounted for up to half of particulate matter pollution in the West in recent years. Particulates cause short- and long-term health problems, including exacerbation of asthma and other respiratory diseases as well as cardiovascular diseases, such as heart failure.[52] These health problems can occur from both short- and long-term exposures to fire smoke.

Approximately 90% of the particles in wildfire smoke are in the fine particulate size range ($PM_{2.5}$ or smaller); this particle size is easily inhaled and can enter the bloodstream, causing cardiovascular problems.[53] At the October 22, 2020 joint Commission and Board of Health meeting, Commission member Dr. Anthony Gerber MD, Ph.D. of National Jewish Health presented information to the Commission on the increased health effects from fire smoke, ranging from increased respiratory, cardiovascular, and other morbidity requiring medical attention, hospitalizations, and restricted activity days, to deaths.[54]

In addition to particulates, wildfire smoke also includes carbon dioxide and water vapor, which are both GHGs. Thus, the fires that are worsened by climate change are also further exacerbating the GHG effect.

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49 D. Gilbert, The Colorado Sun, "Glenwood Springs is still dealing with the effects of a long I-70 closure this summer. Federal aid is a lifeline." (Sept. 28, 2021), *available at* https://coloradosun.com/2021/09/28/glenwood-springs-sba-loans-mudslide-economic-disaster/.

50 O. Prentzel, The Colorado Sun, "One dead, three missing after flash floods sweep mud and debris from wildfire scars into Poudre Canyon" (July 21, 2021), *available at* https://coloradosun.com/2021/07/21/one-dead-after-flash-floods-in-poudre-canyon/?mc_cid=a14768f946&mc_eid=5c79949396.

51 J. Garthwaite, Stanford News, "Stanford researchers find wildfire smoke is unraveling decades of air quality gains, exposing millions of Americans to extreme pollution levels" (Sept. 22, 2022), *available at* https://news.stanford.edu/2022/09/22/wildfire-smoke-unraveling-decades-air-quality-gains/?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter.

52 AirNow, "Wildfire Smoke: A Guide for Public Health Officials" EPA-452/R-21-901 (Sept. 2021), at p. 1, *available at* https://www.airnow.gov/sites/default/files/2021-09/wildfire-smoke-guide_0.pdf; L. Montrose, The Conversation, "What's in wildfire smoke? A toxicologist explains the health risks and which masks can help" (July 15, 2021), *available at* https://theconversation.com/whats-in-wildfire-smoke-a-toxicologist-explains-the-health-risks-and-which-masks-can-help-164597?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter; M. Brown, AP News, "EXPLAINER: As wildfire smoke spreads, who's at risk?" (July 22, 2021) *available at* https://apnews.com/article/canada-science-health-environment-and-nature-coronavirus-pandemic-22599eded88b808881b86c22505136a5.

53 AirNow, *supra* note 52, at p. 4.

54 A. Gerber, MD, PhD, Air Quality Control Commission Meeting, "COVID-19 and air Pollution: Knowledge and gaps" (Oct. 22, 2020), at p. 9, *available at* https://drive.google.com/drive/folders/1nocUAUaVow7cWyBkFlrScZFHzVkgZlH8.

On top of the worsening fires, a warming climate is also dramatically changing the hydrologic cycle in Colorado and the West. The relationships of snow and water in many Western mountain forests are caught in a vicious climate cycle, with more fires leading to faster snowmelt and reduced water, which, in turn, makes forests more flammable.[55] Moreover, increased temperatures have already decreased snowpack, led to earlier runoff, and increased the proportion of rain to snow.[56] Overall, we can expect to see substantial flow declines in key waterways.[57]

The Western United States is locked in an extreme megadrought that has persisted for the past 20 years.[58] It deepened so much in 2021 that the region is now the driest it has been in at least 1,200 years, and shows no signs of easing in the near future.[59] As a result, basin flows, which supports 40 million people and the economy of the Southwest, are becoming rapidly depleted. Lake Powell and Lake Mead, the reservoirs that control allocation of water between the seven Colorado River basin states, are at crisis-level low elevations.

For years, researchers have pointed to alarming drops in water levels in the river due to climate disruption, exacerbating the fact that the annual flows upon which the Colorado River Compact was formulated were over-estimated. The Compact allocates annual flows between seven Western states and Mexico, but until recently, water managers have avoided difficult decisions on how to rebalance a system in which demand far outpaces supply.[60]

Instead, water managers have essentially drained Lake Mead and Lake Powell, the country's two largest reservoirs. In 2000, both reservoirs were about 95% full; today, they are each about 27% full. According to Bureau of Reclamation Commissioner Camille Touton, 2-4 million acre-feet would need to be cut by 2023 to prevent the system from reaching critically low water levels, threatening reservoir infrastructure and hydropower production that utility customers in Colorado and around the West depend upon. The commissioner set an August deadline for the basin states to come up with options for potential water cuts, but they did not submit a plan. As a result, the bureau announced that predetermined water cuts for Arizona, Nevada, and Mexico had kicked in

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[55] B. Berwyn, Inside Climate News, "Western Forests, Snowpack and Wildfires Appear Trapped in a Vicious Climate Cycle" (Sept. 26, 2022), *available at* https://insideclimatenews.org/news/26092022/western-forests-snowpack-wildfires-climate/?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter.

[56] P. Gonzalez & G.M. Garfin, Global Change Research Program, "Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States, Southwest" (2018), at p. 1112, *available at* https://nca2018.globalchange.gov/chapter/southwest (Volume II represents the consensus of government scientists and is the latest and best explanation of the impacts of climate change in the United States).

[57] B. Udall & J. Overpeck, Water Resources Research, Vol. 53, No. 3, "The Twenty-First Century Colorado River Hot Drought and Implications for the Future" (Feb. 17, 2017), at p. 2409-10, *available at* https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016WR019638.

[58] H. Fountain, The New York Times, "What Is a Megadrought?" (Aug. 19, 2021), *available at* https://www.nytimes.com/article/what-is-a-megadrought html.

[59] S. Borenstein, AP News, "West megadrought worsens to driest in at least 1,200 years" (Feb. 14, 2022), *available at* https://apnews.com/article/climate-science-west-megadrought-f02449c2db4f0ebeb1557bb39504c62d.

[60] I. James, Los Angeles Times, "They sounded alarms about a coming Colorado River crisis. But warnings went unheeded" (July 15, 2022), *available at* https://www.latimes.com/california/story/2022-07-15/scientists-have-long-warned-of-a-colorado-river-crisis?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter

and gave the states more time to come up with a basin-wide agreement.[61] Clearly, consequential decisions about basin wide water allocations lie ahead for commerce, industry, agricultural, and municipal water supplies.

C. Local Air Monitoring Data and Analyses Show Elevated Ozone Precursors are Linked to Oil and Gas

Certain LGC members have funded or conducted four different air quality studies, the results of which support the need for increased regulation of the oil and gas industry to improve ozone conditions. These studies are described below.

1. *Boulder County's Air Monitoring and Modeling Studies*

Since 2017, Boulder County has funded an air quality study to research the impacts of oil and gas development using equipment located at the Boulder Reservoir. The Boulder Reservoir monitoring project is a continuous, high-time resolution monitoring study that assesses concentrations of gases, their emissions sources, and their role in ozone production under the highly variable seasonal and diurnal air flow conditions that occur along the Colorado Front Range. In 2017, the researchers deployed the first automated system of its kind in the Rocky Mountain region that posts hourly data on a public website.[62] The monitoring study collects data on methane, NO_X, and VOCs on a continuous basis.

The results of the air monitoring study indicate a strong correlation between air quality in the area and surrounding oil and natural gas development, with northeasterly winds reliably bringing higher levels of ethane, propane, and methane that are not attributable to vehicle emissions. Strong winds from the west tend to carry the fewest pollutants of any samples, while moderate winds from the northeast tend to carry the highest pollutant levels. Boulder County is directly east of the Rocky Mountains and is bordered on the northeast by two counties–Weld and Larimer Counties–that have much more oil and gas development than Boulder County. For this study, ethane is used as an indicator of oil and gas sources because they are the only significant source of ethane emissions in this area. In addition, researchers are using the iso-Pentane/n-Pentane (i/n pentane) ratio as an indicator of oil and gas influence on the monitoring data. An increasing i/n pentane ratio shows an increased urban vehicle influence, while a decreased ratio shows increased oil and gas influence on the air monitor.[63] Monitoring data show a strong correlation between wind speed and direction and measured methane, ethane, propane, and a shift in the i/n pentane ratio. Air transported from the northeast during most time periods has a strong oil and gas emissions signature.[64]

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61 C. Outcalt & B. Peterson, The Colorado Sun, "100 years after the Colorado River Compact, the Southwest is nearing a crisis point" (Sept. 12, 2022), *available at* https://coloradosun.com/2022/09/12/colorado-river-compact-anniversary-southwest-drought/?utm_campaign=Rockies%20Today&utm_medium=email&utm_source=Revue%20newsletter

62 *See* Boulder County, "Current Weather and Atmospheric Chemical Conditions in Boulder, Colorado" (accessed: Oct. 27, 2022), *available at* https://www.bouldair.com/boulder htm.

63 LGC_PHS_EX-004, D. Helmig, Ph.D., "Final Report to Boulder County Public Health: Methane, Volatile Organic Compounds, and Nitrogen Oxides at the City of Boulder Reservoir (Colorado)" (Dec. 19, 2018).

64 *Id*.

The data show a strong correlation between elevated VOC concentrations and air pollution transport events from oil and gas regions. Frequent occurrences of air plumes with highly elevated VOC concentrations, with up to 100-fold increases over local background levels, have been observed. Interpretations with three different data analyses approaches consistently found much higher VOC pollutants coming from northeast of the monitor location. Oil and gas operations are very concentrated in Weld County, which is located to the northeast of the monitoring site. Air transported from oil and gas regions brings in elevated VOC levels. The source region for VOCs overlaps with the source region for high ozone occurrences, which strongly suggests that oil and gas emissions contribute significantly to exceedances of the ozone standard at the Boulder Reservoir monitoring site.

Transport analyses for elevated methane occurrences show that the oil and gas region in the northern portion of the DM/NFR is a much higher source region for methane emissions than in the City and County of Denver.[65] These results are similar to a 2014 study where four monitoring sites were located in eastern Boulder County with nearby oil and gas production wells while a fifth background monitoring site was located further west in the city of Boulder, approximately 15 miles from the east Boulder County line, which is the area of concentrated oil and gas development.[66] Methane measurements were the lowest at the westernmost monitoring site while measurements at the four east county monitors were higher. The highest measurements, at the site in Longmont, Colorado, were approximately twice as high as those at the background site. The researchers found that "[t]here was a noticeable increase in variability with increasing absolute levels, indicated by the wider spread of the data at the eastern monitoring sites. These two features (higher absolute levels as well as higher variability) are a clear indication of higher abundance and stronger strength of methane sources in the eastern part of the county, respectively toward the eastern county boundaries."[67]

The significant negative influence from the larger and more numerous oil and gas facilities located northeast of Boulder County is causing a public health concern in the county. It is clear from this study that emissions from oil and gas production are negatively impacting the area's air quality, and that increased emissions reductions are necessary.

