UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Proposed Oil and Natural Gas Sector: Emission Standards for New, Reconstructed and Modified Sources Reconsideration	)	**Docket No. EPA-HQ-OAR-2017-0483** *Via regulations.gov* *December 17, 2018*

We submit these comments on behalf of Environmental Defense Fund, Chesapeake Bay Foundation, Clean Air Council, Clean Air Task Force, Center for Biological Diversity, Earthjustice, Earthworks, Environmental Integrity Project, Environmental Law & Policy Center, National Parks Conservation Association, Natural Resources Defense Council, and Sierra Club (together, "Environmental Commenters"). There is an urgent need to reduce emissions of methane and other harmful pollutants from the U.S. oil and natural gas sector. Accordingly, Environmental Commenters strongly oppose EPA's Proposal to dramatically weaken vital and commonsense protections that the agency adopted over two years ago and that have been effective in delivering benefits for Americans across the country. EPA should withdraw this misguided proposal, to the extent it amends the 2016 standards EPA should strengthen them, and EPA should move forward expeditiously, consistent with EPA's duty under the Clean Air Act, to adopt standards reducing this harmful pollution from already-existing sources in the oil and natural gas sector.

Introduction

EPA's foremost obligation under the Clean Air Act (the "Act") is "to promote the public health and welfare." 42 U.S.C. § 7401(b)(1). Under section 111 of the Act, when EPA finds that a category of sources emit pollution that endangers human health and welfare, it must promulgate regulations to reduce emissions of those endangering pollutants from the source category. That is precisely what EPA did in 2016 when it promulgated new source performance standards for methane and volatile organic compound ("VOC") emissions from oil and gas sources. *Oil and Natural Gas Emission Standards for New, Reconstructed, and Modified Sources*, 81 Fed. Reg. 35,824 (June 3, 2016) (codified at 40 C.F.R. pt., 60, subpt. OOOOa) ("NSPS" or "2016 Rule"). At that time, EPA recognized the severe endangerment of public health and welfare caused by these pollutants and, in particular, the fact that methane is a potent greenhouse gas and a major contributor to climate change. *Id.* at 35,833-37. Scientific studies published since have found that methane emissions from the oil and gas sector are much higher than EPA estimated in 2016. The NSPS requires oil and gas sources to implement widely available, low-cost, and commonsense technologies and best practices to *reduce* their emissions of dangerous methane and VOCs. The NSPS was based on years of successful implementation of these technologies and best practices and similar regulation of sources in states like Colorado, and has now been in effect and delivering emission reduction benefits for over two-and-one-half

years. In that time, there has been no evidence of any major problems regarding the feasibility, effectiveness, or costs of the NSPS requirements.

Notwithstanding this successful track record, EPA now proposes a regulation to *increase* emissions of methane and VOCs from oil and gas sources. *Oil and Natural Gas Emission Standard for New, Reconstructed, and Modified Sources Reconsideration*, 83 Fed. Reg. 52,056 (Oct. 15, 2015) ("Proposal"). The Proposal constitutes a major revision of the NSPS to fundamentally weaken federal emissions standards, and EPA admits it may "degrade air quality and adversely affect health and welfare." *Id.* at 52,059. The principal reason given for this regulation aimed at increasing dangerous emissions: EPA *might* come upon information in the future that would suggest the current standards are not *as* cost-effective as the best currently available evidence suggests they are, and, in the meantime, industry would prefer weakened regulations. *See, e.g.*, *id.* at 52,065. This reason is both contrary to the statutory command and is arbitrary and capricious, and EPA must therefore withdraw this deeply flawed and unlawful proposal.

Section 111 of the Clean Air Act requires EPA to set standards that reflect the "best system of emissions reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." 42 U.S.C. § 7411(a)(1), (b)(1). EPA must follow the same procedures when it revises standards. *Id.* § 7411(b)(1)(B). For its Proposal to be lawful, EPA must show that revising the NSPS to *increase* emissions of dangerous methane and VOCs by hundreds of thousands of tons (i.e., a system of emissions increase) is a *better* system of emissions *reduction* than the NSPS. But EPA barely mentions the term "best system of emission reduction" in the Proposal at all, much less analyze the relevant statutory factors in sufficient detail. It does not (and could not) claim that the best system of emission reduction reflected in the NSPS is not achievable or adequately demonstrated, nor does it explain why the Proposal reflects a more appropriate balancing of section 111's statutory factors. EPA also does not conclude that any of its assumptions in 2016 regarding the cost of achieving such reductions or other relevant factors were wrong. Indeed, after a one-and-one-half-years-long reconsideration process, EPA has not come upon *any* new studies or data that have persuaded it to change its models or analysis in any relevant respect. To the contrary, the actual evidence that EPA itself presents suggests that the NSPS is even *more* cost-effective (and reduces emissions *more*) than the agency originally estimated. There is simply no permissible reason grounded in the agency's statutory authority and the facts to revise the NSPS to relax its requirements.

In a single-minded, White House-driven effort to weaken the NSPS at industry's behest, however, EPA is now proposing to substantially weaken the standards and *increase* dangerous pollutant emissions, cutting the effectiveness of the NSPS almost by half. Environmental Commenters could not find a single past example where EPA has revised an NSPS to substantially weaken its requirements and increase dangerous pollution. EPA explains that some in industry have "concerns" with the current standards, *e.g.*, *id.* at 52,063, that some of the concerns "might" be legitimate, *e.g.*, *id.* at 52,061, and that while there is "insufficient information" to substantiate those concerns (and EPA has not seen fit to gather information or

even analyze the information in its possession), *e.g.*, *id.* at 52,065, EPA will nonetheless change the standards.

For support, EPA relies primarily on three alleged (and unsubstantiated) "uncertainties" that it claims suggest that the agency *may* have overestimated the emissions reductions from the NSPS and therefore that the NSPS *may* not be *as* cost-effective as EPA initially forecast. *See id.* at 52,064, 52,071. The data-based updates EPA has made to its analysis, however, show that the agency actually *underestimated* the emissions reductions from the NSPS, and therefore the standards are *even more cost effective* than it initially estimated in 2016. Revising the NSPS based on such a speculative and unsupported rationale is illegal for a host of reasons.

EPA cannot substantially weaken critical protections when all of the best available evidence supports those standards (and their cost-effectiveness) merely because at some later point EPA *might* come across information showing that they are less cost-effective than predicted. And even if EPA could rely on uncertainty to fundamentally weaken critical protections (which, again, it cannot), the uncertainties EPA points to in the Proposal either suggest that the NSPS is *more* cost-effective than forecast or are irrelevant to the statutory analysis, or both. Moreover, EPA cherry picks its uncertainties, ignoring uncertainties that EPA itself recognized but that cut the other way—i.e., that suggest that the NSPS is *more* cost-effective than EPA predicted. And even if EPA actually had factual support, it may not elevate cost-effectiveness over all other factors (including the statute's primary goal of achieving emissions *reductions*) in order to fundamentally weaken critical protections required by the Clean Air Act. This is especially so in this case, where EPA did not disclose what it deems to be cost-effective, whether it was changing its threshold for cost-effectiveness, and, if so, why the agency decided to shift the goalposts two-and-one-half-years into the NSPS's implementation. EPA also does not explain why these alleged "uncertainties" would lead the costs per ton of pollution to exceed the thresholds it has deemed reasonable.

More fundamentally, EPA cannot substantially weaken critical protections without so much as acknowledging, much less grappling with, the very problem they were put into place to address: climate change. In the Proposal, EPA makes no findings to undermine those it made in 2009 and 2016 regarding the severe endangerment posed by greenhouse gases. Accordingly, it must explain why the facts and circumstances that underlay the NSPS now lead EPA to disregard those prior findings and conclude that increasing emissions of those dangerous pollutants is consistent with the agency's statutory mandate. Indeed, the factual record regarding both the urgency of climate change and the greater cost-effectiveness of the NSPS suggest that EPA should *strengthen* the current NSPS.

EPA's attempt to issue blanket exemptions from compliance for sources in certain states is also unlawful. EPA has not met the statutory standard of establishing that the state standards "will achieve a reduction in emissions … at least equivalent to the reduction in emissions … achieved under" federal standards. 42 U.S.C. § 7411(h)(3). It has declined to quantify the emissions reductions achieved under the state standards, a necessary precursor to establishing equivalency, and has not even attempted to prove equivalency consistent with its past practice. Moreover, even if EPA could make equivalency determinations based solely on a qualitative

analysis, the determinations in the Proposal would be unlawful because they are based on equivalency with the illegally weakened federal standards contained in the Proposal, *not* the NSPS. Relatedly, equivalency determinations—which are adjudicatory in nature—should only be made *after* the NSPS is issued so that the requester (and the public) know what the state standard is being compared to.

The Proposal also violates section 307 of the Clean Air Act, 42 U.S.C. § 7607. Under that provision, EPA must include in its proposed rule any data supporting the proposal so the public can meaningfully comment. Here, EPA puts the cart before the horse: instead of providing comprehensive and defensible data to support its proposed revisions to the NSPS, EPA attempts to use the Proposal to *collect* supportive information and thereby shield it from public review and critical examination. The Proposal is, therefore, essentially an information collection request masquerading as a notice of proposed rulemaking—asking for data and information in minute detail. If EPA were truly concerned with the alleged uncertainties that it asserts support fundamentally weakening critical protections, it should have used the tool Congress gave it in section 114 of the Act to conduct an information collection request and gather the relevant information.

EPA cannot short circuit the public notice-and-comment process by issuing a proposed rule that runs counter to the evidence before it, while simultaneously seeking to collect information that would support its preferred (but factually unsupported) policy outcome. Should EPA receive information via the comments on this Proposal that it seeks to rely upon in finalizing a new rule, it must make that information available to the public for comment before finalizing any revision. Remarkably, in addition to failing to gather evidence to support its Proposal in the first instance, EPA ignores and conceals relevant evidence within its possession. Specifically, the agency has two years' worth of compliance reports from affected sources subject to the NSPS that include data directly relevant to the alleged "uncertainties" upon which the Proposal is based. Not only does EPA not analyze (or even acknowledge) that data in the Proposal, it has refused to comprehensively release it to the public so that stakeholders may analyze it. Making matters worse, EPA withdrew an information collection request that it had earlier initiated that likewise would have informed some of the "uncertainties" upon which EPA now relies.

The specific provisions of EPA's Proposal are also arbitrary and capricious and not based on substantial evidence. Indeed, the lack of support for EPA's proposed changes is breathtaking. While EPA ostensibly bases the Proposal on its inability to conclude that provisions of the NSPS are cost-effective, it concedes that all of the best-available evidence demonstrates that the NSPS is more cost-effective than EPA forecast. And even the alleged "uncertainties"—which EPA cherry-picks in an unsuccessful attempt to support of its Proposal—all suggest that the NSPS is *more* cost-effective than predicted. Moreover, actual new evidence likewise demonstrates that the NSPS is far more cost-effective than EPA predicted in 2016 or today.

Finally, EPA's cost-benefit analysis is fatally flawed. The costs of the NSPS are significantly lower than EPA states. And EPA significantly undervalues the benefits of the NSPS that will be foregone under the Proposal. EPA arbitrarily relies on an unsupported "interim"

social cost of methane that it admits only represents a "partial accounting" of the harms caused by climate change, and essentially gives zero value to the benefits of reducing dangerous volatile organic compounds and hazardous air pollutants—the very endangerment section 111 was created to address.

EPA should withdraw this deeply flawed Proposal and continue to implement and enforce the NSPS. The agency must also commit to regulating existing sources of methane and VOCs in the oil and gas sector, which are responsible for the vast majority of emissions, and to pursue opportunities to strengthen the current NSPS.

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Background

Emissions for Oil & Gas Sources Threaten Human Health and Welfare.