A dataset of 13 non-methane VOCs (NMVOC) have been continuously collected at the Boulder Reservoir from April 2017 to present. The data set is unique because of the length of the data record and the large number of samples collected. The monitoring site is also located farther from the areas of intense oil and gas development, which are located greater than 20 kilometers (km) to the northeast of the monitoring site. A seasonal source apportionment analysis was conducted using 10,000+ NMVOC observations collected between 2017 and 2019. The NMVOCs were analyzed using two different methods. The analysis methods included a statistical regression analysis and a positive matrix factorization (PMF) model, both of which have been previously

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65 *See* Boulder County, Public Health "Boulder Reservoir Air Monitoring Study Results" (June 2020), *available at* https://assets.bouldercounty.org/wp-content/uploads/2020/06/Boulder-Reservoir-Air-Monitoring-Study-Exec-Summary-June-2020.pdf.

66 D. Helmig, *et al.*, Boulder County "Final Report - Section Ozone, Passive Sampling with Summa Canisters and Adsorbent Tubes: Air Quality Monitoring Study to Assess Exposure to Volatile Organic Compounds and Develop Cost-Efficient Monitoring Techniques" (May 13, 2015), at p. 1-2, *available at* https://assets.bouldercounty.gov/wp-content/uploads/2018/04/boulder-county-oil-and-gas-air-study-051315.pdf.

67 *Id*. at 17.

used in similar studies, "…to estimate the relative contribution of emissions from O&NG development to the observed abundances for speciated NMVOCs."[68] The two methods produced corroborating results, although the positive matrix factorization (PMF) method was ultimately found to be more robust than the regression analysis method. The results of the PMF analysis indicated that 79±1% of light alkanes (C_2-C_5) are associated with oil and gas activity during winter and approximately 84±20% of light alkanes are associated with oil and gas development during summer.[69] The study also found that hexane, a C_6 compound on the EPA's list of hazardous air pollutants (HAPs), was also predominantly attributed to oil and gas activities during all seasons.[70] Consistent with prior analyses, this work shows that the Boulder Reservoir monitoring site in the DM/NFR is more strongly influenced by oil and gas development than other U.S. urban regions.

Regarding the question of whether the DM/NFR would attain the ozone NAAQS but for the influence of wildfire smoke, an analysis of summer 2020 ozone monitoring data from the Boulder Reservoir, Longmont, and Broomfield monitoring sites found that based on wind speed and direction, the summertime daytime high ozone occurrences were predominantly associated with easterly transport. A similar, longer term analysis of 2017 through 2020 Boulder Reservoir ozone data resulted in the same conclusion.[71] Another analysis concluded that while there were clear enhancements (increases) in particulate matter during the fire smoke events this summer, there was no clear association between the occurrence of wildfire smoke events and afternoon peak ozone levels.[72] While the exact contribution of wildfire smoke to ozone concentrations remains unknown, it is clear that violations are occurring without the presence of smoke.

2. *City and County of Broomfield's Air Quality Monitoring and Testing Program*

The City and County of Broomfield, in conjunction with Ajax Analytics, Colorado State University (CSU), and Boulder AIR, began an air monitoring program in 2018 designed to monitor the impact of oil and gas operations throughout northern Broomfield. This network is capable of detecting elevated levels of VOCs, HAPs, and methane at the Extraction well sites, select nearby residential neighborhoods, and other sites throughout the city. The network consists of:

- PID sensors: Historically, 12 stationary photoionization detector (PID) sensors were deployed near oil and gas operations or in surrounding neighborhoods. These sensors provide real-time indicators of total VOCs and will detect concentration changes that require follow-up or analysis.

- Trigger canisters: Each PID sensor is equipped with a trigger canister that can capture VOC emissions in 15 or 1-minute increments when the PIDs detect VOCs above

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[68] LGC_PHS_EX-005, I. Pollack, *et al.*, Journal of Geophysical Research: Atmospheres, Vol. 126, No. 9, "Seasonality and Source Apportionment of Nonmethane Volatile Organic Compounds at Boulder Reservoir, Colorado, Between 2017 and 2019" (Apr. 15, 2021), at p. 2, *available at* https://doi.org/10.1029/2020JD034234.

[69] *Id* at 1.

[70] *Id*.

[71] LGC_PHS_EX-006, D. Helmig, Ph.D., Boulder A.I.R., "Boulder County Presentation October 8, 2020 for posting" (Oct. 8, 2020), at p. 19-25.

[72] See *id.* at p. 40.

established thresholds. The canisters are sent to a lab to be analyzed for speciated VOCs, such as benzene. These canisters provide speciated VOC concentrations at fixed points in time.

- Weekly canisters: The city collects weekly canisters to be analyzed for VOCs, ethane, and methane from each of the PID sensor locations. Each sample is collected continuously during a period of 7 days and represents the average concentration over that weeklong time period. These samples provide baseline measurements which can be compared to trigger canister analysis results and can help identify when the trigger canister detects emission events.

- Proton Transfer Reaction Mass Spectrometer (PTR-MS): This reference-grade equipment provides granular, real-time data on air toxics of greatest concern (BTEX). It is currently located at Soaring Eagle Park.

- Plume tracker: The city deploys CSU's mobile plume tracker on non-windy days to capture data on methane plumes and BTEX.[73]

Boulder AIR operates two reference-grade air quality monitoring trailers, one at Soaring Eagle Park in the Anthem Ranch neighborhood, and one at the North Pecos Open Space near the Northwest pads. This equipment includes a gas chromatography system that provides real-time data on VOCs (including ethane, propane, benzene, toluene, and pentanes), methane, and ozone as well as monitors meteorological conditions.[74]

Results for total VOC (TVOC), benzene, toluene, ethylbenzene, and xylene (BTEX) are reported quarterly for all monitoring sites. Notable for quarter two of 2022, localized increases in VOC concentrations are attributed to oil and gas production activities at Northwest Parkway and pre-production activities at the United pad sites throughout the quarter. Weekly canister data demonstrates elevated VOCs over baseline pre-production activities at all the Extraction well sites and in nearby residential neighborhoods.[75]

In May 2022, Broomfield made available the results of a health study finding that people living near unconventional oil and gas facilities may be at risk of developing acute and non-acute adverse health symptoms.[76] Researchers from the School of Public Health at the University of Colorado Anschutz campus collaborated with Broomfield's Department of Public Health and Environment on the study. The study identified 3,993 randomly selected households across Broomfield located between one and two miles, and greater than two miles from the Extraction well sites. Study participants were mailed a postcard with a QR code that linked to the study questions, which asked

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[73] Ajax Analytics for The City and County of Broomfield, "Quarterly Reports," *available at* https://www.ajax-analytics.com/broomfield-quarterly-reports.

[74] AirLive, The City and County of Broomfield, *available at* https://www.bouldair.com/broomfield.htm.

[75] Ajax Analytics with CSU for The City and County of Broomfield, "Q2 2022 Quarterly Air Quality Monitoring Report" (2022), at p. 8, *available at* https://drive.google.com/file/d/1QtFzMZYcmzBB1pLSeBNXtvsxYAgCxoTk/view.

[76] LGC_PHS_EX-007, M. Weisner, Ph.D. & L. McKenzie, Ph.D., MPH, "Research Results from the Broomfield Health Symptoms Survey and Proximity to Active, Multi-Well Oil and Gas Sites" (May 2022), *available at* https://www.broomfieldvoice.com/oil-and-gas-health-survey.

about the frequency of symptoms such as difficulty sleeping, headaches, dizziness, anxiety or stress, numbness or tingling, nausea, vomiting, nosebleeds, among other things. To analyze the resulting data, the study team assigned numeric values to the frequency of symptoms. After the results were collected, symptoms were grouped into eight categories based on previous studies, physiology, and principal components analysis, including total number of symptoms, frequency of total number of symptoms, upper respiratory and lower respiratory symptoms, neurological symptoms, gastrointestinal symptoms, and mental health symptoms. The study team used the method of least squares linear regression to test the association between residence setback distance to the Extraction Well Sites and the overall number of symptoms and their frequency. Separate models were used for adults and children under 18 years old.

The results of the health study document a statistically significant increase in the reported frequency of adverse health symptoms by persons living within two miles of the Extraction Well Sites. Specifically, the study revealed that adult respondents living within one mile of the Extraction Wells reported statistically significant increases in the frequency of upper respiratory and acute symptoms (nosebleeds, lung irritation, shortness of breath, cough, throat irritation, nausea, and vomiting) as compared to adults living more than two miles away. Parents living within two miles of the Extraction Wells reported statistically significant increases in frequency of lower respiratory, gastrointestinal, and acute symptoms, as well as more overall symptoms for their children, than those living more than two miles away.[77]

3. *City of Longmont's Air Monitoring Study*

The City of Longmont is concerned about the impact that oil and gas has on local air quality and has sponsored a study to install two monitoring stations to increase data collection and expand Boulder AIR's regional analysis. The study involves observations of meteorological conditions as well as continuous monitoring of atmospheric pollutants, including methane, VOCs, carbon dioxide (CO_2), NO_X, ozone, and particulate matter. The objectives of this program are to: 1) establish baseline air quality conditions for assessing potential impacts from oil and natural gas drilling emissions on local and regional air quality, and 2) observe changes in greenhouse gas pollution to assess the City's sustainability goals, in particular, its path towards curbing greenhouse gas emissions. The approach enables comparison of concurrent observations of the three most important climate gases, CO_2, methane, and tropospheric ozone, at two strategically located monitoring locations, one west and one east of the City of Longmont.

Longmont's air monitoring study began in late 2019. Similar to the results of Boulder County's monitoring, analysis by Dr. Helmig of Boulder AIR indicates that oil and gas exerts a strong influence on the Longmont's local air quality. Comparison of wind speed/direction and methane/VOC concentrations consistently indicates that the dominant source of these pollutants lies to the east and northeast of Longmont, in the direction of oil and gas well fields of Weld County. Additionally, concentrations of methane and VOCs measured on the east side of Longmont, nearer to the wellfields, are higher and more variable than concentrations measured at the Longmont airport on the west side of town.

[77] *Id.*

During both 2020 and 2021, instruments at the east Longmont monitoring station recorded numerous short-term pollution events, during which methane and other oil and gas-related pollutants were significantly elevated. These short-term events typically lasted 5 to 15 minutes and included concurrent rapid increases in methane, ethane, propane, benzene, and other VOCs. The highest concentrations recorded to date occurred during an event on January 6, 2021, when the peak methane concentration was 14,500 ppb, over 7.5 times higher than background. The precise peak ethane concentration during this event was not quantified because monitoring sensors became saturated; however, it is estimated to have been 1000-3000 times higher than the regional background.[78] Analysis of chemical signatures further supports that these events were related to oil and gas operations. The results of Longmont's air quality study highlight the prevalence of high concentration, short-term, oil and gas-related pollution events, and supports that the oil and gas development in neighboring Weld and Larimer Counties has a significant impact on the air quality of Longmont.[79]

4. *Town of Erie's Air Monitoring Study*

The Town of Erie began an air monitoring program in September 2021 with contracts with BoulderAIR and Ajax Analytics/CSU. The program consists of 10 Ajax/CSU PID triggered whole-air canister sampling stations, similar to the sites described in Broomfield and one Boulder AIR operated continuous air monitoring station, and similar to the facilities described at Boulder County's Boulder Reservoir, Longmont's Union Reservoir, and Broomfield's Soaring Eagle and North Pecos sites.[80]

The program was initiated in response to resident concerns about potential health related impacts of the 96 producing wells within municipal limits and the 221 wells producing within 2,000 feet of Erie. VOC concentrations measured in weekly canisters are directly correlative to the samples' proximity to oil and gas production or spill events. Additionally, the program has recorded 26 plumes via triggered 1 minute whole air canister samples of significantly elevated alkanes and VOCs which are, through composition analysis, attributable to either on-going production activities or were the results of unplanned spill and release events. Methane concentrations exceeding 5,000 ppb are observed routinely, approximately twice per month, with some measurements exceeding 10,000 ppb, likely due to the proximity of oil and gas production.