EPA has a legal mandate to protect against the harms associated with climate change and the threats that climate pollutants like methane pose to public health and welfare. As the U.S. government recently acknowledged, global climate change is one of the largest challenges our civilization faces. *See* United States Global Change Research Program, National Climate Assessment (November 2018) ("2018 National Climate Assessment").[1] And as EPA itself concluded almost a decade ago, the science of climate change, the risks it presents to human health and welfare, and the role of anthropogenic greenhouse gas ("GHG") emissions as the prime driver of this phenomenon are irrefutable. *See generally Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule*, 74 Fed. Reg. 66,496 (Dec. 15, 2009). Immediate and deep cuts to global GHG emissions are necessary to mitigate the worst effects of climate change.

Reducing emissions from the U.S. oil and natural gas sector is an indispensable part of addressing the urgent threat of climate change. Methane is the main ingredient of natural gas and a common byproduct of oil production. This highly potent greenhouse gas and fast-acting climate forcer traps heat in the atmosphere at a rate 87 times that of carbon dioxide over a 20-year timeframe, and up to 36 times that of carbon dioxide over a 100-year timeframe.[2] Approximately one-quarter of the anthropogenic climate change we are experiencing today is attributable to methane.[3] Climate scientists now recognize that avoiding catastrophic climate change will require both a long-term strategy to reduce carbon dioxide emissions and near-term

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[1] https://nca2014.globalchange.gov/report.

[2] Int'l Panel on Climate Change (IPCC), *Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report* (Thomas Stocker et al., eds. 2013), Chapter 8- Natural and Anthropogenic and Natural Radiative Forcing, at 714 https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf; Bradbury et al., Dep't of Energy, Office of Energy Policy and Systems Analysis, *Greenhouse Gas Emissions and Fuel Use within the Natural Gas Supply Chain – Sankey Diagram Methodology* (July 2015), at 10, n. ‡‡‡, https://www.energy.gov/sites/prod/files/2015/07/f24/QER%20Analysis%20-%20Fuel%20Use%20and%20GHG%20Emissions%20from%20the%20Natural%20Gas%20System%2C%20Sankey%20Diagram%20Methodology_0.pdf (explaining how the effects of oxidation increase the IPCC's global warming potential values for methane to 87 over a 20-year timeframe an 36 over a 100-year timeframe).

[3] IPCC, *Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Thomas Stocker et al., eds. 2013) (calculation based on Chapter 8), https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf; *see also* Drew T. Shindell et al., *Improved Attribution of Climate Forcing to Emissions*, 326 SCIENCE 716, 717 (2009).

action to mitigate methane and similar short-term climate forcers. The need to control greenhouse gases, including methane, is highly time-sensitive.

The onshore oil and natural gas sector is among the largest domestic industrial sources of methane emissions. According to EPA's most recent Inventory of Greenhouse Gas Emissions and Sinks, U.S. oil and gas operations emitted nearly 8.1 million metric tons of methane into the air in 2016, approximately 31 percent of the nation's total methane emissions for that year.[4] And the latest scientific evidence shows that EPA inventories dramatically underestimate the amount of methane emitted by the oil and gas sector. A recent synthesis of site-level emissions studies found that the U.S. oil and gas sector emits 13 million metric tons per year, equivalent to 2.3 percent of gross U.S. gas production—a value that is approximately 60 percent higher than EPA estimates. Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCIENCE, 186–188 (2018). The NSPS is beginning to address these massive emissions figures by achieving annual methane reductions of 300,000 tons in 2020 and 510,000 tons in 2025. 81 Fed. Reg. at 35,885.

In addition to methane, oil and natural gas facilities co-emit significant amounts of other harmful air pollutants, which can be curbed by the same technologies and practices that reduce methane emissions. These pollutants include hazardous air pollutants ("HAPs") such as benzene and formaldehyde, known human carcinogens, and VOCs, which react in the atmosphere to form ground-level ozone (the primary component of smog) and fine particulate matter. Human exposure to ozone and fine particulates can cause respiratory and cardiovascular disease and lead to premature death. Not surprisingly, recent research demonstrates increased negative health effects among communities situated in close proximity to oil and gas development.[5]

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[4] EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016* (2018) at ES-7, Table ES-2, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015.

[5] *See, e.g.* Joan A. Casey et al., *Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA,* 27(2) EPIDEMIOLOGY 163 (Mar. 27, 2016) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4738074/ (preterm birth and increased risk of heart defects); Janet Currie et al., *Hydraulic Fracturing and Infant Health: New Evidence from Pennsylvania*, 13 SCIENCE ADVANCES 1 (Dec. 13, 2017) http://advances.sciencemag.org/content/advances/3/12/e1603021.full.pdf (low birth weight); Thomas Jemielita et al., *Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates,* 10(7) PLoS ONE 1 (July 15, 2015) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4503720/ (increased hospitalization); Lisa McKenzie et al., *Ambient Non-Methane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks*, 2018 ENVT'L SCI. & TECH. 4514 (Apr. 17, 2018) https://pubs.acs.org/doi/10.1021/acs.est.7b05983 (higher cancer risk and exposure to HAPs); SG Rasmussen et al, *Association between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations,* 176 J. AM. MED. ASSN. INTERNAL MED. 1334-43. (Sept. 2016) https://www.ncbi.nlm.nih.gov/pubmed/27428612 (exacerbated asthma); Shaina L. Stacy et al., *Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania*, 10(6) PLoS ONE 1 (June 3, 2015) https://doi.org/10.1371/journal.pone.0126425

Ozone and VOCs can also harm welfare interests including effects on soils, vegetation, wildlife, visibility, damage to and deterioration of property and public lands including national parks and wildlife refuges, and effects on economic values and on personal comfort and well-being. In particular, oil and gas-related emissions and climate change threaten the air quality and health of the nation's national parks, and weakening EPA's standards would allow continued harm to these treasured public lands and their visitors. Recent modeling by Colorado State University and the National Park Service identified that oil and gas emissions—despite likely being underestimated in current emissions inventories—nevertheless are "a significant source of pollution in national parks" that can cause or contribute to violations of health standards and exceedances of air quality related value thresholds, including haze pollution and ecosystem-damaging ozone and nitrogen deposition.[6] Oil and gas emissions represented an increase in ozone and nitrogen deposition levels of up to 33 percent versus the base case, and significantly degraded visibility at numerous national parks, including contributing substantially to haze on nearly every day of the year at Aztec Ruins National Monument in New Mexico.[7]

National parks are already being impacted by climate change as well, with 90 percent of our natural resource parks currently experiencing extreme weather[8] and 92 percent of our coastal parks already experiencing sea-level rise,[9] both of which scientists link to climate-changing air pollution. Damage associated with sea-level rise is expected to total more than $40 billion in just 40 of our coastal parks alone.[10] As the climate continues to change, Glacier National Park's namesake glaciers could disappear from the park within the century, and Joshua trees could disappear from Joshua Tree National Park, fundamentally altering the very icons these parks were designated to protect.

Likewise, nitrogen deposition from air pollution is a significant contributor to water quality impairment in the Chesapeake Bay.[11] Moreover, climate change impacts caused by

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(low birth weight); Aaron W. Tustin et al., *Associations between Unconventional Natural Gas Development and Nasal and Sinus, Migraine Headache, and Fatigue Symptoms in Pennsylvania,* 125 ENV. HEALTH PERSPECTIVES 189 (Feb., 2017) https://ehp.niehs.nih.gov/EHP281/ (increased nasal, sinus, and migraine headaches and fatigue symptoms).

[6] Tammy M. Thompson et al., *Modeling to Evaluate Contribution of Oil and Gas Emissions to Air Pollution*, 67:4 J. OF THE AIR & WASTE MGMT ASSOC., 445 (2017).

[7] *Id.*

[8] WB Monahan and NA Fisichelli, *Climate Exposure of US National Parks in a New Era of Change*, 9(7): e101302 PLoS ONE (2014) http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0101302.

[9] Caffrey and Beavers, *Planning for the Impact of Sea-Level Rise on U.S. National Parks*, 30:1 PARK SCIENCE 6 (2013) http://www.bostonchemicaldata.com/wpi/ParkSciencesummer2013.pdf.

[10] McDowell Peek et. al., *Adapting to Climate Change in Coastal Parks*, NATURAL RESOURCE REPORT NPS/NRSS/GRD/NRR—2015/961 (2015).

[11] Chesapeake Bay Total Maximum Daily Load 2010, https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document.

emissions of greenhouse gases such as methane and combustion byproducts such as CO and NOx will contribute to acidification, warming, and sea level rise in the Chesapeake Bay.

To Address These Threats to Human Health and Welfare, EPA Promulgated the NSPS.

Recognizing the urgent need to protect Americans against the dire impacts of climate change, in 2016, EPA finalized standards under section 111(b) of the Clean Air Act to limit methane and VOC emissions for the oil and gas sector. 81 Fed. Reg. at 35,824. The standards in the NSPS rely on low-cost technologies and best practices to deliver real-world emission reductions. Moreover, the NSPS's provisions deliver significant benefits at costs that constitute only a small fraction of industry revenues—and these costs will continue to decline with innovations in leak detection and repair ("LDAR") technology. The NSPS also reflects and builds upon approaches taken by leading states, like Colorado and California, which have successfully implemented many of these solutions in their own state-level standards to help reduce oil and gas methane emissions and protect the health of their citizens, all without negative economic repercussions. These proven state-level standards have shown that effective pollution control of oil and gas operations is plainly "achievable" and "adequately demonstrated" as required by the Clean Air Act, 42 U.S.C. § 7411(a)(1) (defining "standard of performance").

EPA amassed an extensive technical record supporting the NSPS, including information on low-cost technologies that are readily available to reduce these emissions. Indeed, in the summer of 2014, before issuing a proposed rule, EPA conducted a broad-based solicitation for information concerning emissions from oil and gas sector sources and cost-effective technologies to minimize those emissions. It issued five technical white papers that looked at the significant sources of VOC and methane emissions within the oil and natural gas sector, including those sources' emissions and the mitigation techniques available.[12] EPA sought formal input from independent experts, as well as other data and technical information from all stakeholders.[13] In addition to that effort, there are innumerable reports that document the cost-effective opportunities to reduce oil and gas sector emissions. For example, a report by ICF International found that a discrete set of key technologies could help to reduce methane emissions by 40 percent for an average of just one penny per thousand cubic feet of natural gas produced.[14]

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[12] *See* EPA, Office of Air Quality Planning and Standards ("OAQPS"), Oil and Natural Gas Sector Leaks (Apr. 2014) ("Sector Leaks White Paper"); EPA, OAQPS, Oil and Natural Gas Sector Hydraulically Fractured Oil Well Completions and Associated Gas during Ongoing Production (Apr. 2014) ("Hydraulic Fracturing White Paper"); EPA, OAQPS, Oil and Natural Gas Sector Compressors (Apr. 2014) ("Compressors White Paper"); EPA, OAQPS, Oil and Natural Gas Sector Pneumatic Devices (Apr. 2014) ("Pneumatic Devices White Paper"); EPA, OAQPS, Oil and Natural Gas Sector Liquids Unloading Processes (Apr. 2014) ("Liquids Unloading White Paper").

[13] *See* Sector Leaks White Paper at 1; Hydraulic Fracturing White Paper at 1; Compressors White Paper at 1; Pneumatic Devices White Paper at 1; Liquids Unloading White Paper at 1.

[14] ICF International, prepared for EDF, *Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries*, B-6 (March 2014) ("ICF (2014)") https://www.edf.org/sites/default/files/methane_cost_curve_report.pdf.

Another recent report concluded, based on emission estimates from EPA's Inventory of Greenhouse Gas Emissions and Sinks, that proven, low-cost technologies could reduce sector-wide methane emissions by 42 to 48 percent, at a cost of just $8 to $18 per metric ton CO2-e.[15] These same technologies will likewise reduce VOC and HAP emissions at sources in the production and gathering and boosting segments of the sector. And because methane is a saleable commodity, reductions in methane emissions often pay for themselves, in whole or in part, due to reductions in wasted product—making methane mitigation a low-cost (and sometimes *negative* cost) proposition.

After receiving comments in June 2014, EPA reviewed the data and other information and proposed methane and VOC regulations in September 2015. *Oil and Natural Gas Sector: Emission Standards for New and Modified Sources*, 80 Fed. Reg. 56,593 (Sept. 18, 2015). EPA originally allowed for a 60-day comment period on the proposal that led to the current NSPS, but extended it to 77 days. 80 Fed. Reg. 70,179 (Nov. 13, 2015). In the final rule, EPA projected that, as finalized, the NSPS would achieve annual methane and VOC reductions of 300,000 and 150,000 short tons, respectively, in 2020. 81 Fed. Reg. at 35,885. Those reductions increase to 510,000 and 210,000 short tons in 2025. *Id*. Of those total reductions, the fugitive emissions requirements contained in the NSPS accounted for 170,000 short tons of methane and 46,000 shorts tons of VOCs in 2020, and 350,000 short tons and 94,000 short tons in 2025. 2016 RIA at 3-13, Table 3-4. These fugitive emissions reductions are the climate equivalent of taking 800,000 cars off of the road by 2020, and taking nearly 1.5 million cars off of the road by 2025.[16]

Domestic companies and workers have for years been building and installing the equipment and instituting the practices necessary to reduce waste of natural gas and minimize emissions of methane and other harmful pollutants. Another report found these made-in-America solutions are manufactured by numerous companies across the country—many of them small businesses in places like Texas, Oklahoma, the Mountain West, and the industrial Midwest.[17]

The Proposal Would Substantially Weaken Federal Standards, Significantly Increasing Emissions of Dangerous Pollutants.

EPA's Proposal, by contrast, would *increase* emissions of these dangerous pollutants, wiping away many of the emissions reduction benefits of the NSPS. EPA's proposed changes to the fugitive emissions provisions would *increase* methane emissions by up to 480,000 short tons and VOC emissions by up to 124,000 short tons in the years 2019-2025.[18] 83 Fed. Reg. at

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[15] Clean Air Task Force et al., *Waste Not: Common Sense Ways to Reduce Methane Pollution from the Oil and Gas Industry* 8-9 (Jan. 2015) ("Waste Not"), *available at* http://www.catf.us/resources/publications/files/WasteNot.pdf.

[16] EPA, Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator (last accessed Dec. 16, 2018).

[17] Datu Research, prepared for EDF, *The Emerging U.S. Methane Mitigation Industry* (Oct. 2014) https://www.edf.org/sites/default/files/us_methane_mitigation_industry_report.pdf.

[18] The estimated forgone emissions reductions were calculated using a different baseline that recognizes small changes EPA made since the 2016 final rule that now allow operators on the

52,059-60. This Proposal is the latest in the Administration's campaign to relax the common-sense requirements for oil and gas development reflected in the NSPS. The first of those attempts was vacated by the D.C. Circuit, while the remaining proposals were never finalized. We discuss them below in turn.

Within weeks of President Trump taking office, then-Administrator Pruitt unilaterally withdrew an Information Collection Request ("ICR") finalized in 2016. *Notice Regarding Withdrawal of Obligation to Submit Information; Notice*, 82 Fed. Reg. 12,817 (Mar. 7, 2017). Pruitt's withdrawal came just one day after receiving a letter from the Attorneys Generals and Governors of eleven states that had been hostile to the NSPS.[19] The ICR would have collected information including major equipment and component counts at low-production wells and the effectiveness of any ongoing leak detection and repair program to which the reporting facility was subject (both areas for which EPA now professes it has uncertainties that cause it to doubt the cost-effectiveness of the NSPS).[20] The Administrator's entire basis for withdrawing it was that "EPA would like to assess the need for the information that the agency was collecting through these requests, and reduce burdens on businesses while the Agency assesses such need." 82 Fed. Reg. at 12,817. To date, there is no evidence that EPA has undertaken this assessment.

On April 18, 2017, just over a month before the first compliance deadline for fugitive emissions, EPA notified operators via letter—without signing or publishing any official notice—that the agency intended to issue a 90-day stay of certain provisions of the NSPS (including the fugitive emission requirements) under section 307(d)(7)(B) of the Clean Air Act, 42 U.S.C. 7607(d)(7)(B), and that sources did not need to comply with the requirements while the stay was in effect.[21] Eventually, on June 5, 2017, EPA published the notice of reconsideration and retroactive partial stay of, *inter alia*, the fugitive emission requirements—two days *after* the June 3, 2017 compliance deadline and with a retroactive effective date of June 2, 2017.[22] *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources; Grant of Reconsideration and Partial Stay*, 82 Fed. Reg. 25,730 (June 5, 2017) ("Administrative Stay Rule"). Many of the Environmental Commenters immediately challenged EPA's Administrative Stay Rule in the D.C. Circuit, as unlawful. EPA argued that the stay was consistent with section

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Alaska North Slope to perform LDAR inspections annually instead of semi-annually. *See* EPA, *Regulatory Impact Analysis for the Proposed Reconsideration of the Oil and Natural Gas Sector Emission Standards for New, Reconstructed, and Modified Sources* at 1-7 (2018) ("2018 RIA).

[19] See Letter from Ken Paxton, Texas AG et al., to Scott Pruitt, U.S. EPA Administrator (March 1, 2017) https://www.epa.gov/sites/production/files/2017-03/documents/letter_from_attorneys_general_and_governors.pdf

[20] *See* Information Collection Request Supporting Statement at 95, EPA ICR No. 2548.01 (Nov. 9, 2016) https://www.epa.gov/sites/production/files/2016-11/documents/oil-natural-gas-icr-supporting-statement-epa-icr-2548-01.pdf; *see also* EPA Fact Sheet at 1, https://www.epa.gov/sites/production/files/2016-11/documents/oil-gas-final-icr-factsheet.pdf.

[21] *See* Letter from Scott Pruitt, U.S. EPA Administrator, to Howard Feldman, API et al. (April 18, 2017).

[22] EPA claimed that the proposal was effective three days prior to publication without any evidence it had authority to do so. *See* 82 Fed. Reg. 25,731.

307(d)(7)(B) because there were issues of central relevance that commenters had not had an opportunity to comment on, and therefore reconsideration was mandatory. The D.C. Circuit quickly and summarily vacated the stay, holding that because the parties had an opportunity to comment on all the relevant issues during the 2016 Rule's process, any reconsideration was not mandatory and EPA could not issue stay under section 307(d)(7)(B). *Clean Air Council v. Pruitt*, 862 F.3d 1, 14 (D.C. Cir. 2017).

Less than two weeks after publishing the Administrative Stay Rule, and before the *Clean Air Council* case was decided, EPA published two more proposals that sought to further stay the 2016 Rule by three months and two years, respectively. *Oil and Natural Gas Sector: Emissions Standards for New, Reconstructed and Modified Sources: Three Month Stay of Certain Requirements*, 82 Fed. Reg. 27641 (June 16, 2017); *Oil and Natural Gas Sector: Emissions Standards for New, Reconstructed and Modified Sources: Stay of Certain Requirements*, 82 Fed. Reg. 27,645 (June 16, 2017) (collectively the "June 2017 Stay Proposals"). EPA cited no legal authority for the June 2017 Stay Proposals, and in fact directed commenters to avoid comment on the substantive requirements of the 2016 Rule. 82 Fed. Reg. at 27,648. Several months later, in November 2017, EPA published two new "notices of data availability" that did not, in fact, make any data available. *See Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Stay of Certain Requirements*, 82 Fed. Reg. 51,788 (Nov. 8, 2017); *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Three Month Stay of Certain Requirements*, 82 Fed. Reg. 51,794 (Nov. 8, 2017) (collectively the "November 2017 NODAs"). Instead, these proposals presented new legal theories as to how EPA could stay certain provisions, including the fugitive emissions requirements. Both sets of proposals had short comment periods: 45 days for the June 2017 Stay Proposals and only 30 days for the November 2017 NODAs. The June 2017 Stay Proposals were never finalized. The minimal amount of public participation permitted with respect to EPA's attempts to suspend or revise the NSPS stand in stark contrast to the thorough and collaborative process that EPA undertook to promulgate the rule.

Additionally, at the same time that EPA has been seeking to suspend or otherwise remove emission reduction requirements for the oil and gas sector, another agency tasked with oversight of oil and gas operations on public land has been undertaking a similar task. The Bureau of Land Management ("BLM") finalized the Waste Prevention Rule in November 2016, which strictly limited operators' authority to vent or flare emissions in facilities located on federal lands. *Waste Prevention, Production Subject to Royalties, and Resource Conservation*, 81 Fed. Reg. 83,008 (Nov. 18, 2016) ("Waste Prevention Rule"). Just as EPA attempted to do with the 2016 Rule, BLM tried to administratively stay various provisions of that rule in June 2017 without public comment, erroneously claiming authority to do so under section 705 of the Administrative Procedures Act. *See Waste Prevention, Production Subject to Royalties, and Resource Conservation; Postponement of Certain Compliance Dates*, 82 Fed. Reg. 27,430 (June 15, 2017) ("Postponement Rule"). And as with EPA's Administrative Stay Rule, a federal court overturned BLM's administrative stay of the Waste Prevention Rule. *See State of California v. BLM*, 277 F. Supp. 3d 1106 (N.D. Cal. 2017). After the Court's order, BLM then began a notice-and-comment rulemaking to suspend or extend the Waste Prevention Rule's compliance deadlines for one year. *Waste Prevention, Production Subject to Royalties, and Resource Conservation; Delay and*

Suspension of Certain Requirements, 82 Fed. Reg. 58,050 (Dec. 8, 2017) ("Suspension Rule"). The U.S. District Court for the Northern District of California preliminarily enjoined implementation of the Suspension Rule, finding that BLM's "reasoning behind the Suspension Rule [wa]s untethered to evidence contradicting the reasons for implementing the Waste Prevention Rule." *California v. BLM*, 286 F. Supp. 3d 1054, 1058 (N.D. Cal. 2018). Finally, BLM just recently finalized a rule that rescinds virtually all of the waste prevention measures that the Waste Prevention Rule had put in place. *Waste Prevention, Production Subject to Royalties, and Resources Conservation; Rescission of Revision of Certain Requirements*, 83 Fed. Reg. 49,184 (Sept. 28, 2018). Among the rationales for the rescission are that BLM standards are unnecessary because the NSPS contains similar requirements that help mitigate waste of publicly-owned gas. *Id.* at 49,186.

While the federal government has been launching a concerted assault on critical public health, environmental, and waste prevention safeguards, knowingly and willfully increasing emissions of dangerous pollutants, several states—recognizing the benefits of reducing these emissions and the availability of low-cost, common sense controls—have moved in the opposite direction. In the time since the 2016 Rule was finalized, three states have finalized or strengthened methane standards for oil and gas operations. In July 2017, California finalized statewide methane regulations requiring more frequent fugitive emissions inspections for both well sites and compressor stations than what EPA's Proposal would mandate. Cal. Code. Regs. tit. 17 § 95669 (2017). Then, in June 2018, the Colorado Air Quality Control Commission strengthened the state's 2014 methane regulations to increase the frequency of LDAR inspections for oil and natural gas wells in ozone nonattainment areas and to require LDAR for pneumatic controllers. 5 Colo. Code Regs. 1001-9 § XII.L (2018). That same month, Pennsylvania finalized General Permit requirements that increased the frequency of LDAR inspections. Pennsylvania Department of Environmental Protection, Bureau of Air Quality, General Plan Approval and/or General Operating Permit GP-5 and GP-5A. In addition to these states, neighboring countries have likewise strengthened oil and gas sector protections. Indeed, the day before EPA's public hearing on this Proposal, Mexico adopted standards similar to the 2016 Rule, including requirements to perform quarterly LDAR.[23] And in 2018, Canada published federal methane regulation requiring triennial LDAR inspections at affected natural gas sites.[24] Each one of these recently finalized LDAR standards requires more frequent inspections, yielding greater reductions in harmful pollution, than what EPA proposes to do.