While the air monitoring program in Erie lacks the length of data record of the neighboring programs, the first year of operation has found similar results to the longer-lived programs and strengthens the record of evidence showing that oil and gas development has a significant impact on the air quality of the adjacent communities.

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78 Boulder A.I.R., "Longmont Air Quality Study Q1 2021 Report" (2021), at p. 7, *available at* https://www.longmontcolorado.gov/home/showpublisheddocument/34053/637588363642770000.

79 *Id.* at 2.

80 Town of Erie, "Air Quality: Town of Erie Air Quality Monitoring Program," *available at* https://www.erieco.gov/869/Air-Quality; Town of Erie, "Current Air Conditions in the Town of Erie," *available at* https://www.bouldair.com/erie.htm.

D. Additional Control Measures are Critically Needed to Address NO_X Emissions from Oil and Gas Production Activities.

1. *SIP Modeling Shows that Ozone is Often NO_X Sensitive*

Within the DM/NFR ozone NAA, the relative influence of the two classes of ozone precursors, VOC and NO_X, depends on location and varies day-by-day. SIP modeling shows that emissions reductions are needed for *both* precursors. The 2023 ozone source apportionment modeling presented in the draft SIP and its supporting documents shows that high ozone at key monitoring locations is often formed under NO_X-sensitive conditions.[81] For example, for emissions from the continental modeling domain contributing to ozone at the National Renewable Energy Lab (NREL) on the ten highest ozone days, 65% of the ozone was formed under NO_X-sensitive conditions.[82] For emissions within the DM/NFR nonattainment area, 55% of the ozone at NREL on the ten highest ozone days was formed under NO_X-sensitive conditions.[83]

Within the NAA, NO_X reductions from dispersed sources outside of the metro area's urban core are expected to be especially effective in reducing ozone, as the ozone production efficiency of NO_X emissions increases with lower NO_X emissions density and higher VOC/NO_X emissions ratios. This trend is illustrated by the results of modeling performed for the FRAPPÉ/DISCOVER AQ study, which concluded that "NO_X emissions inside the Denver-Julesburg (DJ) basin are particularly important for how efficiently ozone is produced before NO_X availability increases due to transport of these air masses across the urban regions to the west."[84] The source apportionment results presented at the Regional Air Quality Control Council (RAQC) modeling forum in April 2021 similarly show the highest likelihood that ozone was formed under NO_X-limited conditions in portions of the NAA that are away from the urban core, with NO_X-sensitive conditions prevailing over most of the domain.[85] While not negating the critical need for VOC reductions, these findings call for redoubled efforts to reduce NO_X emissions throughout the DM/NFR area, including from oil and gas sources in the DJ Basin.

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[81] State Implementation Plans for the Denver Metro and North Front Range Ozone Nonattainment Area, Draft, Colorado Department of Public Health and Environment and Regional Air Quality Council (Sept. 2022) (hereinafter "Draft SIP"); 2026/2023 Attainment Demonstration Modeling for the Denver Metro/North Front Range 2023 Severe/Moderate Ozone State Implementation Plan, Technical Support Document, Ramboll (Aug. 2022) (hereinafter "TSD").

[82] Draft SIP at p. 5-42; TSD at pp. 45-46.

[83] *Id.* Results presented for other sites at the April 2021 Ozone Modeling Forum indicate that NOx-sensitive conditions prevail at each of the key sites in the DM/NFR that were considered in the source apportionment analysis, with percentage NOx-sensitive production for CASA: 60%, CHAT: 72%, FTCW: 80%, NREL: 65%, RFNO: 70%, RMNP: 86% and WELD:67%.

[84] LGC_PHS_EX-008, G. Pfister, *et al.*, National Center for Atmospheric Research, "Process-Based and Regional Source Impact Analysis for FRAPPÉ and DISCOVER-AQ 2014, Final Report" (July 2017), at p. 46, *available at available at* https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=FRAPPE-NCAR_Final_Report_July2017.pdf.

[85] LGC_PHS_EX-009, Denver Ozone Modeling Forum, "2023 OSAT Ozone Source Apportionment NOx/VOC Sensitivity Results, Ramboll and Alpine Geophysics" (April 14, 2021), *available at* https://raqc.egnyte.com/dl/oynO19Yc73/2021_Modeling_Forum_Master_Presentation.pdf.

2. *NO_X Emissions Contribute to Other Environmental Harms and Health Impacts*

In addition to serving as an ozone precursor, nitrogen oxide is also a fine particulate ($PM_{2.5}$) precursor pollutant and is addressed by the nitrogen dioxide (NO_2) standard, so this one pollutant plays multiple roles in contributing to three criteria pollutants under the Clean Air Act. Short-term exposure to NO_2 causes airway irritation and aggravates asthma, while long-term exposure is associated with respiratory and cardiovascular disease and decreased lung function growth in children.[86] $PM_{2.5}$ itself is linked to an array of health impacts including lung and heart disease. The estimated health damages from the contribution of NO_X to $PM_{2.5}$ alone exceeds ten thousand dollars per ton.[87] In addition to the adverse health effects caused by NO_2, $PM_{2.5}$, and ozone, NO_X emissions also contribute to visibility impairment in Class I areas and to nitrogen deposition that harms sensitive alpine ecosystems.

i. Nitrogen Dioxide from Drill Rig Engines

In 2014, the Colorado Field Study Workgroup, including WESTAR-WRAP, the City and County of Denver, EPA, and the Bureau of Land Management measured fenceline NO_2 levels near an operating drill rig at two different sites in the DJ Basin near Platteville, CO.[88] The rigs were powered by three diesel generators that were certified as EPA Tier 2 engines. NO_2 levels were monitored over two weeks at each site. One-hour average NO_2 levels exceeded the short-term NAAQS (100 ppb) on two occasions at the second site. These exceedances were not violations due to the form of the one-hour standard but indicate the potential for drill rig NO_X emissions to contribute to high NO_2 exposures.

ii. NO_X Emissions and Fine Particulate Health Impacts

In addition to being an ozone precursor pollutant, NO_X is also a $PM_{2.5}$ precursor pollutant and although Colorado currently has no $PM_{2.5}$ nonattainment areas, there is still reason for exposure concern in several locations, including in the ozone nonattainment area which only compounds the negative health impacts associated with high concentrations of several air pollutants and increases the disproportionate impacts on low income and minority populations in the area. EPA's May 2022 *Final Policy Assessment for the Reconsideration of the PM NAAQS* reviews the wide range of acknowledged health outcomes of $PM_{2.5}$ exposures which include mortality, cardiovascular and respiratory morbidity, lung cancer, and nervous system effects. These poor health outcomes are worsened for at-risk populations, which include children, the elderly, minorities, and those with low socioeconomic status.[89] The Policy Assessment made the conclusion that, "…the current

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[86] California Air Resources Board, "Nitrogen Dioxide and Health" (last visited: Oct. 28, 2022), *available at* https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health.

[87] LGC_PHS_EX-010, A.L. Goodkind, *et al.*, PNAS, Vol. 116, No. 18 "Fine-scale damage estimates of particulate matter air pollution reveal opportunities for location-specific mitigation of emissions" (2019), at p. 8775-8780.

[88] LGC_PHS_EX-011, Colorado Field Study Workgroup, "2014 Colorado Oil and Gas Drill Rig Field Study Model Evaluation Database, presentation for the WRAP Oil & Gas Workgroup" (Dec. 8, 2020), *available at* https://www.wrapair2.org/pdf/WRAP_OG_WG_Overview_Colorado_NO2_Drill_Rig_Study_12082020.pdf.

[89] U.S. Envtl. Prot. Agency, "Final Policy Assessment for the Reconsideration of the PM NAAQS," EPA-452/R-22-004 (May 2022), at p. 3-50 through 3-59, *available at* https://www.epa.gov/naaqs/particulate-matter-pm-standards-policy-assessments-current-review-0.

primary $PM_{2.5}$ standards could allow a substantial number of $PM_{2.5}$-associated deaths in the U.S." The policy assessment goes on to explain that "…when air quality in the 47 study areas is adjusted to simulate just meeting the current standards, the risk assessment estimates 40,600-45,100 long-term $PM_{2.5}$ exposure-related deaths in a single year, with confidence intervals ranging from 30,300-59,000 deaths."[90] EPA's Policy Assessment ultimately recommended lowering the annual $PM_{2.5}$ standard from 12.0 micrograms per cubic meter μ/m^3 to 10.0 μ/m^3.[91]

Unfortunately, 2021 monitoring data for the Denver area shows there were three monitors that exceeded the 98th percentile 24-hour NAAQS of 35 μ/m^3; those monitors are: Longmont, National Jewish Health (Denver), and Chatfield State Park. The Longmont and Chatfield State Park monitors are also violating the 24-hour 3-year average with concentrations of 47 μ/m^3 and 36 μ/m^3 respectively.[92] This means that the area is in danger of also becoming a $PM_{2.5}$ nonattainment area which reinforces the need for increased NO_X reductions sooner.

iii. Social Costs of NO_X Emissions

The estimated social costs from NO_X emissions contributions to health effects of $PM_{2.5}$ alone exceed ten thousand dollars per ton. Damages from ozone health effects and the harmful effects of ozone and $PM_{2.5}$ on the environment add to that estimate. Goodkind et al. (2019) estimated a national mean value of health damage from the contribution of NO_X emissions to $PM_{2.5}$ of $13,000 per metric ton in 2011 dollars, with a 99th percentile range of $1,500 to $52,000 per metric ton.[93] The map presented of damage estimates by source location suggests the estimates for Colorado's North Front Range are in the range of $8,000 to $16,000 per metric ton in 2011 dollars. Using the U.S. Bureau of Labor Statistics CPI inflator to adjust from 2011 to 2022 dollars, the current damage estimates are $11,000 to $22,000 per metric ton.

iv. Visibility Impairment in Class I Areas

In addition to being an ozone precursor, the NO_X pollution emitted from oil and gas sources contributes to poor visibility conditions in Class I areas (national parks and wilderness areas) and nitrogen deposition in sensitive ecosystems. Colorado is home to 12 mandatory Class I federal areas protected under the Clean Air Act and by EPA's Regional Haze Program. Visibility is tracked by Interagency Monitoring of Protected Visual Environments (IMPROVE) network; six IMPROVE stations are located in Class I areas in Colorado.[94]

Under the EPA's Regional Haze Rule, Colorado must adopt additional plans to improve visibility in order to make reasonable progress towards the year 2064 regional haze milestone and meet the requirements for the second implementation period. Section 169A of the Clean Air Act establishes

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[90] *Id.* at p. 3-167.

[91] *Id*. at p. 3-217.

[92] Colorado Department of Public Health & Environment, Air Pollution Control Division Technical Services Program, "2022 Ambient Air Monitoring Network Plan" (June 30, 2022), at p. 22, *available at* https://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=2022AnnualNetworkPlan.pdf

[93] *See* Goodkind, *et al.*, *supra* note 87.

[94] *See* Colorado State University, "IMPROVE Program" (last visited: Oct. 28, 2022), *available at* http://vista.cira.colostate.edu/Improve/improve-program/.

requirements for visibility protection for Federal class I areas for which impairment results from human-cause air pollution. "Visibility impairment" is defined under the Clean Air Act to "include reduction in visual range and atmospheric discoloration."[95] Visibility is impacted by an array of sources, including sources of NO_X.