I. The Proposal Is Unlawful under Section 111(b) of the Clean Air Act.

[23] Press Release, EDF, Mexico Finalizes Strong Oil and Gas Regs to Slash Methane Pollution (Nov. 13, 2018) https://www.edf.org/media/mexico-finalizes-strong-oil-and-gas-regs-slash-methane-pollution (citing http://www.dof.gob.mx/nota_detalle.php?codigo=5543033&fecha=06/11/2018).

[24] *See* Government of Canada, *Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)* (SOR/2018-66), https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?Id=146 (last visited Dec. 10, 2018).

A. EPA fails to acknowledge the relevant statutory factors.

EPA's reconsideration proposal violates the Clean Air Act because the agency has failed to demonstrate that its revised standards of performance reflect the "best system of emission reduction" ("BSER"). The Agency's foremost obligation under the Clean Air Act is to "to promote the public health and welfare." 42 U.S.C. § 7401(b)(1). In furtherance of that goal, section 111 of the statute requires EPA to adopt binding emission limits based on the *best* adequately demonstrated system of emission reduction. Section 111(a)(1) defines the term "standard of performance" as "a standard for emissions of air pollutants which reflects the degree of emissions limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." 42 U.S.C. § 7411(a)(1). As the statutory language and case law make clear, this requires the Administrator to first identify "the emission levels that are 'achievable' with 'adequately demonstrated technology.'" *Sierra Club v. Costle*, 657 F.2d 298, 330 (D.C. Cir. 1981). Once he makes this determination, he must then determine the "best" system, taking into account the "amount of air pollution reduced" by the standards, the "cost" of the standards, any resulting "nonair quality health and environmental impacts," "energy requirements," and how the standards may drive "technological innovation." *Id.* at 326, 330, 347; *see* 42 U.S.C. § 7411(a)(1), (b)(1)(B), (h)(1).

Section 111(b) further provides that when EPA revises a previously-issued standard of performance, it must "follow[] the procedure required by this subsection for promulgation of such standards." 42 U.S.C. § 7411(b)(1)(B). Accordingly, the agency must evaluate the full suite of BSER factors not only when it issues a performance standard in the first instance, but also whenever it revises an existing standard. *See also id.* ("[W]hen revising standards promulgated under this section, [the Administrator shall] consider the emission limitations and percent reductions achieved in practice."). Furthermore, in selecting the "best" system of emission reduction for either a new or revised standard, EPA must explain why *other* potential systems—including the one currently in effect—are *not* the "best." This follows from the inherently comparative nature of the word "best": one thing can only be the "best" in relation to other comparable things that are not the "best." *Cf. Nat'l Hells Canyon Ass'n v. Fed. Power Comm'n*, 237 F.2d 777, 784 (D.C. Cir. 1956) (in the context of the Federal Power Act, "the word 'best' is of course superlative and suggests comparison of two or more applications for licenses under § 4(e)."). Ultimately, the aim is to require the "*best* system of emissions *reduction*," not a merely mediocre system. This is especially so when EPA proposes a rule that would *increase* emissions, it must have good reasons for concluding that the prior regime was unachievable, inadequately demonstrated, or did not represent the best balance of the statutory factors.

Independent of the particular requirements of the Clean Air Act, bedrock principles of administrative law also obligate EPA to consider reasonable alternatives when taking any final agency action. *See, e.g., Del. Dep't of Nat. Res. v. EPA*, 785 F.3d 1, 18 (D.C. Cir. 2015) ("Because EPA too cavalierly sidestepped its responsibility to address reasonable alternatives, its action was not rational and must, therefore, be set aside.") (citations omitted); *Neighborhood TV Co. v. FCC*, 742 F.2d 629, 639 (D.C. Cir. 1984) (reviewing courts must "ensure that the agency

took a 'hard look' at all relevant issues and considered reasonable alternatives to its decided course of action") (citing *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 41–43 (1983)). Thus, where an agency revises a performance standard to reflect a new and weakened BSER, it must discuss all of the statutory factors and explain why it believes the proposed standard to be "best." It must also explain why the current BSER—a reasonable alternative to the proposed revision—is no longer the "best" system. And, as discussed in more detail below, where an agency revises a previous policy based on new data, or when the revisions would disrupt serious reliance interests, it must provide "a reasoned explanation . . . for disregarding facts and circumstances that underlay or were engendered by the prior policy." *FCC v. Fox Television Stations, Inc.,* 556 U.S. 502, 515 (2009).

Consistent with its legal obligations, EPA has in previous section 111 rulemakings explained not only why its standard is the BSER, and why potential alternatives do *not* qualify as the BSER. *See, e.g.*, 80 Fed. Reg. 64,662, 64,727 (Oct. 23, 2015) (explaining why carbon capture and sequestration, natural gas co-firing, heat rate improvements at oil- and gas-fired plants, and heat rate improvements at coal plants without additional measures were not the BSER for carbon dioxide reductions from power plants); 80 Fed. Reg. 64,510, 64,594 (Oct. 23, 2015) (explaining why supercritical or ultra-supercritical boiler design, integrated gasification combined cycle technology, and full carbon capture and sequestration were not the BSER for the section 111(b) carbon pollution standards for power plants); 80 Fed. Reg. 56,593, 56,619 (Sept. 18, 2015) (explaining why dry seal systems and capturing emissions and routing them to a process are not the BSER for centrifugal compressors in the proposed 2016 methane rule); 79 Fed. Reg. 52,000, 52,115 (Aug. 27, 2015) (explaining that specific best management practices, cover practices, oxidative controls and technologies, organics diversion, and source separation are not elements of the BSER for the proposed section 111(d) emission guidelines for municipal solid waste landfills); 79 Fed. Reg. 41,796, 41,803-04 (July 17, 2014) (explaining why leachate recirculation, the use of advanced seals, and oxidative covers are not elements of the BSER for the section 111(b) performance standards for municipal solid waste landfills). Similarly, in issuing the current NSPS for oil and gas sources, EPA discussed at length the BSER factors and why the currents standards meet them. *See* 80 Fed. Reg. 56,593, 56,595, 56,610, 56,613-14, 56,616-45 (proposed rule); 81 Fed. Reg. at 35,826-27, 35,829, 35,845-46, 35,852, 35,855-56, 35,862, 35,871, 35,878-79, 35,891 (final rule).

In the Proposal, however, EPA does not discuss the BSER factors at all, much less explain why weakening the standards is the BSER and is *better* than the current NSPS. In fact, the agency does not even assert that its revised standards are the BSER. Nowhere, for instance, does EPA claim that, after weighing the relevant statutory factors in light of the data, it has determined that the current NSPS's system of emission reduction does not represent the "best" balance of those factors and that its revised system of emission reduction *does* represent the best balance. EPA acknowledges early on in its rule proposal that "the standard of performance must be based on controls that constitute 'the best system of emission reduction … adequately demonstrated," 83 Fed. Reg. at 52,061, but then essentially ignores that requirement—never evaluating the relevant factors for determining the BSER or even mentioning the term BSER itself apart from two brief references to the 2016 Rule's treatment of optimal gas imaging cameras and state-level LDAR standards. *Id.* at 52,07, 52,080. Thus, not only does EPA fail to

require the *best* system of emission reduction in its revised standards, it arbitrarily fails to provide "reasoned analysis to cogently explain why its [Proposal] satisfies the [Clean Air Act's] requirements" at all. *NRDC v. Daley*, 209 F.3d 747, 755-56 (D.C. Cir. 2000). EPA nowhere explains either why its weakened standards reflect the BSER or why the current NSPS standards no longer reflect the BSER.[25] In this regard, the proposal violates both the specific requirements of the Clean Air Act and the standards necessary for reasoned decisionmaking under fundamental administrative law precepts.

B. EPA fails to demonstrate that the Proposal is the BSER and that the current NSPS is not the BSER.

Perhaps more significant than the virtual absence of the terms "best system of emission reduction" or "BSER" from the Proposal is EPA's failure to properly analyze section 111's individual BSER factors in proposing the new weakened set of standards and rejecting the current standards. With respect to the current standards, the agency has not asserted (and could not credibly assert) that the current NSPS's BSER is not a "system," that it is not "adequately demonstrated," or that the resulting standard is not "achievable." "An adequately demonstrated system is one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly in an economic or environmental way." *Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973). And "an achievable standard is one which is within the realm of the adequately demonstrated system's efficiency and which, while not at a level that is purely theoretical or experimental, need not necessarily be routinely achieved within the industry prior to its adoption." *Id.* at 433–34.

The BSER for the current NSPS—which is modeled on successful state programs and has been in effect for over two years—easily meets these standards for adequate demonstration and achievability. EPA makes no claim that its original selection of the BSER was not "reasonably reliable" or "reasonably efficient," nor does it assert that the rule would entail "exorbitant" environmental or economic costs. Given that the standard has been in effect for over two years, if such a claim were supportable (which it isn't), there would be evidence to support it (which there isn't). As for achievability, not only is the current NSPS "within the realm of the [BSER's]

[25] The 2016 Rule's requirements encompass both standards of performance issued under section 111(b) and work practice standards issued under section 111(h). Under the statute, work practice standards must reflect "the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." 42 U.S.C. § 7411(h)(1). In practice, for the purposes of the analyzing the relevant statutory factors, EPA treats the "best technological system of continuous emission reduction" as identical to the BSER, and the agency frequently refers to the BSER throughout the preamble for the NSPS. *See, e.g.*, 80 Fed. Reg. at 35,825-27, 35,829, 35,845-46, 35,852, 35,855-56, 35,862, 35,871, 35,878-79, 35,885, 35,891. Thus, we do not distinguish between the "best technological system of continuous emission reduction" and the BSER throughout these comments, and refer exclusively to the latter term.

efficiency," but it has *already* been achieved: the 2016 Rule's "system" was finalized 30 months ago and has been fully enforceable (and, presumably, fully enforced) for the last 18 months. The agency does not allege (and cites no data to suggest) that either the industry as a whole or significant numbers of individual affected sources have had difficulty complying with the existing standards. Indeed, the agency points to no evidence suggesting that *any* sources have been unable to meet those standards. As such, EPA has not in any way dislodged (or even attempted to dislodge) its own previous conclusion that the BSER for the current NSPS represents an achievable and adequately demonstrated system of emission reduction.

Furthermore, as noted above, section 111 requires EPA to set standards (including revised standards) that reflect the BSER, and the current NSPS's BSER represents a reasonable alternative to the Proposal. Accordingly, EPA must explain why its new and substantially weakened performance standards reflect the "best" system of emission reduction while the BSER for the current NSPS is *not* the best system. Whether a particular system is the "best" or not depends on the section 111 statutory factors: costs, nonair quality health and environmental impacts, energy requirements, the amount of air pollution reduced, and technological innovation. 80 Fed. Reg. at 64,538 (quoting *Sierra Club,* 657 F.2d at 326, 347); *see also id.* at 330 (once EPA has determined which systems of emission reductions are adequately demonstrated, it must "choose an achievable emission level which represents the best balance of economic, environmental, and energy considerations"). Of these factors, two are particularly relevant to this analysis: costs and the amount of air pollution reduced.[26] On both counts, the Proposal fails to reflect the "best" system and falls short of the requirements of section 111.

Under section 111, the agency must consider costs in determining the BSER, but the case law makes clear that this requirement does not entail a formal cost-benefit balancing test. *See, e.g., Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d 427, 437 (D.C. Cir. 1973) (cost-benefit analysis was not required for acid mist standards); *Lignite Energy Council v. EPA*, 198 F.3d 930, 933 (D.C. Cir. 1999) (EPA did not exceed its discretion in setting boiler standards that modestly increased the overall cost of producing electricity). Rather, the agency must ensure that the performance standards reflective of the BSER are not "exorbitantly costly in an economic or environmental way." *Essex*, 486 F.2d at 433 (emphasis added). To that end, in *Portland Cement Association v. Train*, the court upheld EPA's interpretation that section 111's cost inquiry functions as a safety valve to ensure that the costs an NSPS imposes are not "greater than the industry could bear and survive," but are sufficient to allow the industry to "adjust" in a "healthy economic fashion to the end sought by the Act as represented by the standards prescribed." 513 F.2d 506, 508 (D.C. Cir. 1975) ("*Portland Cement II*"). *See also Lignite*, 198 F.3d at 933 ("EPA's choice [of the BSER] will be sustained unless the environmental or economic costs of using the technology are exorbitant."). The Proposal appears to acknowledge this relevant threshold when it proposes annual monitoring for non-low-production wells because, ostensibly, petitioners "are able to *bear* such costs." 83 Fed. Reg. at 52,065 (emphasis added). Importantly,

[26] As for the other three factors, neither energy requirements nor nonair health and environmental impacts are strongly relevant to EPA's selection of the BSER to control oil and gas methane emissions. We discuss technological innovation below in this section.

however, it does not provide any evidence that industry is *not* able to bear the costs of the current standards, and all of the facts suggest otherwise.

With regard to the quantity of emission reductions that a performance standard must achieve, the D.C. Circuit has repeatedly held that section 111 requires the "maximum practicable degree" of control. *Essex*, 486 F.2d at 437 (citing Summary of the Provisions of Conference Agreement on the Clean Air Amendments of 1970, 116 Cong. Rec. 42384, 42385 (1970)); *see also Costle*, 657 F.2d at 326 (a standard of performance must "reduc[e] emissions as much as practicable."). The D.C. Circuit adopted this understanding by exploring the legislative history of section 111 and concluding that "Congress was most concerned that new plants—new sources of pollution—would have to be controlled to the greatest degree practicable if the national goal of a cleaner environment was to be achieved." *Essex*, 486 F.2d at 433 n.14.

Indeed, the Conference report explained that "the provisions for new source performance standards are designed to ensure that new stationary sources are designed, built, equipped, operated and maintained so as to reduce emissions to a minimum," and that the covered sources "must be controlled to the maximum practicable degree regardless of their location. Standards of performance must be set at the greatest degree of control attainable through the application of the best system of emission reduction which has been adequately demonstrated."[27] Congress further emphasized that "[t]he performance standards should be met through application of the latest available emission control technology or through other means of preventing or controlling air pollution. The maximum use of available means of preventing and controlling air pollution is essential…." *Id.* at 416. Accordingly, while the Act does not necessarily require EPA to set a standard at a level that reflects the maximum level of control that is *technologically* possible, *Costle*, 657 F.2d at 330, it *does* require the agency to maximize the level of emission reductions that can be achieved while giving reasonable consideration to the other statutory factors. Thus, with regard to costs, this means that the standard must achieve the maximum degree of emission reductions without becoming exorbitantly costly or crippling the regulated industry.

As judicial precedent makes clear, section 111 is seen as a "technology-forcing statute." In designating a BSER, EPA is required to look broadly at systems and techniques that may be in use in other, comparable industrial sectors;[28] to consider future improvements and refinements in emission reduction systems;[29] and to consider systems that are not necessarily in "actual, routine

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[27] S. REP. NO. 91-1196, at 16 (1970), *reprinted in* A Legislative History of the Clean Air Act Amendments of 1970 Vol. ii, at 415-16 (1974) https://catalog.hathitrust.org/Record/003215009.
[28] *Lignite Energy Council v EPA*, 198 F.3d 930, 934 (D.C. Cir. 1999).
[29] *Sierra Club v. Costle*, 657 F.2d 298, 364 (D.C. Cir. 1981) ("Recognizing that the Clean Air Act is a technology-forcing statute, we believe EPA does have authority to hold the industry to a standard of improved design and operational advances" when setting standards under section 111); *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 391 (D.C. Cir. 1973) ("[s]ection 111 looks toward what may fairly be projected for the regulated future, rather than the state of the art at present"); *id.* (holding that EPA may make a reasonable "projection based on existing technology" when selecting the best system of emission reduction).

use somewhere."[30] In its proposal, EPA briefly acknowledges the potential for emerging technologies to significantly decrease the cost of fugitive emissions monitoring, 83 Fed. Reg. at 52,080, but nowhere factors that into its decision to fundamentally weaken the standards. Moreover, while both the current NSPS and the Proposal permit the use of alternative means of emission limitation for LDAR to encourage the development of emerging technologies, *see* 81 Fed. Reg. at 35,860-61; 83 Fed. Reg. at 52,080, the weakened standards for production wells and compressor stations in the Proposal do not take into account the potential for technology to *reduce* the costs of control and therefore do not create incentives for technological innovation to achieve greater reductions. Thus, the ultimate standard must achieve the maximum degree of emission reductions, keeping in mind the extent to which innovations in technology can provide the means for preventing compliance costs from becoming exorbitantly costly or crippling the regulated industry.

The standards contained in the Proposal, however, do not nearly satisfy the statutory requirements, nor could they. As noted above, the current NSPS was finalized two-and-a-half years ago, and the rule's fugitive emissions provisions have been fully effective and enforceable for the last 18 months. There is no evidence to suggest that NSPS compliance costs come anywhere close to the level of "exorbitance" that would justify replacing it with a less stringent standard, as EPA now seeks to do. On the contrary, as we document later in these comments (and as EPA acknowledges), compliance costs associated with the NSPS are *lower* than EPA predicted in 2016 and only a small fraction of industry revenues. Indeed, industry has continued to thrive under the current NSPS: as of September 2018, monthly natural gas production in the U.S. had increased by approximately 17 percent since the standards were finalized in June 2016 and monthly crude oil production had increased by approximately 30 percent.[31]

Nowhere in the Proposal does EPA argue or even imply that the current NSPS's compliance costs are exorbitant or in any way unreasonable; to the contrary, EPA admits that these costs of control for semiannual monitoring at non-low-production well sites—which is the level of frequency required at such sites under the current NSPS—"appear to be reasonable." 83 Fed. Reg. at 52,065. In fact, since the current NSPS went into effect, the costs of compliance have *decreased*, making it even more cost-effective than forecast. The agency's own updated 2018 analysis shows that semiannual monitoring for non-low-production wells is actually nearly *20 percent less costly* on a dollars-per-ton of methane emission reduction basis than what the agency found to be "cost-effective" in the 2016 Rule. *Compare* EPA, *Background Technical Support Document for the Proposed Reconsideration of the New Source Performance Standards 40 CFR Part 60, subpart OOOOa* 32 (September 2018) ("2018 TSD") *with* EPA, *Background Technical Support Document for the Final New Source Performance Standards 40 CFR Part 60,*

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[30] *See Portland Cement Ass'n*, 486 F.2d at 391 (citing S. Rep. No. 91-1196, at 16); *Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d at 433–34 (To be achievable, the standard needs to be "within the realm of the adequately demonstrated system's efficiency and which, while not at a level that is purely theoretical or experimental, need not necessarily be routinely achieved within the industry prior to its adoption.").

[31] EIA, *Monthly Crude Oil and Natural Gas Production*, https://www.eia.gov/petroleum/production/ (last visited Dec. 3, 2018).

subpart OOOOa 54 (May 2016) ("2016 TSD"). *See also* EPA, *Regulatory Impact Analysis for the Proposed Reconsideration of the Oil and Natural Gas Sector Emission Standards for New, Reconstructed, and Modified Sources* 1-4-1-5 (September 2018) ("2018 RIA") ("[B]ase emissions from a well site are estimated to be larger, and the reductions due to the monitoring and repair requirements have also increased compared to the base emissions and emission reduction estimates used in the 2016 NSPS OOOOa RIA").

Moreover, as we describe in more detail later, *infra* § VI, this is consistent with the data from the limited NSPS compliance reports commenters were able to obtain through Freedom of Information Act requests. These data show operators completing surveys far more quickly than the agency original projected, resulting in costs nearly 15-32 percent lower than those EPA projected in the 2016 Rule—nearly identical to EPA's own 2018 analysis noted above. The current NSPS is based on technologies that are widely required—for both new and existing sources—by several States and that are used voluntarily by many companies. It strains credulity to suggest that such a system is not economically reasonable within the meaning of section 111, or that EPA would achieve the greatest emission reductions practicable by *weakening* those standards.

Furthermore, Section 111(b)(1)(B) requires EPA to "consider the emissions limitations and percent reductions achieved in practice" when revising standards under section 111. 42 U.S.C. § 111(b)(1)(B). Since EPA promulgated the NSPS, several states, including Colorado and California, have promulgated new or updated rules governing emissions from the oil and gas sector, and some companies have adopted new standards voluntarily. While the Proposal considers state programs in determining equivalency under section 111(h)(3) for AMEL, it does not consider these standards in revising the NSPS under section 111(b), *i.e.* BSER for fugitive emissions in non-low and low-production well sites and compressor stations. EPA cannot ignore these successful programs, which demonstrate the achievability, cost-effectiveness, and emissions reductions required in some states, in revising the NSPS. To the contrary, EPA must fully consider these programs and explain why, in light of the fact that the technologies and techniques required by the NSPS are in widespread use under certain State programs, it may weaken those standards under section 111. *See* 42 U.S.C. § 111(b)(1)(B) ("When implementation and enforcement of any requirement of this chapter indicate that emission limitations and percent reductions beyond those required by the standards promulgated under this section are achieved in practice, the Administrator shall, when revising standards promulgated under this section, consider the emission limitations and percent reductions achieved in practice.").

Indeed, EPA's proposal to deem a whole range of state-level standards—from rigorous standards like those required in Colorado and California to weak standards like those in Texas—as "equivalent" to the proposed BSER demonstrates that it cannot be the "best" system of emissions reduction. If all of these state standards are truly "equivalent" to (or exceed) the Proposal, then the Proposal must be the lowest-common-denominator, *not* the "best" system of emissions reduction. To develop the "best" system, EPA must examine the stronger standards required (and in application) in Colorado and California—in addition to the NSPS—and explain why those systems are not better than the one contained in its Proposal.

Since EPA has offered no evidence that the current NSPS's compliance costs are excessive or unreasonable, it has no basis to replace those requirements with standards that the agency admits would achieve significantly fewer emission reductions. EPA's entire case for weakening the standard is premised on the counter-factual notion that the standards *might* not be *as* cost-effective as the actual data suggests—that is, that sometime in the future, new information may come to light suggesting that the standards cost per ton of reduction than the best-available science currently demonstrates.[32] This is unlawful, arbitrary, and inadequate for the many reasons discussed in these comments.