Rocky Mountain National Park is one of Colorado's Class I areas. The National Park Service has operated a visibility monitor in Rocky Mountain National Park since 1991, as part of the IMPROVE network.[96] Overall, visibility has not improved at Rocky Mountain National Park in the last 10 years despite the implementation of past regional haze SIPs, although there is an improving trend looking back to data from 1991.[97] The regional haze SIP approved by the Commission in 2021 shows that visibility conditions on the 20% most impaired days and the 20% least impaired days are improving in the park but all of the visibility metrics (visibility on clearest days, visibility on haziest days, visibility on most impaired days, and visibility on mid-range days) for the year 2010 through 2019 show a "relatively unchanging trend slope."[98] Mobile sources, oil and gas, and coal-fired electric generating units (EGUs) are some of the main contributors to impairment at Rocky Mountain National Park,[99] and the fact that visibility improvements are not evident in the past decade points to the need for additional reductions from these sources of impairment. Since mobile sources and oil and gas are the top contributors of the NO_X emissions that cause high ozone levels, this is an additional reason to reduce emissions from these sources.

v. Nitrogen Deposition in Sensitive Ecosystems

NO_X emissions contribute to nitrogen deposition leading to negative ecological effects including loss of biodiversity in freshwater, wetland, and estuarine ecosystems through acidification and nitrogen enrichment/eutrophication.[100]

High levels of nitrogen deposition are causing significant degradation in the eastern portion of Rocky Mountain National Park, disrupting its fragile ecosystems. Due to increasing levels of harmful nitrogen deposition, the Rocky Mountain National Park Nitrogen Deposition Reduction Plan (NDRP) was issued in 2007 jointly by CDPHE, EPA, and the National Park Service (NPS). The NDRP established a nitrogen deposition threshold, which "is the 'critical load' of nitrogen that can be absorbed by ecosystems within Rocky Mountain National Park before detrimental changes occur."[101] This threshold is the resource management goal. A glidepath approach was

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95 42 U.S.C. §7491(g).

96 Nat'l Park Serv., "Air Quality Conditions & Trends, Rocky Mountain National Park" (last visited: Oct. 28, 2022), *available at* https://www nps.gov/subjects/air/park-conditions-trends.htm?tabName=trends&parkCode=ROMO&paramCode=Visibility&startYr=1991&endYr=2019&monitoringSite=ROMO1%20(IMPROVE)&timePeriod=Long-term.

97 *See id.*

98 *Id.*

99 Air Pollution Control Division, Draft Colorado Visibility and Regional Haze State Implementation Plan for the Twelve Mandatory Class I Federal Areas in Colorado (2021), at pp. 50-52.

100 U.S. Envt'l Prot. Agency, EPA/600/R-20/278, "Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter-Ecological Criteria" (Sept. 2020), *available at* https://www.epa.gov/isa/integrated-science-assessment-isa-oxides-nitrogen-oxides-sulfur-and-particulate-matter.

101 Nat'l Park Serv., Envt'l Prot. Agency, & Colo. Dep't of Pub. Health & Env't, "Rocky Mountain National Park Initiative – Nitrogen Deposition Reduction Contingency Plan" (June 21, 2010), at p. 3, *available at*

developed to achieve the critical threshold, with interim targets along the glidepath set at five-year intervals. Despite these goals developed in the NDRP 14 years ago, deposition levels remain above the glidepath. In fact, the most recent milestone report that uses 2017 data, showed that wet nitrogen deposition levels were 38% higher than that year's target level.[102] The milestone report also found significant increasing long-term trends in precipitation-weighted mean ammonium concentrations through 2017 at all five monitoring sites.[103]

Due to concerns over the negative impacts from nitrogen deposition at Rocky Mountain National Park, in 2019 the Commission passed a resolution which states, "Recognizing the commonalities in emissions and atmospheric processes affecting nitrogen deposition, regional haze, and ozone, the Commission will actively include consideration of nitrogen deposition reduction goals in upcoming rulemakings for regional haze, ozone, and Senate Bill 19-181."[104] Despite this resolution, nitrogen deposition at the national park is not mentioned in any of the ozone SIP documents submitted to the Commission for this rulemaking.

vi. Oil and Gas is the Largest Source of NO_X Emissions in the Nonattainment Area

According to the draft SIP, the oil and gas sector is the largest source of NO_X emissions in the nonattainment area. In the 2023 inventory for the 2015 NAA, the oil and gas sector is estimated to emit 57.6 tons per day (TPD) of NO_X, nearly three times the emissions from on-road vehicles.[105] The oil and gas sector emissions comprise 39% of the NO_X emissions in the 2023 inventory. In comparison, non-road NO_X emissions are a distant second, contributing 25% of the inventory; on-road NO_X emissions are third with a 13% contribution.[106] Within the 2008 NAA boundary in the 2026 inventory, the oil and gas sector accounts for 41% of NO_X emissions, followed by non-road emissions at 27% and on-road emissions at 17%.[107]

The SIP inventory indicates the main sources of NO_X in the oil and gas sector are internal combustion engines, including both diesel engines used in pre-production activities and natural gas-fired engines used in production, processing, and transmission phases. As shown in Table 38 of the draft SIP, which is reproduced below, internal combustion engines classified as point sources contribute 27% of oil and gas NO_X emissions in the 2023 inventory for the 2015 NAA.[108] Well pad internal combustion engines counted in the area source portion of the inventory contribute 31% of total oil and gas NO_X emissions; hydraulic fracturing engines contribute 16.5%;

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https://www.colorado.gov/pacific/sites/default/files/AP_PO_Nitrogen-Deposition-Reduction-Plan-NDRP-Contingency-Plan-Final-Version.pdf.

[102] Colo. Dep't of Pub. Health & Env't, Nat'l Park Serv. & Envt'l Prot. Agency, "RMNP Initiative: 2017 Nitrogen Deposition Milestone Report" (July 1, 2019), at p. 22, fig.3, *available at* https://cdphe.colorado.gov/public-information/planning-and-outreach/rocky-mountain-national-park-initiative.

[103] *Id.* at 33.

[104] Air Quality Control Commission, "Rocky Mountain National Park (RMNP) Resolution," (adopted Sept. 19, 2019), at p. 3, *available at* https://cdphe.colorado.gov/sites/cdphe/files/AP_PO_Air-Qaulity-Control-Commission-%20AQCC-Resolution-2019.pdf.

[105] Draft SIP at p. 4-27, Table 37.

[106] *Id.* at p. 4-27, Table 37.

[107] *Id.* at p. 4-15, Table 28.

[108] *Id.* at p. 4-30, Table 38.

drill rig engines contribute 13%; and process heaters contribute 8%.[109] All of these sources require attention. However, diesel-fired drill rigs and hydraulic fracturing engines are of particular concern because of their disproportionately high potential to emit NO_X, along with carbon monoxide (CO), CO_2, and primary PM, and because they have long been underregulated in Colorado.

Figure 1. Emissions estimates for oil and gas sources, reproduced from the draft SIP.

Table 38. 2023 Oil and Gas Sources

2023 Oil and Gas Area Sources (TPD)						
	2008 NAA Boundary		N. Weld Contrib		2015 NAA Boundary	
Description	2023 VOC	2023 NOx	2023 VOC	2023 NOx	2023 VOC	2023 NOx
Area	**68.5**	**37.7**	**4.3**	**2.5**	**72.8**	**40.2**
Drilling Engines	0.70	7.37	0.02	0.21	0.72	7.58
Drilling Mud Degassing	1.95	--	0.02	--	1.97	--
Fugitives	10.79	--	0.33	--	11.11	--
Hydraulic Fracturing Engines	2.05	9.23	0.06	0.26	2.11	9.49
Process Heaters	0.22	4.60	0.01	0.26	0.23	4.86
Pneumatic Devices	24.50	--	1.33	--	25.83	--
Pneumatic Pumps	0.06	--	0.00	--	0.07	--
Separator Control	5.01	--	0.62	--	5.63	--
Truck Loading of Condensate Liquid	4.92	0.03	0.42	0.00	5.34	0.03
Venting - Blowdowns	5.31	--	0.34	--	5.65	--
Venting - Initial Completions and Recompletions	2.45	0.09	0.07	0.00	2.52	0.09
Water Tank Losses	2.49	0.21	0.22	0.03	2.72	0.23
Internal Combustion Engines (Well-pad)	8.06	16.16	0.88	1.70	8.94	17.86
Condensate/Oil Tank	**27.7**	**0.3**	**11.3**	**0.2**	**39.0**	**0.4**
Point	**13.3**	**15.3**	**1.9**	**1.7**	**15.2**	**17.0**
External Combustion Boilers	0.04	0.23	0.00	0.05	0.04	0.28
Industrial Processes	3.68	1.17	1.01	0.14	4.69	1.31
Internal Combustion Engines	6.85	13.84	0.67	1.44	7.52	15.28
Petroleum and Solvent Evaporation	2.69	0.04	0.24	0.12	2.93	0.15
Waste Disposal	0.01	0	0	0	0.01	0
Oil & Gas SUBTOTAL	**109.5**	**53.2**	**17.6**	**4.4**	**127.0**	**57.6**

According to the draft SIP inventory for 2023 (Figure 1 above), drill rig engine emissions in the NAA are projected to total 7.6 TPD or approximately 2,800 tons per year (TPY) (assuming uniform emissions year-round) and hydraulic fracturing engines total 9.5 TPD or approximately 3,500 TPY. Division staff indicate the 2023 inventory assumes 1,874 spuds will occur within the 2015 NAA.[110] Using that spud count, the pre-production emissions totals reported in the 2023 inventory equate to an average of 3.3 tons of NO_X per well (1.5 tons from drill rig engines and 1.9 tons from hydraulic fracturing engines). Based on this average estimate, a pad with more than 7.5 wells drilled in one year would be classified as a severe NAA major source (> 25 TPY) if these

[109] *Id.* at p. 4-30, Table 38. The breakdown of oil and gas emissions in 2026 for the 2008 NAA is given in the draft SIP in Table 29. The breakdown for 2026 is similar to that for 2023, so for brevity draft SIP Table 29 is not included here.

[110] Email communication from Jessica Ferko, CDPHE, to Cindy Copeland, Boulder County (Sept. 29, 2022).

engines were counted as stationary sources. A pad with more than 15 wells drilled in one year would be classified as a major source (> 50 TPY) in a serious NAA.

While they represent only a fraction of the drilling applications submitted, Comprehensive Area Plan (CAP) applications filed in the past year with the Colorado Oil and Gas Conservation Commission (COGCC) under Rule 314[111] underscore the significance of pre-production NO_X emissions including those from drill rigs and hydraulic fracturing engines. The CAP applications also help demonstrate the technical feasibility of addressing emissions from pre-production sources using alternative fuels and line power.