1. EPA cannot elevate cost overall all other statutory factors.

As explained above, the statute requires EPA to comprehensively address both the costs to industry *and* the need to reduce dangerous emissions. While it is not entirely clear, the Proposal suggests that EPA is attempting to maximize the rule's cost-effectiveness above all other factors, but cost-effectiveness cannot lawfully (or practically) be considered in isolation. The relevant question is not what standard is *most* cost-effective on a dollars-per-tons-reduced basis, but whether the standard is economically reasonable *while achieving significant emission reduction*s. Thus, EPA may not consider a standard's costs and the overall emission reductions it would achieve in isolation of one another, but must address these factors in relation to one another. As a corollary, EPA may not elevate costs over all other factors in order to fundamentally weaken the current standards, as it now seeks to do. As noted above, courts have interpreted section 111 as requiring the *maximum practicable degree* of emission reduction, *not* the most cost-effective degree of emission reduction. In other words, even if EPA were to determine that a particular level of pollution control were optimally cost-effective, section 111 would require a still more

[32] EPA previously recognized that it would be improper to consider net benefits—which do not include benefits that are not monetized—in setting the BSER, and has not done so in the Proposal. Attachment to Dkt. No. EPA-HQ-OAR-2017-0483-0073 ("EPA disagrees with the [OMB] reviewer that the highest net benefit option should be chosen in this case, given that cost-effective options are available as demonstrated in the BSER analysis."); Attachment to Dkt. No. EPA-HQ-OAR-2017-0483-0076 ("In contrast to the statutorily required BSER analysis, the quantified net benefits presented in the RIA are based solely on monetization of the increase in methane emissions. While we cannot monetize the increase in VOC emissions (which is regulated under subpart OOOOa), we cannot ignore its impact, in particular in ozone nonattainment areas. The net benefit analysis also does not consider increases in other air emissions (e.g., HAP), as well as nonair quality health and environmental impacts."). EPA is right. Contrary to what the White House stated, *id.*, net benefits are an improper way to determine the BSER where significant benefits of the standard have not been monetized. For example, net benefits do not take into account the health benefits of reducing dangerous emissions of VOCs—the very goal of section 111. To the extent net monetized benefits are what is really driving the proposed standards, that would be unlawful under the statute. As explained *supra*, through section 111, Congress made a judgment that the threats posed by air pollution—even if they cannot be monetized—should be reduced through technologies so long as the cost of those technologies is not exorbitant. EPA cannot turn that judgment on its head by ignoring the non-monetized benefits of reducing dangerous pollution.

stringent level of control provided that the overall costs of the more protective standard were not exorbitant or unreasonable. *See Ctr. for Biological Diversity v. EPA*, 722 F.3d 401, 410-11 (D.C. Cir. 2013) (rejecting EPA's reasoning for not adopting a more protective regulatory option for limiting biogenic CO_2 emissions because even if that reasoning was "accurate," it was "non-responsive" to the Clean Air Act's requirements).

Indeed, if the agency put on blinders to anything other than cost-effectiveness, it would systematically under-regulate dangerous sources of air pollution and fail to achieve the Act's goal of reducing emissions. That is because it is not at all unusual for the first ton of emissions reduction to be less expensive (i.e., more cost-effective) than the second ton—that's what's called low-hanging fruit.[33] Cost-effectiveness can provide an indication of how efficiently you are achieving a goal, but it is not in itself the goal—emissions reductions are the goal. Thus, EPA may not lawfully weaken an existing NSPS solely by demonstrating that the revised standard would be more cost-effective: it must explain why the enhanced cost-effectiveness would be "worth" the overall decline in emission reductions (including non-monetized benefits of emissions reductions) under the revised rule, and why the statute would permit such a trade-off. EPA has not done this in the Proposal.

Furthermore, EPA provides no governing principle in the Proposal that would delineate what is and is not cost-effective on a dollars-per-tons basis. Consistent with the statutory charge, when EPA developed the current NSPS, it transparently and thoroughly explained how it considered cost-effectiveness and why it determined that the standards contained in the NSPS were cost-effective, taking into account both the urgent need to reduce dangerous emissions and the statutory direction to not impose exorbitant costs on industry. In developing the current standard, EPA provided valuable context by considering its cost-effectiveness calculations in relation to industry's overall capital expenditures. For instance, the 2016 Final Rule referred back to the Proposal's discussion of costs, which identified judicial decisions that had upheld as reasonable increases in compliance costs that represented a certain percentage of overall capital expenditures and/or revenues. *See* 80 Fed. Reg. at 56,617 (citing decisions that upheld as reasonable new source standards associated with 12–15 percent increases in capital expenditures).

EPA went on to describe how the compliance cost increases attributable to the 2016 standards fell below these thresholds. For instance, in the preamble to the 2016 Rule proposal, EPA calculated that in the production segment, the total capital costs of complying with the standards across all facilities amounted to just 0.13 percent of total revenues and 0.16 percent of total capital expenditures. 80 Fed. Reg. at 56,627. In the transmission and storage segment, overall capital costs amounted to just 0.11 percent of total revenues and 0.24 of total capital

[33] For example, and to simplify, suppose that one standard would reduce only 10 tons of pollution at a cost of $100, while a more stringent standard would reduce 100,000 tons of pollution for $1.1 million. The latter would be somewhat less "cost-effective" than the former in terms of the cost of each ton of pollution reduction, but still well within the economically reasonable threshold and *much* better at achieving emissions reductions—the fundamental purpose of the "system" in section 111.

expenditures. *Id.* at 56,620. For LDAR in particular, EPA determined that the proposed standards' capital costs would be 0.085 percent of the total revenues at well sites and .103 percent of total revenues at compressor stations. *Id.* at 56,636, 56,641. This was consistent with a conservative analysis provided by environmental commenters, who provided data demonstrating that in the vast majority of instances, the current NSPS's overall compliance costs for LDAR (including both capital and non-capital expenditures) amounted to less than 1 percent of revenues for non-low-production wells and no more than 2 to 3 percent of revenue for low-producing wells[34]—values that are higher than our updated assessments for this rulemaking now show, *infra* § VI. Ultimately, EPA found that "[b]ecause control costs for both semiannual and annual monitoring are cost-effective," the agency "evaluated the difference in emissions reductions between the two monitoring frequencies and concluded that semiannual monitoring would achieve greater emissions reductions." Therefore, EPA selected semiannual LDAR monitoring as the BSER for well sites. 81 Fed. Reg. at 35,856.

Notably, EPA has finalized NSPS in the past that imposed similar (or, in some cases, significantly greater) costs, all of which have been upheld in court. For example, in *Portland Cement Ass'n v. Ruckelshaus* ("*Portland Cement I*"), 486 F.2d 375, 387-88 (D.C. Cir. 1973), the D.C. Circuit upheld an NSPS for particulate matter emissions, even though control technologies amounted to roughly 12 percent of the capital investment for an entire new plant and consumed five to seven percent of a plant's total operating costs. 486 F.2d 375, 387-88. Likewise, in *Portland Cement III*, the court upheld particulate matter standards that were anticipated to increase the cost of cement by one to seven percent, with little projected decrease in demand. *Portland Cement Ass'n v. EPA*, 665 F.3d 177, 191 (D.C. Cir. 2011); *see also* 73 Fed. Reg. 34,072, 34,077, 34,086 (June 16, 2008). And in *Lignite Energy Council* court held that a two percent increase in the cost of producing electricity was not exorbitant, and upheld the 1997 nitrogen oxides NSPS for power plants and industrial boilers. *See* 198 F.3d at 933 (citing 62 Fed. Reg. 36, 948, 36,958 (July 9, 1997)).

In the Proposal, EPA entirely ignores its past factual findings, and does not provide any new analysis of the costs of the current NSPS (or its Proposal) relative to capital expenditures or revenue. EPA does not explain what its threshold for cost-effectiveness is, whether it agrees or disagrees with the agencies prior cost-effectiveness threshold, why it thinks its alleged uncertainties push the requirements above some unstated cost-effectiveness threshold, whether it agrees or disagrees that cost-effectiveness should be judged by comparison to industry capital expenditures or revenue, or *any* of the relevant factors to determining a lawful standard. EPA cannot "simply disregard contrary or inconvenient factual determinations," *Fox Television*, 556 U.S. at 537 (Kennedy, J., concurring). Here, EPA seeks to implement a weaker standard that is unmoored to the factual record before the agency.

Had EPA actually done any analysis, it would have found that under any reasonable set of assumptions, the current NSPS's compliance costs amount to a tiny fraction of the industry's

[34] CATF et al. Comments, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources at 40-41, Dkt. No. EPA-HQ-OAR-2010-0505-7322 (Dec. 4, 2015) ("CATF et al., Comments").

capital expenditures and revenue. Indeed, these are the rare standards that, in many cases, result in the capture of natural gas that would otherwise be wasted, allowing operators to save money and offset compliance costs. In weakening the current NSPS, EPA entirely ignores these prior regulatory actions and court decisions, as well as any other information that would properly contextualize its discussion of cost-effectiveness. EPA cannot, consistent with the statute, elevate industry costs (or vague "uncertainties" about cost-effectiveness) over all other factors. It may not lawfully ignore the key purpose of section 111—to put into place systems of emissions *reduction* that minimize pollution to the maximum practicable degree. *See Nat'l Asphalt Pavement Ass'n v. Train*, 539 F.2d 775, 783 (D.C. Cir. 1976) (Section 111 was "designed to prevent new pollution problems, especially the deterioration of air quality in areas where existing air quality levels exceed the promulgated air quality standards."). Yet nowhere in the Proposal does EPA either explain that it has a new and different view of what is an acceptable level of cost-effectiveness (and why), or that it does not have a different view, but believes the alleged "uncertainties" render the NSPS uneconomic under the same cost-effectiveness thresholds.

The agency's analysis of cost-effectiveness as a relevant BSER factor is entirely unmoored from any relevant benchmarks or points of comparison. For instance, EPA asserts that it is unable to conclude that semiannual monitoring is cost effective for non-low-production wells, without ever indicating what level of cost-effectiveness it would consider reasonable. *See Ctr. for Biological Diversity v. EPA*, 722 F.3d 401, 410-11 (D.C. Cir. 2013) (finding EPA's explanation wanting where EPA "spen[t] pages explaining the scientific uncertainty," but "nowhere offer[ed] an interpretation of the Clean Air Act" that would make that uncertainty relevant). To the extent EPA has not changed its view of the proper threshold for cost-effectiveness, the agency admits that the data demonstrates that the requirements in the NSPS *are* cost-effective. And EPA has not given any reason to think that the alleged "uncertainties" on which it bases the Proposal would push the requirements above those thresholds. Rather, EPA appears to bluntly assume that any revision to a performance standard that would reduce its total costs-per-ton (which it has not even shown the Proposal would do) is consistent with section 111. Yet this simply not the case. In the 2016 Rule, rather than simply assuming that "cheaper is better," EPA examined the costs of control for each regulatory option and compared them to the costs of control for past NSPS to determine whether and to what extent the various options were in line with the agency's past practice. And to the extent EPA *has* changed its view of a reasonable cost-effectiveness threshold, it has completely failed to disclose or explain that change of position.[35]

Moreover, as noted above, EPA's BSER determination must take into account the overall *amount* of air pollution that its standard of performance would achieve. *Costle*, 657 F.2d at 326. Here, EPA proposes to relax the current NSPS (thus *increasing* dangerous pollution by hundreds of thousands of tons) based solely on the *ratio* of pollution reductions achieved to dollars spent: nowhere does EPA explain (nor could it) why the purportedly enhanced cost-effectiveness of its revised standard is worth the environmental harm that would occur due to increased air

[35] The fact that commenters cannot discern upon which basis EPA is concluding the requirements of the NSPS may not be cost-effective is itself a problem, and precludes meaningful comment.

emissions, or how it would serve the goals of section 111 to make this trade-off. This stands in stark contrast to the 2016 Rule. To give just one example, in that rulemaking, EPA explicitly determined that, although annual LDAR inspections at well sites would incur fewer costs per ton of methane abated than semiannual inspections, both options were reasonably cost-effective, and since semiannual inspections would achieve greater overall emission reductions than annual inspections, the semiannual option represented the BSER for LDAR at well sites. *See* 81 Fed. Reg. at 35,855-56.[36] EPA has provided no similar analysis for any of the NSPS revisions that are included in the Proposal.

EPA's failure in this regard is particularly striking in light of the fact that the agency openly admits that the Proposal will inflict harm: "EPA expects that the foregone VOC emissions reductions may also degrade air quality and adversely affect health and welfare effects associated with exposure to ozone, PM2.5, and HAP." 83 Fed. Reg. at 52,059. EPA is simply at a loss to explain why how its Proposal can be reflect the "best" system of emission reduction given those harms and the reasonableness of the current NSPS, which avoids them. In contravention of the statutory command, the Proposal would *increase* emissions of health and welfare-endangering methane and VOCs by hundreds of thousands of tons by removing requirements already in place throughout the United States for which there is *no* evidence of any problem. This simply cannot be the "best system of emissions *reduction*." The Proposal thus runs directly contrary to the Clean Air Act and must be withdrawn.