The Kerr-McGee Bronco CAP covers 24,322 acres in Weld County, with plans for a maximum of 209 wells to be drilled within six years at 11 conceptual locations.[112] The application states that Kerr-McGee will pursue electricity infrastructure upgrades needed to electrify permanent production and compressor station facilities.[113] No mitigation measures specific to pre-production NO_X emissions are listed.[114] The application states that emissions for pre-production activities were calculated using emissions estimates from existing and historical Kerr-McGee facilities in the DJ basin.[115] Project-level NO_X emissions are projected to peak at 469 tons per year in the second year of development, when the largest number of wells are drilled, with emissions exceeding 340 tons per year for three years.[116] Summing the emissions over the first four years of the project when development occurs and dividing by the 209 wells proposed yields an estimated average of 6.5 tons of pre-production NO_X emissions per well drilled and completed. This is approximately twice the average per-well pre-production NO_X emissions inferred from the draft SIP inventory as explained above. Part of the discrepancy may be that in addition to drilling and hydraulic fracturing engines, CAP applications include emissions from pad preparation and other construction equipment that are counted in the non-road inventory in the SIP. Regardless of how they are counted, these oil and gas pre-production activities are a significant source of NO_X in the NAA.

The Crestone Box Elder CAP describes a 151-well project with 20 locations on 37,520 mineral acres located on both sides of I-70 immediately east of E-470 in Aurora, CO.[117] The Box Elder application states that the operator is pursuing line power "to run fully electric drilling rigs and production facilities"[118] and that Tier 4 dual fuel hydraulic fracturing engines will be used for the

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111 According to COGCC Rule 314, 2 CCR 404-1-314, the purpose of Comprehensive Area Plans is to facilitate evaluating and addressing cumulative impacts. As an incentive for operators to prepare them, COGCC may convey an exclusive right to operate in the covered area.

112 LGC_PHS_EX-012, Kerr-McGee Oil & Gas Onshore LP, "Rule 314 Comprehensive Area Plan Amended Application" (Apr. 14, 2022), at p. 2.

113 LGC_PHS_EX-013, Kerr-McGee Oil & Gas Onshore LP "Rule 314 Bronco Comprehensive Area Plan" (Apr. 14, 2022), at Amended Exhibit 4, at p. 9 (hereinafter "Kerr-McGee Bronco CAP Application").

114 *Id.* at pp. 15-17.

115 *Id.* at p. 18.

116 *Id.* at p. 19, Table 1.

117 LGC_PHS_EX-014, Crestone Peak Resources Operating LLC, "Second Amended Rule 314 Comprehensive Area Plan Application" (June 1, 2022).

118 LGC_PHS_EX-015, Crestone Peak Resources Operating LLC, "Crestone Box Elder CAP Application" (June 2, 2022), at p. 8.

project.[119] However, electrification is not assumed for the project's air quality cumulative impact assessment. This assessment estimates "worst case" pre-production emissions (assuming diesel engines are used) for a 145-well project will range from 22.1 to 103.6 Tons of NO_X per pad, with an average of 59.1 tons per pad. Using the project's average pad size of 7.6 wells, this equates to an average of 7.7 tons of pre-production NO_X emissions per well. NO_X emissions for the project (including pre-production and production) peak at 395.7 tons NO_X in the third year (2023) when maximum development was scheduled to occur.[120]

The PDC Energy Guanella CAP describes a 466-well project with 22 locations on 33,427 mineral acres in Weld County.[121] The CAP application states that "PDC will drive its drilling rigs and most production equipment with electric power at all locations …"[122] The application further states that PDC will use electric power for both "surface and production rigs", and to their knowledge they will be the first operator in the DJ Basin to use electric power for a surface rig.[123] The air quality cumulative impact evaluation states that electrification of drill rigs was assumed in developing the emissions estimates. Despite this, annual NO_X emissions from the project are estimated to peak at 2853 tons per year in 2026, and to exceed 800 tons per year for six years of project development.[124] Total emissions shown for the project development period are estimated to be about 21 tons NO_X per well, 98% of which is attributed to pre-production emissions. According to APCD staff, the pre-production engine emissions reported in the CAP application are expected to be revised downward, because the operating time for the engines was overestimated when the inventory was prepared.[125] As of this writing the revised estimates are not available, so the size of the correction is unclear. Nevertheless, the CAP application underscores the critical importance of getting a better handle on pre-production emissions and addressing this potentially overwhelming source of NO_X. In the future, annual oil and gas emissions reports required under Commission Regulation 7, Part D, section V should be used to refine and update NO_X emissions estimates for the oil and gas sector, including for pre-production activities.

vii. NO_X Emissions from Oil and Gas and Related Operations are Inadequately Regulated in Colorado

NO_X sources in the oil and gas sector include spark ignition internal combustion engines that are typically natural gas-fired compressor engines; gas turbine engines used in compressors and generators; and compression ignition engines that are typically diesel-fired and used to power drill rigs and hydraulic fracturing pumps. These diesel engines may be used directly or used to power generators that in turn power drill rigs and frac pumps. Operator data that were used as input to

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[119] *Id.* at p. 17.

[120] LGC_PHS_EX-016, SLR International Corporation, Box Elder Comprehensive Area Plan, Air Quality Cumulative Impacts, COGCC Rule 300, December 2021, Attachment E to Geosyntec Corporation Rule 314.E(10) Cumulative Impacts Assessment, Box Elder Comprehensive Area Plan (Feb. 17, 2022) (hereinafter "Box Elder Comprehensive Area Plan").

[121] LGC_PHS_EX-017, PDC Energy, "Amended Application" (Aug. 1, 2022).

[122] *Id.* at pp. 14-15.

[123] *Id.* at p. 27.

[124] LGC_PHS_EX-018, PDC Energy, "AR-1 Cumulative Impact Evaluation Guanella Comprehensive Area Plan (CAP)" (June 2022) at p. 27, Table 3-3.

[125] Email communication from Richard Coffin, Colo. Dep't of Pub. Health & Envt't Energy Liaison, to Jana Milford (Oct. 27, 2022).

the draft SIP inventory indicate that drilling and completions engines used in the DJ basin in 2017 were predominantly diesel-fueled, although a modest fraction of drill rig engines used electricity.[126]

Stationary internal combustion engines and combustion turbines in Colorado and elsewhere are subject to federal New Source Performance Standards (NSPS).[127] New nonroad compression ignition engines, including those used in oil and gas operations, are subject to federal engine standards that were most recently updated to "Tier 4" effective after the 2014 model year.[128] Along with the NSPS, the nonroad mobile "Tier" standards generally apply to engines that are newly introduced into service, potentially allowing older engines to remain in service or be placed into service in Colorado despite the availability of newer, cleaner models.

In September 2020, the Commission amended Regulation 7 to tighten statewide, state-only emissions standards for new, modified, and relocated stationary natural gas fired reciprocating internal combustion engines with a design rating greater than or equal to 1,000 horsepower (hp).[129] The Statement of Basis and Purpose adopted with the amended rules notes that "Except for the combustion process adjustment requirements for engines at major sources, the Commission ha[d] not revised the requirements pertaining to engines since 2010."[130] During the 2020 proceeding, the National Parks Conservation Association introduced a proposal and evidence in support of further tightening the requirements for stationary engines over 1,000 hp and updating the standards for smaller stationary engines. Although these changes were not adopted, the Statement of Basis and Purpose adopted with the regulation called on the Division to consider updating standards for smaller stationary engines and to consider opportunities for engine electrification using line power.[131]

Although drill rig or hydraulic fracturing pump engines are often over 1,000 hp and produce a large fraction of NO_X emissions from the oil and gas sector, they were not addressed in the Commission's September 2020 rulemaking. A common argument for neglecting these engines is that they are deemed to be non-road mobile sources, and as such are subject to federal standards. However, a recent memo for the Western Regional Air Partnership that reviewed additional reasonable control strategies (ARCS) for NO_X emissions from the oil and gas sector noted that "State agencies may consider mobile source controls to the extent that implementation of such

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[126] Email communication from Dale Wells, Colo. Dep't of Pub. Health & Envt't, to Cindy Copeland, Boulder County (Oct. 18, 2022).

[127] *See* 40 CFR Part 60 Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; 40 CFR Part 60 Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines; 40 CFR Part 60 Subpart KKKK Standards of Performance for Stationary Combustion Turbines.

[128] 40 CFR Part 1039 Control of Emissions from New and In-Use Nonroad Compression Ignition Engines, Subpart B Emission Standards and Related Requirements.

[129] 5 CCR 1001-9, Commission Regulation 7, "Control of Ozone Via Ozone Precursors and Control of Hydrocarbons via Oil and Gas Emissions (Emissions of Volatile Organic Compounds and Nitrogen Oxides)" at Part E Section, I.A.3, *available at* https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=9113&fileName=5%20CCR%201001-9.

[130] 5 CCR 1001-9, Part F, "Statements of Basis, Statutory Authority and Purpose" (Sept. 23, 2020) at p. 298, *available at* https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=9113&fileName=5%20CCR%201001-9.

[131] *Id.* at p. 299.

control programs is feasible. ARCS may be accomplished by retrofits on existing emission sources and/or replacements of existing emission sources with lower-emitting technology."[132] Thus Colorado is not precluded from implementing regulations to reduce emissions from drill rigs and fracking engines and has a range of options to consider. The options include pausing drilling and hydraulic fracturing during time-periods conducive to ozone formation, requiring offsets for pre-production emissions, requiring use of engines electrified by line power, requiring use of lower emitting dual-fuel technology, and ensuring that all diesel engines used in the sector comply with Tier 4 emissions standards.

Another oversight in the Commission's Regulation 7 relates to Part D, Section VI, which has requirements for pre-production and early production air quality monitoring that are targeted to hydrocarbons, including methane, BTEX and total VOC. The program implemented under this provision currently neglects air quality monitoring needed to better understand oil and gas NO_X emissions and their contribution to ozone, as well as monitoring near-source NO_2 levels during pre-production activities.

Commission Regulation 3 appears to provide exemptions and exclusions for drill rigs and hydraulic fracturing engines that are inequitable in comparison to other emissions sources and harmful to people in the NAA who are impacted by their emissions.[133] Regulation 3 generally exempts non-road engines from the requirement to file air pollution emission notices (APENs) and obtain permits.[134] Regulation 3 provides a limited state-only exception to the APENs exemption for nonroad engines if they are rated at 1,200 hp or greater (aggregated over multiple engines, if applicable) and operate more than 4,380 hours per year.[135] Such engines must also obtain a nonroad engine permit if they emit more than 100 tons of NO_X or CO or more than 40 tons of SO_2 per year.[136] If co-located at an existing major source of NO_X or SO_2, the threshold for nonroad engines to require a permit drops down to 40 tons of NO_X per year.[137] These engine size and operating hours thresholds for APENs and the NO_X emissions thresholds for permit requirements for nonroad engines are inappropriately high for the nonattainment area. Drill rigs and hydraulic fracturing engines can operate at a given location for months and operate in the nonattainment area for years. They should be subject to APENs and permitting on the same basis as stationary sources in the NAA, for which the APENs and permitting threshold for criteria pollutants is 1 ton per year.[138]

Regulation 3 also excludes emissions from indirect sources, temporary sources, and portable sources in determining whether a facility is a major stationary source for purposes of having

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[132] LGC_PHS_EX-019, J. Grant, K. Lieschke, & A. Bar-Illan, "Additional Reasonable Control Strategies for Oil and Gas Sources in the WESTAR-WRAP Region," Memorandum to the Western Regional Air Partnership Oil and Gas Working Group (Mar. 23, 2020) at p. 1, *available at* https://www.wrapair2.org/pdf/WRAP_OGWG_ARCS_Memo_23Mar2020.pdf.

[133] 5 CCR 1001-5, Commission Regulation 3, Stationary Source Permitting and Air Pollutant Emissions Notice Requirements.

[134] *Id.* at Part A section II.D.1.dddd.

[135] *Id.* at Part A section I.B.31.c.

[136] *Id.* at Part A section I.B.31.c.(ii).

[137] *Id.* at Part A section I.B.31.d.(ii).

[138] *Id.* at Part A section II.B.3.a.

heightened new source review permitting requirements.[139] Whether or not they are allowable under federal regulations, these broad exclusions are inappropriate for the nonattainment area. As explained above, while they are in development many multi-well oil and gas locations would likely have annual NO_X emissions in excess of major source thresholds. Their emissions would subject them to offsets requirements if pre-production emissions were counted toward major source thresholds. The CAP applications cited above show that these excessive emissions may persist for years within the nonattainment area as large projects are implemented.

A final gap in addressing NO_X emissions from the oil and gas sector relates to the broader disconnect between permitting new wells or approving comprehensive area plans and the requirement to demonstrate attainment and evaluate the need for additional control measures in the SIP. Colorado's permit review process fails to assess the cumulative impacts of new oil and gas sources on ozone. Likewise, the CAP review process at COGCC fails to evaluate cumulative impacts on ozone of these extensive new project plans. Specifically with regard to NO_X emissions, COGCC's January 2022 "Report on the Evaluation of Cumulative Impacts, Rule 904.a" tabulated VOC, HAPs, and methane emissions but didn't even include data on NO_X emissions.[140] The report discussed ozone trends but did not evaluate cumulative impacts of new development for ozone.

viii. Cost-effective Control Opportunities are Available and Must be Required

Reliable and cost-effective options exist today to reduce NO_X, VOC, and particulate matter emissions from diesel-powered drill rigs and hydraulic fracturing pumps. Options could include, but are not limited to, electrification, substituting diesel-fueled engines with natural gas-fired engines, and/or requiring use of newer internal combustion diesel engines that achieve EPA's Tier IV emission limits. The LGC favors these options because they are available today, some operators already have years of experience using these approaches, and several operators are committed to using these technologies in future drilling plans as discussed previously in Section I.D.2.vi of this prehearing statement.

Using grid power for drilling is a well-established and feasible technology implemented by oil and gas producers in the NAA. Using electrification to power hydraulic fracturing is in the early stages of development, but it is more common to use EPA Tier IV engines as an air quality strategy. One of the early examples was Extraction Oil and Gas, Inc. ("Extraction," now a subsidiary of Civitas Resources, Inc.) in a 2017 Operator Agreement with the City and County of Broomfield.[141] Their agreement requires electrification for pre-production and ongoing production activities, including drilling, compression, engines, and pumps. Under this agreement, 67 wells were drilled using an electric rig. In addition, the operator agreement requires the use of Tier 2 and liquefied natural gas dual fuel hydraulic fracturing pumps. If Tier 4 fracturing pumps become commonly available, Extraction must begin using Tier 4 fracturing pumps. The well service company used by Extraction

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[139] *Id.* at Part D section II.A.25.b; II.A.25.f.

[140] LGC_PHS_EX-020, Colo. Oil & Gas Conserv'n Comm'n, "Report on the Evaluation of Cumulative Impacts, Rule 904a" (Jan. 2022) (2021 COGCC CI Report 20220114.pdf).

[141] City and County of Broomfield and Extraction Oil and Gas, Inc., "Oil and Gas Operator Agreement, Amended and Restated, Resolution No 207-186" (Oct. 24, 2017), at Exhibit B, Section 18, p. 6, *available at* https://www.broomfield.org/DocumentCenter/View/25064/Resolution-2017-186-and-Agreement.

to hydraulically fracture and complete their wells used a combination of Tier II, Tier IV, and Tier IV engines supplemented with compressed natural gas to complete 65 of the 67 drilled wells.

The City of Aurora has also established an Operator Agreement with ConocoPhillips (the assets were later sold to Crestone Peak Resources, now a subsidiary of Civitas Resources, Inc.) where electrification is an option if feasible.[142] To date, the operator has drilled 22 wells using electric rigs, including 8 wells at the Eastern Hills pad and 14 wells at the Lone Tree pad. Crestone plans to use electrification to drill 8 additional wells at the Jamaso pad. In addition, Aurora requires a minimum of EPA Tier II pump engines for hydraulic fracturing and Tier IV if available.

Crestone also committed to drilling 19 wells in Weld County using an electric rig and Tier IV pump engines for hydraulic fracturing through the Cosslett East Oil and Gas Development Plan Application (July 12, 2021).[143] This location is in Erie and adjacent to I-25, just north of the City and County of Broomfield.

In addition to this experience, the energy costs of electricity is substantially less than the cost of diesel fuel. The pre-production non-road internal combustion engine emissions analysis presented in the Box Elder CAP reports that three diesel non-road engines are planned for primary drilling power and an additional sixteen engines for hydraulic fracturing. These 19 engines, with a combined horsepower of 46,151 hp, are estimated to consume 1,148,389 gallons of diesel fuel annually (Table 2).[144] With an average statewide price of diesel fuel of $5.19/gallon as of October 24, 2022, the estimated total annual fuel cost for the Box Elder CAP drilling and hydraulic fracturing activities is $5,956,247.

Table 2: Box Elder CAP Drilling and Hydraulic Fracturing Diesel Fuel Costs[145]

Diesel Fuel consumption										
	Number of Engines	hp	Non-road emissions rating	BSFC (btu/hp-hr)	Btu/gal diesel	Operating Hours	Load Factor	Total Diesel Consumed	$/gal diesel	Total Fuel Cost
Generator Set #1	1	1,495	Tier 2	7,000	137,381	1,338	43%	43,827	$ 5.19	$ 227,284
Generator Set #2	2	2,328	Tier 2	7,000	137,381	1,722	43%	175,665	$ 5.19	$ 911,703
Frack Pumps	16	2,500	Custom	7,000	137,381	844	54%	928,897	$ 5.19	$ 4,817,260
Grand Total		**46,151**				**3,904**		**1,148,389**		**$ 5,956,247**

In contrast, the cost of electricity is far less. Comparing the Total Fuel Cost in Table 2 to the Total Electricity Cost in Table 3 for the same drilling and hydraulic fracturing activities using the Box Elder CAP as an example, the cost of using electricity is 58 percent *less* than using diesel fuel. Note that electricity costs are determined using the latest worst-case (summer months) commercial

[142] LGC_PHS_EX-021, ConocoPhillips Company, Burlington Resources Oil and Gas Company LP, & the City of Aurora Colorado, "Oil and Gas Operator Agreement" (June 5, 2019) at Exhibit C: Best Management Practices, Section 13, at p. 9, *available at* https://cdn5-hosted.civiclive.com/UserFiles/Servers/Server_1881137/File/Residents/Oil%20and%20Gas%20Drilling/ConocoPhillips%20Draft%20Operator%20Agreement%20May%2029%202019.pdf.

[143] LGC_PHS_EX-022, Crestone Peak Resources Operating, LLC, "Cosslett East OGDP Application", COGCC Hearing Docket No 210700115 (Oct. 19, 2022) at p. 51.

[144] Box Elder Comprehensive Area Plan, *supra* note 120, at Appendix A.

[145] AAA, "State of Colorado Diesel Price" (last visited: Oct. 24, 2022), *available at* https://gasprices.aaa.com/state-gas-price-averages/.

electric rates obtained from Xcel Energy.[146] While both diesel and electricity costs vary over time due to macro-economic trends, this current-day example shows that even if prices vary, it is very likely the cost of electricity is at least in cost parity (if not substantially less costly) than diesel fuel.

Table 3: Box Elder CAP Electricity Costs

Electric consumption								
	Number of Engines	hp-hr	kWh	Operating Hours	Load Factor	Total kWh	Xcel Commercial Rate $/kWh	Total Electricity Cost
Generator Set #1	1	1,495	1,115	1,338	43%	641,401	$ 0.14788	$ 94,850
Generator Set #2	2	2,328	1,736	1,722	43%	2,570,861	$ 0.14788	$ 380,179
Frack Pumps	16	2,500	1,864	844	54%	13,594,407	$ 0.14788	$ 2,010,341
Grand Total						**16,806,669**		**$ 2,485,370**

The LGC acknowledges that there are energy costs at pre-production sites other than just the cost of the energy itself, including but not limited to energy storage, building transmission lines, acquiring right of way, and interconnection-related grid upgrades. At the same time, truck traffic delivering hundreds of thousands of gallons of diesel fuel comes at a significant cost for industry, and causes impacts from NO_X, other pollutants, dust, noise, roadway wear, and congestion for neighboring communities. As shown above, a total of 1,148,389 gallons of diesel fuel consumption for drilling and fracking is estimated for just one year on average as part of the Box Elder CAP emission impacts. Assuming a large petroleum fuel tank truck can carry 9,000 - 9,800 gallons of fuel per trip,[147] electrification of just the drill rig can save up to 118 to 128 truck trips per year. Totaled for the entire development period of 11 years for the Box Elder CAP in the NAA, electrification saves 1,289 to 1,408 truck trips just for drilling as well as the associated emissions and trucking costs. These benefits should be included when weighing the costs and benefits of trucking diesel oil versus pad electrification.

In part because of the cost effectiveness of electrification and operator agreements in communities like Broomfield and Aurora, the drilling and hydraulic fracturing industries have responded by offering electrification in their service portfolios. Top drilling companies in the United States such as Nabors,[148] Helmerich and Payne,[149] Precision Drilling,[150] and Ensign[151] all have electrified

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[146] Derived from Public Service Company of Colorado, "Electric Rates Summary: Effective October 1, 2022" for "C" Commercial use, *available at* https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Electric_Summation_Sheet_All_Rates_10.01.22.pdf.

[147] Average petroleum tank truck capacity can vary by manufacturer. Capacity average for oil and gas operations obtained from N. Harmon, Trailers of Texas, "How Much Does a Tank Trailer Hold" (Jun. 21, 2022), *available at* https://www.trailersoftexas.com/blog/how-much-does-a-tank-trailer-hold--25081.

[148] Nabors Energy, Inc., "Canrig PowerTAP: Highline Power Transformer Module" (2022), *available at* https://www.nabors.com/wp-content/uploads/2022/07/Spec-Sheet_PowerTAP_Canrig_V2_2022-1.pdf.

[149] Helmerich and Payne, Inc., "2021 Sustainability Report" (2021), at p. 23, *available at* https://www.helmerichpayne.com/media/product-literature/H&P_2021_Sustainability_Report.pdf.

[150] Precision Drilling, Inc. "Making Sustainable Drilling a Reality" (2022), *available at* https://www.precisiondrilling.com/drilling-technology/evergreen/.

[151] Ensign Energy Services, Inc., "Sustainability Report 2020" (2020), at p. 27, *available at* https://www.ensignenergy.com/wp-content/uploads/2021/06/Ensign-Sustainability-Report_WEB.pdf.

rigs available for their land drilling services. In addition, well service companies such as Liberty Energy[152] and Halliburton[153] have electric hydraulic fracturing rigs available for operators.

In summary, electrification, particularly for drilling and hydraulic fracturing, is a technologically feasible and cost-effective alternative to the continued use of non-road internal combustion engines in pre-production activities in the NAA. It is an established practice in locations where grid power is available, and local governments in the front range have successfully implemented electrification requirements through operator agreements since at least 2017. In addition, the cost of electricity is far less than the cost of diesel fuel. The full costs and benefits of electrification should be thoroughly understood in future analysis and control strategy discussions with the Division and other stakeholders.

When grid power is not available, there are still several options to significantly reduce emissions of NO_X, VOCs, particulates, and other pollutants from pre-production activities in the NAA. This includes using field gas-fired internal combustion engines for drilling and hydraulic fracturing or at minimum diesel engines that comply with EPA's Tier IV engine emission standards.