2. EPA cannot weaken the standards based on speculation.

Even if EPA could elevate industry costs over all other factors and not even specify a threshold for what cost-effectiveness it deems reasonable (which it cannot lawfully do), here the agency has not even concluded that it *did*, in fact, overestimate the cost-effectiveness of the NSPS standards, but only that it *may* have done so. EPA cannot substantially weaken critical protections when all of the best available evidence supports those standards (and their cost-effectiveness) merely because at some later point it *might* come across information showing that the standards are less cost-effective than initially (and currently) predicted.

In the Proposal, EPA does not assert that there were any substantial flaws with the analysis underlying the current NSPS with respect to the factors that inform the BSER. To the contrary, despite a concerted effort to undermine it—including past pleas for data from industry (though notably not through the information collection request authorized by the Clean Air Act) and a year-and-a-half-long reconsideration process—EPA could find no actual data or information that merited changing the assumptions and models underlying the current NSPS in any relevant way. *Cf. Nat'l Lime Ass'n v. Envtl. Prot. Agency*, 627 F.2d 416, 533 (D.C. Cir. 1980) ("We cannot help but wonder if the industry's failure to supply such data means that the data available or obtained would not be favorable to the industry's position."). For example, EPA declined to revise its estimates of the efficacy of optical gas imaging ("OGI") monitoring for fugitive emissions at different frequencies in response to an industry-provided report. 83 Fed. Reg. at 52,064 ("In our analysis of the information presented by CAPP, we are unable to

[36] *See also* 2016 TSD at 47-55.

conclude that annual monitoring with OGI will achieve 80 percent emission reductions."). Indeed, the only newfound evidence that EPA deems relevant and reliable enough to justify changing its assumptions and models shows that the standards are *more* cost-effective than EPA believed when it promulgated the standards. *Compare* 2018 TSD at 32 (concluding, for example, that semiannual monitoring at well sites under a single-pollutant approach taking into account gas savings costs $965 per ton of methane) *with* 2016 TSD at 54 (concluding for same parameters that cost is $1,183 per ton of methane). Accordingly, even if cost-effectiveness alone could justify weakening the standards (and as we demonstrated above, it cannot), the only actual evidence shows that the current standards are highly cost-effective.

Rather than actually identifying data or information to support revising the current NSPS, EPA instead relies upon speculative and unquantified "concerns" and "uncertainties" that it apparently has been unable to resolve over the course of its year-and-a-half-long reconsideration process. Nor has the agency made any serious attempt to resolve these issues through the systematic collection of information that the Clean Air Act authorizes. These "uncertainties" allegedly inhibit EPA from concluding that the current standards are cost-effective vis-à-vis some unstated cost-effectiveness threshold, but EPA's uncertainty is self-inflicted: instead of actually collecting data in an attempt to resolve any alleged uncertainties, the Proposal relies predominantly on unsubstantiated industry "concerns," sometimes supplemented with a small and self-selected set of data offered by industry petitioners, which is not nearly robust or comprehensive enough to provide anything like a representative sample of the oil and gas sector as a whole.

For example, in weakening the standards for non-low-production wells from semi-annual monitoring to annual monitoring, EPA states:

> Although under the updated analysis, semiannual monitoring may appear to be cost-effective, we have identified several areas of our analysis that indicate we *may* have overestimated the emission reductions and, therefore, the cost effectiveness due to gaps in available data and factors that *may* bias the analysis towards overestimation of reductions. Therefore, the semiannual monitoring *may* not be as cost-effective as presented, and the EPA is proposing to revise the monitoring frequency to require annual fugitive emissions monitoring at non-low production well cites.

83 Fed. Reg. at 52,062 (emphasis added); *see also id.* at 52,064 ("While the EPA's estimated emission reductions are based on the best currently available information, there are considerable uncertainties associated with that information and the consequent reductions, and the EPA is aware there may be studies that may provide additional analysis on the effectiveness of OGI monitoring that can further refine our estimates."). The same uncertainties are also invoked to support weakening the frequency of monitoring at compressor stations. *Id.* at 52,071(suggesting current analysis overestimates emissions reductions for compressor stations "due to the same uncertainties described previously for non-low production well sites").

Additional explanation for this weakening comes later in the Proposal, which states:

> These costs of control for both the semiannual and annual monitoring frequencies may appear to be reasonable for non-low production well sites. However, as explained above regarding the three areas of concern, we acknowledge that our updated analysis may overestimate the emission reductions achieved under semiannual monitoring and the number of fugitive emissions components identified during semiannual monitoring. Therefore, we are unable to conclude that semiannual monitoring is cost effective. …As mentioned earlier, petitioners have requested that we consider annual monitoring, which suggests that they are able to bear such costs. In light of all these considerations, we are therefore proposing to revise the monitoring frequency for the collection of fugitive emissions components located at non-low production well sites.

83 Fed. Reg. at 52,065.

The only reason stated for significantly weakening these standards is that the current standard "*may* not be as cost-effective as presented," that there "*may* be studies that *may* provide additional analysis" in the future, and that some in industry would prefer weakened standards. EPA does not make a finding that the current standards are not cost-effective (in fact, the agency's "best currently available information" supports a conclusion that they are), much less that industry cannot "bear" the costs of the current standards. Indeed, all of the evidence suggests that not only can industry "bear" the current standards, it has thrived under them. *See infra* § VI. EPA does not explain what would be a reasonable cost or level of cost-effectiveness, or how that differs from its own judgments and determinations made in developing the NSPS. Nor does EPA explain why any speculative reduction in cost-effectiveness (however small) justifies significantly weakening standards that are adequately demonstrated, achievable, and delivering significant benefits to human health and welfare right now. If the alleged speculative reduction in cost-effectiveness affected the adequate demonstration or achievability of the standards, or otherwise made complying with the current standards unduly burdensome—something EPA does not claim—there would be evidence supporting that conclusion from the past year-and-a-half that the standards have been in place. To the contrary, the record is bereft of any such evidence.

As we explain in detail below, *infra* § V, the three alleged "areas of concern" either support a conclusion that the current NSPS is *more* cost-effective than EPA initially projected or are irrelevant to the analysis, or both. But in any event, EPA cannot weaken an adequately demonstrated, achievable standard that has been delivering critical emissions reductions because it *might* at some point in the *future* come upon information supporting an assertion that the standards are less cost-effective than the currently best available data shows. As the D.C. Circuit stated in an analogous context, "[t]he statute requires the agency to take into account the 'best *available*' evidence. 42 U.S.C. § 300g-1(b)(3)(A) (emphasis added). EPA cannot reject the 'best available' evidence simply because of the possibility of contradiction in the future by evidence unavailable at the time of the action—a possibility that will *always* be present." *Chlorine Chemistry Council v. EPA*, 206 F.3d 1286, 1290-91 (D.C. Cir. 2000). As that court further explained:

> All scientific conclusions are subject to some doubt; future, hypothetical findings always have the potential to resolve the doubt (the new resolution itself being subject, of course, to falsification by later findings). What is significant is Congress's requirement that the action be taken on the basis of the best available evidence *at the time* of the rulemaking. The word "available" would be senseless if construed to mean 'expected to be available at some future date.

Id.; *see also Mississippi v. EPA*, 744 F.3d 1334, 1357 (D.C. Cir. 2013) ("Indeed, it is a familiar principle that agencies may not merely recite the terms 'substantial uncertainty' as a justification for their actions; instead, they must explain the evidence which is available, and must offer a rational connection between the facts found and the choice made.") (internal quotations and alternations omitted); *accord State Farm*, 463 U.S. at 52 (same); *see also Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir. 1976) (agency has no power "to act on hunches or wild guesses").

Moreover, EPA must "make a reasonable effort to develop facts," and cannot base its revision "on the basis of a guess about what the facts might be." *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 531 (D.C. Cir. 1983) ("*Small Refiner*"). Here, as explained in detail *infra* § IV, EPA has declined to use the tools the Act grants it to collect relevant information to resolve any "concerns" or "uncertainties"—indeed, it withdrew such an information collection request that would have provided additional information in areas it now describes as uncertain—and even ignores and conceals data within its possession. By not collecting and presenting data to support its actions, EPA essentially affords itself unlimited discretion. For instance, EPA states that it is "unable to conclude that semiannual monitoring is cost effective" for non-low production wells, 83 Fed. Reg. at 52,065, but it could just as easily conclude that it is "unable to conclude that semiannual monitoring is *not* cost effective," as it admits the evidence before it suggests. *Id.* ("These costs of control for both the semiannual and annual monitoring frequencies may appear to be reasonable for non-low production well sites."). In other parts of the proposal, EPA suggests that similar uncertainty suggests that lack of information favors *retaining* certain NSPS provisions. *See id.* at 52,072 ("We currently do not have sufficient information to suggest that the cost-effectiveness of the fugitive emissions requirements specific to well sites and compressor stations located on the Alaskan North Slope differ from the cost-effectiveness of the program generally."). The agency suggests no rhyme or reason as to why uncertainties sometimes support weakening the NSPS and sometimes do not.

This is a fundamental hallmark of arbitrary and capricious agency decisionmaking, as courts have previously held. For instance, the Proposal bears some similarity to EPA's recent attempt to allow the continued use of the pesticide chlorpyrifos notwithstanding its earlier conclusion that available science "continues to indicate that the risk from potential aggregate exposure does not meet the [statutory] safety standard." *League of United Latin Am. Citizens v. Wheeler*, 899 F.3d 814, 820-21 (9th Cir. 2018). That court explained EPA's actions as follows:

> [EPA's] Order did not refute the agency's previous scientific findings on chlorpyrifos or its conclusion that chlorpyrifos violated the FFDCA safety standard. Instead, the EPA stated that it would not revoke tolerances as "the science addressing neurodevelopmental effects remains unresolved." *Id.* at 16,583. The

> EPA stated that it would not complete "any associated tolerance revocation of chlorpyrifos without first attempting to come to a clearer scientific resolution," *id.*, and claimed to have "discretion to determine the schedule" for reviewing the existing chlorpyrifos tolerances as long as it completed the chlorpyrifos registration review by FIFRA's deadline of October 1, 2022, *id.* at 16,590.

Id. The Court vacated EPA's Order, explaining:

> "[H]owever desirable it may be for [the] EPA to consult [a Scientific Advisory Board] and even to revise its conclusion in the future, that is no reason for acting against its own science findings in the meantime." *Chlorine Chemistry Council v. EPA*, 206 F.3d 1286, 1290 (D.C. Cir. 2000). The EPA cannot refuse to act "because of the possibility of contradiction in the future by evidence unavailable at the time of action—a possibility that will *always* be present." *Id.* at 1290–91 (emphasis in original). Chlorpyrifos similarly does not meet the statutory requirement for registration under FIFRA, which incorporates the [statutory] safety standard. As we have previously counseled, "evidence may be imperfect [and] the feasibility inquiry is formidable," but there remains no justification for the "EPA's continued failure to respond to the pressing health concerns presented by chlorpyrifos," which has now placed the agency in direct contravention of the [relevant statutes]. *In re PANNA*, 840 F.3d at 105.

Id. at 129. So too here. EPA cannot weaken the current NSPS, which it concedes is supported by the available evidence, because of "uncertainties" that it *may* resolve in the future and that, if resolved *may* support a different standard.

This is not a case where the agency must act in the face of scientific uncertainty to protect the public health and welfare.[37] Rather, the Proposal is a totally discretionary rulemaking. *See Clean Air Council v. Pruitt*, 862 F.3d 1, 14 (D.C. Cir. 2017) (concluding that reconsideration of the 2016 Rule is not mandatory under the statute). Here, EPA has chosen to try to justify *not* protecting the public health and welfare by embracing speculative uncertainty and not only declining to gather evidence to resolve those uncertainties, but willfully ignoring evidence in its possession.