In 2019, Ensign modified its Drilling Rig 147 in Wyoming with field gas fired engines and lithium-ion batteries to power three, 1-megawatt generator sets.[154] In addition to the reductions in NO_X, VOCs, and particulate matter, these units also have the potential of using otherwise wasted, flared gas at drilling sites. They can also save an operator money by replacing diesel fuel and delivery costs with field gas. Similar options are emerging for hydraulic fracturing, particularly the commitment to using Tier IV engines in current fleets when grid power is not available.[155]

Replacing older diesel engine model designs with an EPA Tier IV[156] engine can also have significant NO_X reduction benefits. Using the Box Elder CAP as an example,157 which assumed EPA Tier II engine NO_X rates for drilling rig gensets and custom NO_X rates for hydraulic fracturing pump engines, the emission reduction of NO_X is 80 to 89 percent when upgrading to Tier IV engines (Table 4).

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152 Liberty Energy Services, Inc. "Bettering Human Lives" (hereinafter "2021 Liberty Energy ESG Report"), at Section 2.3, p. 69, *available at* https://www.libertyenergy.com/wp-content/uploads/2022/08/Bettering-Human-Lives-Liberty-Energy-ESG-Report-2021-Spreads-Web-2.pdf.

153 Halliburton Company, Inc. "All-Electric Fracturing, Reducing Emissions and Cost" (2021), *available at* https://cdn.brandfolder.io/PKKYOY46/at/bcnf5k2x5kq3hq8r3sfkb5/2020-MKTG-PES-12254_All_Electric_Frac_Brochure_Final.pdf

154 J. Morrison, World Oil, "The next generation of land drilling: Hybrid-powered rig combined with energy storage" (Mar. 2021), *available at* https://www.worldoil.com/magazine/2021/march-2021/features/the-next-generation-of-land-drilling-hybrid-powered-rig-combined-with-energy-storage/.

155 2021 Liberty Energy ESG Report, *supra* note 152, at Section 2.3, p. 67-68.

156 Env't Prot. Agency, Office of Transportation and Air Quality, "Nonroad Compression-Ignition Engines: Exhaust Emission Standards" (EPA-420-B-16-022, Mar. 2016), *available at* https://www.epa.gov/emission-standards-reference-guide/epa-emission-standards-nonroad-engines-and-vehicles.

157 Box Elder Comprehensive Area Plan, *supra* note 120, at Appendix A.

Table 4: EPA Tier IV Emission Reduction Example: Proposed Box Elder CAP

	Number of Engines	hp	Operating Hours	Load Factor	Existing non-road emissions rating			Tier IV non-road emissions rating		Reductions	
					Classification	NOX EF (g/hp-hr)	NOx TPY	NOX EF (g/hp-hr)	NOx TPY	NOx (TPY)	Percent
Generator Set #1	1	1,495	1,338	43%	Tier 2	4.66	4.42	0.5	0.47	3.94	89%
Generator Set #2	2	2,328	1,722	43%	Tier 2	4.66	17.71	0.5	1.90	15.81	89%
Frack Pumps	16	2,500	844	54%	Custom	2.50	50.24	0.5	10.05	40.19	80%
									Total Reduction (NOx tpy)	59.95	

E. The Commission Should Direct an Expedited Stakeholder Process and Include Provisions to Fully Address this Source Category through Rulemaking in 2023

The LGC recommends that the Commission direct the Division to work with RAQC to convene a stakeholder process regarding NO_X emissions from pre-production activities as soon as practicable following this hearing.

This stakeholder process should focus on three critical topics summarized below:

1. The accuracy of NO_X emission estimates from the Division's inventories used in the SIP modeling versus recent operator CAPs;

2. An assessment of the areas in the NAA where electrification is feasible drawing upon where current and past drilling projects are located, the costs to supply grid power, and benefits of reducing NO_X emissions and truck traffic in populated areas; and

3. Recommend regulatory approaches to regulate the NO_X emissions associated with drilling and hydraulic fracturing engines through the Colorado Air Quality Control Regulations. These approaches should consider policies to require electrification, and when electrification is not feasible, require alternative fuel options (e.g., compressed natural gas) or more emission-efficient engines (e.g., EPA Tier IV engines), a pause on pre-production activities during ozone season, and an emissions offset program.

II. The Commission Should Reject the SIP Attainment Demonstration and Adopt New Control Measures in 2023

A. The 2015 SIP Attainment Demonstration is Flawed

The Commission should disapprove the proposed 2015 SIP attainment demonstration because the draft SIP does not include actions sufficient to demonstrate modeled attainment with the more stringent 2015 ozone NAAQS of 70 ppb. Because of this failure to meet basic Clean Air Act requirements, and EPA's recent downgrading of the DM/NFR to Severe Nonattainment for the 2008 ozone NAAQS with an effective date of November 7, 2022,[158] additional emissions controls

[158] 87 Fed. Reg. 60926 (Oct. 7, 2022).

are absolutely necessary for the SIP. But local governments and others have unsuccessfully urged for the adoption of additional emissions control measures during the SIP development process.

The Division's memorandum of notice explains that if the Commission declines to adopt the proposal and the ozone SIPs are not submitted to EPA, that "…could potentially lead to the imposition of a federal implementation plan [FIP] and sanctions on highway funding."[159] But the SIP proposal documents make no mention of the fact that the state is already facing a FIP and sanctions with the submittal of this SIP to EPA. Because the 2015 SIP does not model attainment, EPA will need to issue a partial approval/disapproval of that plan. This will automatically trigger the sanctions and FIP provisions under sections 110(c) and 179 of the Clean Air Act.[160] Under Clean Air Act Section 179, EPA is required to impose sanctions based on four types of actions, one action being EPA disapproval of a SIP submission for a nonattainment area based on its failure to meet one or more Clean Air Act required elements. Colorado would have 18 months to correct the deficiencies in the SIP before EPA would be required to impose sanctions and two years to correct the SIP before EPA will develop a FIP for the area. An EPA memorandum entitled *Processing of State Implementation Plan (SIP) Submittals* further explains the partial approval/disapproval process as well as the sanctions and FIP requirements, noting that "The disapproval of any part of a required SIP submittal starts the clocks discussed above for sanction and FIPs[sic]."[161] Clean Air Act Section 179 and the EPA memorandum also explain that EPA must apply at least one of two sanctions options, those being federal highway funding sanctions or offset sanctions of at least a 2-to-1 ratio to offset emissions from new or modified major sources in the nonattainment area.[162]

Considering these impending actions, the LGC urges the Commission to disapprove the attainment demonstration portion of the 2015 SIP and the associated sections, including the motor vehicle emissions budgets, since those budgets are based on the outcome of the modeling conducted for the attainment demonstration. If the attainment demonstration is not valid because it does not demonstrate attainment by the required attainment date of 2024, then the resulting motor vehicle emissions budgets are also not valid. The LGC also urges the Commission to set a rulemaking hearing for 2023 to add new control measures to the SIP that will help the area attain the 2015 NAAQS sooner. If the Commission holds a rulemaking hearing within a year, this will hopefully help Colorado avoid sanctions and a FIP.

B. Additional SIP Control Measure Options Should be Adopted Next Year

As outlined in a July 7, 2022, letter to the RAQC board[163] the LGC members proposed that the RAQC consider including in the SIP any of the nine listed control measures. Adopting any of these control measures would likely bring significant near-term reductions VOCs and NO_X during ozone

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[159] Division, Memorandum of Notice, "Ozone State Implementation Plans; Regulation Number 3; Regulation Number 7; Regulation Number 21; Common Provisions; Air Quality Standards, Designations and Emission Budgets" (Sept. 15, 2022), at p. 28.

[160] 42 U.S.C. §§7410(c) and 7509.

[161] LGC_PHS_EX-023, J. Calcagni, Env't Prot. Agency, Air Quality Management Division, Memorandum Re: "Processing of State Implementation Plan (SIP) Submittals," (July 9, 1992), at p. 2, *available at* https://www.epa.gov/sites/default/files/2015-07/documents/procsip.pdf.

[162] *Id*. at 11; 42 U.S.C. §7509.

[163] LGC_PHS_EX-024, Local government letter to Mike Foote, RAQC board chair and RAQC board (July 7, 2022).

season and help the DM/NFR attain the 2015 ozone NAAQS. This proposal was not adopted. The suggested control measures in that letter were:

Transportation:

- **Commitment to adopt Advanced Clean Cars II (ACC II) as soon as possible:** Colorado has already adopted ACC I through the adoption of the low emission vehicles standards (LEV) and zero emission vehicle standards (ZEV) but will need to separately adopt ACC II.

- **Programs that increase transit ridership and bike and pedestrian infrastructure help reduce VMT:** Under the Clean Air Act, Severe ozone nonattainment areas are required to include vehicle miles traveled (VMT) growth offsets in the SIP.[164] Relying solely on cleaner vehicles does nothing to reduce VMT. SB22-180 is a start, with free bus fare during August of 2022 and 2023 and increased funding to the Colorado Department of Transportation (CDOT) for its transit program, but a lot more is needed.

- **Indirect source rules (ISR):** The RAQC should move ahead with the inclusion of ISR for at least one sector, such as the warehouse sector.

Oil and Gas:

- **Curtail high emitting oil and gas activities during ozone season:** This could be done through a pause on oil and gas drilling and/or completions during ozone season. Reductions could also be achieved through curtailing specific ancillary activities such as minimizing vehicle and engine idling, reducing truck and employee traffic, delaying vehicle refueling, suspending or delaying use of gas-powered ancillary equipment, and postponing construction and maintenance activities. Other possibilities are restricting well unloading and non-automated condensate tank load out activities on ozone action days unless there is a safety issue or damage to equipment.

- **Flare minimization plans for oil and gas operations:** Oil and gas operations should submit plans that will minimize their use of flaring.

Industrial Sources:

- **Flaring controls or flare minimization plan at the Suncor refinery**: refinery flaring should be limited; one possibility is a flare minimization plan rule which has been used at several refineries in California.[165]

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[164] Env't Prot. Agency, "Required SIP Elements by Nonattainment Classification" (last updated: Jan. 27, 2022), *available at* https://www.epa.gov/ground-level-ozone-pollution/required-sip-elements-nonattainment-classification.

[165] Bay Area Air Quality Management District, "Flare Minimization Plans" (last updated: Dec. 7, 2021), *available at* https://www.baaqmd.gov/plans-and-climate/emission-tracking-and-monitoring/flare-minimization-plans.

Area Sources:

- **Adopt California's non-road engine standards**: California has regulations for heavy-duty off-road compression-ignition engines and large off-road spark-ignition engines 25 hp or greater. The RAQC has been researching this and should move ahead with this plan; under the Clean Air Act, other states can adopt California's engine emissions regulations.

- **Small off-road engine emissions standards:** Lawn and garden equipment contributes significantly to VOC emissions. Emissions standards for this category should be included in the SIPs to reduce emissions while Colorado waits for a shift in the market to all electric equipment.

- **Low NO_X appliance requirements for residential and commercial buildings:** Several other states have rules that could be used as examples. Utah has a rule for water heaters[166] and South Coast Air Quality Management District has rules that target residential and commercial space and water heating and cooking.[167]

The LGC had originally intended to put forward an alternate proposal for this rulemaking but the limited scope of the notice made it unlikely that an alternate proposal would be accepted for consideration. According to the notice, "Alternate proposals will be considered by the Commission 'only if the subject matter of the alternative proposal is consistent with and fits within the scope of the notice.' 5 CCR 1001-1, Section (V)(E)(4)(b)." Additionally, the preparation of the required data and analysis within the confines of this rulemaking proved to be too difficult for the LGC to prepare an alternate proposal. Instead, the LGC has included in this prehearing statement not only the above list of previously recommended control strategies, but also an in-depth analysis of NO_X emissions from the oil and gas sector and a demonstration of cost-effective emissions control strategies for key sources.

The 2023 rulemaking should include measures to reduce emissions from oil and gas pre-production activities because, as explained earlier in this prehearing statement, the SIP inventory shows that NO_X emissions from this source category will amount to 6,300 TPY in the nonattainment area in 2023. Additionally, the 2023 rulemaking should include emissions controls for the gas-fired rich burn reciprocal internal combustion engines (RICE) of 100 hp or larger and from lean-burn RICE 1,000 hp or larger as presented to the Commission on July 30, 2020, by the National Parks Conservation Association (NPCA) during the Regulation Number 7 rulemaking. During that rulemaking, the Commission did not adopt NPCA's proposal but did direct the Division to return with a proposal for these smaller sized engines. The Division has not done so at this time. Lastly, as covered in this prehearing statement, the Commission should also consider the environmental

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166 *See* Utah Office of Administrative Rules, "Rule 307-230 NO_X Emission Limits for Natural Gas-Fired Water Heaters" (July 12, 2022), *available at* https://adminrules.utah.gov/public/rule/R307-230/Current%20Rules?searchText=water%20heater.

167 South Coast Air Quality Management District, "2022 AQMP: Residential and Commercial Buildings: Working Group Meeting #1" (Dec. 17, 2020), available at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/2022-aqmd-residential-and-commercial-building-wg-1-v2.pdf?sfvrsn=19

justice impacts and nitrogen deposition at Rocky Mountain National Park as part of this rulemaking proceeding.

III. ISSUES TO BE RESOLVED BY THE COMMISSION

The issues to be resolved by the Commission include:

1. Whether to adopt the Division's proposed rule and draft SIP language.

2. Whether to adopt the revisions as proposed herein by the LGC.

3. Whether the process and proceedings in this matter comply with all relevant requirements of the Colorado Air Pollution Prevention and Control Act, C.R.S. §§ 25-7-101 *et. seq.*, and the State Administrative Procedure Act, C.R.S. §§ 24-1-101 *et. seq*.

IV. EXHIBITS

A summary of all exhibits, including voluminous exhibits, attached by the LGC to this Prehearing Statement and incorporated herein by reference is included in the Exhibit Table of Contents, LGC_PHS_EX-TOC. Exhibits also include reports and other technical documents referenced in this Prehearing Statement. The LGC and its member parties reserve the right to list further exhibits or revise the LGC or individual party exhibit lists in response to other parties' prehearing statements, including the Division's prehearing statement, and any alternate proposals submitted by parties. The LGC will identify any further exhibits necessary as part of its rebuttal statement. The LGC reserves the right to respond to information, exhibits, and arguments submitted by other parties.

V. ESTIMATE OF TIME

The LGC requests a time allocation of 45 minutes for direct testimony, rebuttal testimony, and cross-examination of other parties' witnesses.

VI. WITNESS AND WRITTEN TESTIMONY

While the LGC does not intend to offer any written testimony beyond what is contained in this prehearing statement, its rebuttal statement, and associated filings, the LGC may call the following witnesses at the rulemaking hearing:

- **Cindy Copeland**, Air and Climate Policy Advisor, Boulder County: testimony in support of this prehearing statement. She may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Olivia Lucas**, Assistant County Attorney, Boulder County: facts and legal argument in support of the proposed regulation and the LGC-CC4CA Proposal. She may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Collin Tomb**, Climate/Health Strategist, Boulder County: testimony in support of this prehearing statement. She may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **William Obermann**, Air Policy Program Manager, Denver Department of Public Health and Environment: testimony in support of this prehearing statement. He may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Elizabeth Babcock**, Manager, Climate Action Team, Denver Office of Climate Action, Sustainability and Resiliency: facts and legal argument in support of the proposed regulation. She may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Elizabeth Paranhos**, Counsel for City of Aurora, City and County of Broomfield, and City of Lafayette, on behalf of the LGC: facts and legal argument in support of the proposed regulation and proposed amendments addressed herein.

- **Tom Easley**, Senior Policy Advisor, Colorado Communities for Climate Action: testimony in support of this prehearing statement. He may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Sarah Keane**, Counsel for Colorado Communities for Climate Action, on behalf of the LGC: facts and legal argument in support of the proposed regulation and the proposed amendments addressed herein. She may rely on any of the exhibits listed in the Exhibit Table of Contents.

- **Timothy Roth**, Counsel for Colorado Communities for Climate Action, on behalf of the LGC: facts and legal argument in support of the proposed regulation and the proposed amendments addressed herein. He may rely on any of the exhibits listed in the Exhibit Table of Contents.

The LGC reserves the right to identify additional rebuttal witnesses in the rebuttal prehearing statement as necessary based on issues identified in other parties' prehearing statements.

VII. CONCLUSION

The LGC members appreciate the opportunity to participate in this process as well as the Commission's consideration of the issues the LGC has raised.

Respectfully submitted this 31st day of October 2022,

For the City of Aurora, City and County of Broomfield, and City of Lafayette

By: *s/ Elizabeth Paranhos*
ELIZABETH PARANHOS, # 39634
deLone Law Inc.
1555 Jennine Place
Boulder, CO 80304
Phone: (303) 442-0610
Email: elizabethparanhos@delonelaw.com

For Colorado Communities for Climate Action

By: *s/ Sarah M. Keane*
SARAH M. KEANE, # 51109
TIMOTHY ROTH, # 57691
Kaplan Kirsch & Rockwell LLP
1675 Broadway, Suite 2300
Denver, CO 80202
Phone: (303) 825-7000
Email: skeane@kaplankirsch.com
troth@kaplankirsch.com

For Boulder County

By: s/ *Olivia Lucas*
OLIVIA LUCAS, # 36114
Assistant County Attorney
Boulder County Attorney's Office
1325 Pearl Street
Boulder, CO 80302
Phone: (302) 441-3854
Email: olucas@bouldercounty.org

For the City and County of Denver

By: s/ *Lindsay Walton*
LINDSAY WALTON, # 47087
Assistant City Attorney
Denver City Attorney's Office
201 W. Colfax Ave. Dept. 1207
Denver, CO 80202
Phone: (720) 913-8085
Email: lindsay.walton@denvergov.org

CERTIFICATE OF SERVICE

The undersigned certifies that on the 31st day of October, 2022, electronic copies of the foregoing **PREHEARING STATEMENT OF THE LOCAL GOVERNMENT COALITION and LGC_PHS_EX-TOC** were emailed to the following:

Air Quality Control Commission
jeremy.neustifter@state.co.us
jojo.la@state.co.us
theresa.martin@state.co.us
tom.roan@coag.gov
alexis.butterworth@coag.gov

Air Pollution Control Division
michael.ogletree@state.co.us
garrison.kaufman@state.co.us
jessica.ferko@state.co.us
leah.martland@state.co.us
joshua.korth@state.co.us
laura.mehew@coag.gov
sarah.rowlands@coag.gov
kacey.higgerson@coag.gov

350 Colorado
heidi@350colorado.org

American Petroleum Institute Colorado
grangerl@api.org
paulesm@api.org
jbiever@williamsweese.com
ctaylor@williamsweese.com

Black Hills
tim.rogers@blackhillscorp.com
maria.garduna@blackhillscorp.com
shannon.pollmiller@blackhillscorp.com
greg.sopkin@blackhillscorp.com

Center for Biological Diversity
rmaher@biologicaldiversity.org

Civitas Resources
randy.dann@dgslaw.com
nicole.rushovich@dgslaw.com

Coloradans for Practical Policies
bw-aqcc-hearings@bwenergylaw.com
jmartin@bwenergylaw.com

Colorado Chamber of Commerce
lfurman@cochamber.com

Colorado Oil and Gas Association
christy.woodward@coga.org
bw-aqcc-hearings@bwenergylaw.com
ccolclasure@bwenergylaw.com

Colorado Petroleum Association
angie@coloradopetroleumassociation.org

Colorado Stone Sand & Gravel Association
todd@coloradocaa.org

Colorado Utilities Coalition for Clean Air
mari.deminski@coloradosprings.gov
leonards@prpa.org
hammittj@prpa.org
chad.campbell@xcelenergy.com
jill.h.van.noord@xcelenergy.com
jon.bloomberg@squirepb.com
dlempke@tristategt.org
jrosen@wsmtlaw.com
jsanderson@wsmtlaw.com

Colorado Wyoming Petroleum Marketers Association & Colorado Motor Carriers Association
greg@cmca.com
gbailey@cwpma.org

Conservation Colorado
kelly@conservationco.org
mattsuralaw@gmail.com

CoorsTek, Inc.
jrosen@wsmtlaw.com
jsanderson@wsmtlaw.com

DCP Operating Company
prtourangeau@dcpmidstream.com
schwarzjw@outlook.com

EVRAZ Rocky Mountain Steel
adam@devoe-law.com

GCC Pueblo
adam@devoe-law.com

Household & Commercial Products Association
ngeorges@thehpca.org
cfinarelli@thehpca.org
cbrown@thehpca.org

Justice and Health Groups
eantafoya@greenlatinos.org
reneechacon@gmail.com
spacha@healthiercolorado.org
mkemp@healthiercolorado.org
madhvi4ecoethics@gmail.com
cmiller@earthjustice.org
aschluntz@earthjustice.org

Local Government Coalition
elizabethparanhos@delonelaw.com
ccopeland@bouldercounty.org
olucas@bouldercounty.org
william.obermann@denvergov.org
lindsay.walton@denvergov.org
jsmith@cc4ca.org
teasley@cc4ca.org
skeane@kaplankirsch.com
troth@kaplankirsch.com

National Aerosol Association
djraymond@me.com

Occidental Petroleum Corporation
angela_zivkovich@oxy.com
mark_hamlin@oxy.com
ewaeckerlin@bhfs.com

PDC Energy
randy.dann@dgslaw.com
nicole.rushovich@dgslaw.com

Public Service Company of Colorado dba Xcel Energy
chad.campbell@xcelenergy.com
jill.h.van.noord@xcelenergy.com
jon.bloomberg@squirepb.com

Raymond Regulatory Resources
djraymond@me.com

Regional Air Quality Council
msilverstein@raqc.org
wchuang@raqc.org

Rocky Mountain Bottle Company
jrosen@wsmtlaw.com
jsanderson@wsmtlaw.com

Tri-State Generation & Transmission Association, Inc.
dlempke@tristategt.org
jrosen@wsmtlaw.com
jsanderson@wsmtlaw.com

Weld County BOCC
bbarker@weldgov.com
mconroy@weldgov.com

West Slope Colorado Oil & Gas Association
chelsie.miera@wscoga.org

Western Midstream Partners
candace.uduebor@westernmidstream.com
doug.jordan@westernmidstream.com
joel.kenyon@westernmidstream.com
ana.gutierrez@hoganlovells.com

michael.miller@hoganlovells.com

WildEarth Guardians
jnichols@wildearthguardians.org

Williams
kirsten.derr@williams.com
jonathan.torizzo@williams.com

s/ *William Trull*
William Trull
Paralegal
Kaplan Kirsch & Rockwell LLP