It is notable that the Proposal bears a remarkable resemblance to EPA's earlier failed attempts to suspend the NSPS based on unsubstantiated "concerns" that the agency avowed it would investigate during the reconsideration process. *See, e.g.*, 82 Fed. Reg. at 27,654 (proposed

[37] *Cf. Ethyl Corp. v. Envtl. Prot. Agency*, 541 F.2d 1, 28 (D.C. Cir. 1976). ("Where a statute is precautionary in nature, the evidence difficult to come by, uncertain, or conflicting because it is on the frontiers of scientific knowledge, the regulations designed to protect the public health, and the decision that of an expert administrator, we will not demand rigorous step-by-step proof of cause and effect. Such proof may be impossible to obtain if the precautionary purpose of the statute is to be served.").

suspension of NSPS "would provide the EPA sufficient time to propose, take public comment, and issue a final action on the issues concerning the specific requirements on which EPA has granted reconsideration"). That proposal, though never finalized, was unlawful because EPA cannot suspend substantive provisions of law merely because it seeks to reconsider them. *See Air Alliance Houston v. EPA*, 906 F.3d 1049, 1067 (D.C. Cir. 2018) ("[T]he mere fact of reconsideration, alone, is not a sufficient basis to delay promulgated effective dates specifically chosen by EPA on the basis of public input and reasoned explanation."). What EPA proposes to do here is even worse: instead of proposing to *temporarily* suspend the NSPS to investigate its concerns, it proposes to *permanently* weaken the NSPS because it might come across information in the future shedding doubt on the currently best-available data's demonstration of cost-effectiveness.

Moreover, instead of actually resolving the "issues" raised in the proposed suspension (or attempting to collect the information that would resolve them) as EPA represented it would do, EPA now simply casts aside its prior concerns and, like trial balloons, trots out new "concerns" and "uncertainties," but this time to justify a permanent weakening of the standard. The policy goal has remained constant—weakening the standards at the behest of some in industry—while only the tactics and rationale have changed. Further underscoring the nature of this Proposal, by withdrawing an information collection request in 2017 that was already underway, EPA took the remarkable affirmative step of ensuring it *would not obtain the very data* that it now claims a lack of which creates the "uncertainties" that EPA has used to justify weakening the NSPS. In issuing the Proposal, EPA further entirely ignores the data in two years' worth of compliance reports that are currently in its possession. Indeed, the agency almost completely ignores that the NSPS has been in place for over two-and-a-half years—and that if there were significant problems with the current BSER that would justify substantially weakening the NSPS as EPA now proposes, those problems would have come to light and the supporting data and information would be part of the record.

3. The alleged "uncertainties" EPA relies on suggest it *underestimated* cost-effectiveness or are irrelevant to the analysis.

Even if EPA could rely on uncertainty to fundamentally weaken critical protections, the uncertainties EPA points to in the Proposal either suggest that the NSPS is *more* cost-effective than the agency initially forecast or are irrelevant to the statutory analysis. As discussed in detail *infra* § VI, *none* of EPA's concerns support the change from semiannual to annual monitoring for non-low-production wells, from semiannual to biennial for low production wells, or from quarterly to annual monitoring for compressor stations. In the case of the first alleged "uncertainty" (regarding the percent emission reduction achieved by OGI), the evidence EPA cites as the basis for its concern suggests EPA *underestimated* emissions reductions achieved with semiannual monitoring. EPA cites an industry study indicating OGI monitoring is even more effective at reducing emissions than the agency estimates. *See* 83 Fed. Reg. at 52,064. In the case of the second two "uncertainties" (addressing the change in percentage of leaking components over time and the initial percentage of leaking components), the issue itself is utterly unrelated to site-level methane emissions, and if it were, would likewise show that the NSPS is *more* cost-effective than the current data suggests. As we explain in detail below, *infra* § V,

because leaks are stochastic, the number of leaking components is not correlated with site-level emissions. For this reason, EPA did not in 2016 and does not now incorporate the number of leaking components or initial percentage of leaking components in its model facility emissions estimates. *See* 2018 TSD at 63 ("It is important to note that . . . the emissions are not affected by any changes in the percent leaking valves used.").

With respect to the weakened standards for low production wells, EPA again relies on these uncertainties, supplemented only by a small and self-selected set of data, which is not nearly robust or comprehensive enough to provide anything like a representative sample of the oil and gas sector as a whole. For example, the Fort Worth study, which is the only evidence EPA cites as a basis for its revised low-production LDAR standards (and which EPA considered in developing the current NSPS), actually concludes that low production wells have high absolute emissions. As we describe later in these comments, *infra* § V, the Fort Worth study shows that low-production sites are a significant source of emissions and does not support EPA's proposal to reduce monitoring frequency at these sources. Moreover, the study provides emissions and production data from a collection of natural gas wells—no oil wells are included—in just one municipal area, which consists almost entirely of "dry" (as opposed to "wet") natural gas. The data is particularly threadbare for low-producing wells: the study includes measurements for just 27 low-producing wells, which is a tiny fraction of the thousands of such wells that exist around the country and are subject to the NSPS. As we describe more fully below, *infra* § V, the Fort Worth study actually supports retaining semiannual monitoring at low producing well sites. But even if that were not the case, EPA cannot lawfully justify weakening the BSER, nor can it determine that its revised standards reflect the BSER, based only upon this study.

Finally, EPA cherry picks its "uncertainties," completely ignoring "uncertainties" that would suggest that EPA *underestimated* emissions reductions and therefore *underestimated* the cost-effectiveness of the NSPS. For example, as EPA notes, the agency's own updated approach likely still *significantly underestimates* the emissions associated with storage tanks. EPA uses data from a study that utilized helicopter-based OGI monitoring to create an emissions factor for PRDs—however, that study only identified large emissions due to detection limitations with aerial OGI monitoring, and thus provides a lower-bound estimate of emissions from storage tanks and PRDs. As EPA "acknowledge[s]… emissions are likely underestimated when using this information because small or medium sized emissions would not be visible during an aerial OGI survey." 83 Fed. Reg. at 52,063. Furthermore, EPA assumes that detected emission sources have an emission rate of 1 gram methane per second, based on the study's detection limit of 1 – 3 grams hydrocarbons per second. In reality, detected sources could emit at a much higher than the detection limit, and therefore EPA's estimate is a very conservative lower bound.[38]

[38] A more accurate estimate of tank fugitive emissions can be determined from Alvarez *et al* 2018, a peer-reviewed paper published in *Science* in June 2018 (discussed more fully below). Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCIENCE, 186–188 (2018) http://science.sciencemag.org/content/361/6398/186.

EPA cannot only rely on the "uncertainties" that it (wrongly) believes support its efforts to weaken the current standards.

* * *

For these reasons, EPA has not properly determined (or even alleged) either that the Proposal reflects the BSER or that the NSPS no longer reflects the BSER. Despite ample guidance from the statute itself, prior rulemakings, several decades' worth of case law, and input from stakeholders, EPA has failed to give the BSER factors the legally requisite consideration. The Proposal is therefore unlawful, and EPA must withdraw it and commit to fully enforcing the NSPS as it current stands.

II. The Proposal Is Unlawful Under Section 111 of the Clean Air Act and Arbitrary and Capricious Because EPA Cannot Ignore the Scientific Facts About Climate Change and Associated Perils to Human Health and Welfare.

The oil and gas sector is the largest emitter of methane in the United States, and the evidence is now overwhelming that climate change caused by methane and other greenhouse gases ("GHGs") gravely and imminently imperils human health, the economy, and the natural resources on which human survival depends. Nonetheless, the topic of climate change is almost entirely absent from the Proposal and supporting documents. More troublesome still, it is *completely* absent from EPA's rationale for weakening the NSPS. Nowhere does the Proposal acknowledge, much less discuss, the endangerment posed by methane emission from the oil and gas sector, nor does it explain why weakening the NSPS makes sense in light of that endangerment. This failure renders the Proposal both contrary to the Clean Air Act—the major purpose of which is to reduce dangerous air pollution— and arbitrary and capricious.

By ignoring the threat of climate change, the Proposal standards in direct contravention of EPA's statutory duties and flouts basic requirements of reasoned decisionmaking. It fails to address the human suffering, death, and environmental destruction and economic harms already caused by climate change and exacerbated by increased GHG emissions, including the emissions increases that would occur as a result of the Proposal. Crucially, it provides no explanation as to why greatly weakening standards governing the United States' economy's largest-emitting sector of methane could possibly be described as a reasonable response given the established scientific facts about climate change. Even in the time since the Proposal was published, the Administration has published a major report documenting the enormous adverse human health, welfare, and economic effects of climate change. The Proposal contains no rationale for how permanently weakening standards that have already been delivering benefits for over two-and-a-half years can be reconciled with the overwhelming record evidence that rapid and massive emissions reductions must occur within the next decade if we are to avoid truly disastrous consequences. These gaping analytical voids on central issues violate fundamental requirements of reasoned decisionmaking applicable to all federal agencies. They are an egregious violation of EPA's obligations as the agency Congress designated to protect the public from air pollution that endangers health and welfare.

A. The scientific record confirms that anthropogenic climate change is a grave and imminent hazard, and the latest studies—which EPA has not even considered—reinforce that climate change is proceeding at an unprecedented pace requiring rapid and decisive action to reduce greenhouse gas emissions now.

Climate change caused principally by anthropogenic emissions of methane, carbon dioxide, and other GHGs poses severe hazards to human civilization and is already causing extensive damage throughout the nation and the world.[39] In 2009, EPA found—based on an "ocean of evidence"[40]—that anthropogenic GHGs are driving climate change that endangers public health and welfare;[41] the D.C. Circuit upheld that finding in its entirety against industry challenges,[42] and the Supreme Court refused to review the holding.[43] In the 2016 Rule, EPA specifically discussed at length the endangerment finding, the science demonstrating a link between GHG emissions and climate change, the role of methane in contributing to near-term climate change, and the contribution of the oil and gas sector to methane emissions. *See* 81 Fed. Reg. at 35,830, 35,833-837. Since the 2009 endangerment finding and the promulgation of the NSPS, the peer-reviewed scientific literature on climate change and evidence of both future and *current* climate impacts has become even more clear, specific and undeniable, further buttressing the rigor of the endangerment finding and the urgency of the Clean Air Act's legal mandate that EPA address methane emissions from the oil and gas sector.[44] In the U.S. alone, climate change-related damages have already reached hundreds of billions of dollars every year, with 2017 setting an annual record of $306 billion.[45]

As EPA put it less than just two years ago, climate change is "the United States' most important and urgent environmental challenge."[46] Recent assessments of the best available

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[39] *See, e.g.*, 2018 National Climate Assessment; Intergovernmental Panel on Climate Change, *IPCC Special Report: Global Warming of 1.5°C*, at 1-7 (Oct. 6, 2018) ("IPCC (2018)"), http://www.ipcc.ch/report/sr15/.

[40] *Coal. for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, 123 (D.C. Cir. 2012), *rev'd in part on other grounds sub nom. Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427 (2014).

[41] Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009).

[42] *Coal. for Responsible Regulation*, 684 F.3d at 116-26.

[43] The Supreme Court denied the petitions for certiorari that sought to challenge the D.C. Circuit's ruling upholding the Endangerment Finding. *Virginia v. EPA*, 571 U.S. 951 (2013), and *Pac. Legal Found. v. EPA*, 571 U.S. 951 (2013).

[44] *See* Joint Summary Comments of Environmental, Advocacy, and Science Organizations Regarding the Proposed Greenhouse Gas Emissions and Fuel Efficiency Standards for Light-Duty Vehicles, Model Year 2021-2026 - Comments Specific to Climate Change (Oct. 26, 2018) EPA-HQ-OAR-2018-0283-5075.

[45] NOAA National Centers for Environmental Information [NCEI], Billion-Dollar Weather and Climate Disasters (2018), https://www.ncdc.noaa.gov/billions/.

[46] EPA, Basis for Denial of Petitions to Reconsider and Petitions to Stay the CAA section 111(d) Emission Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility

science – an already vast and definitive body of knowledge – from the United States government, scientific and professional bodies, and the international scientific community, have confirmed both that these climate change hazards are even more severe than previously believed and that they gravely damage us now.

As explained in the 2016 Rule:

> Climate change caused by manmade emissions of GHGs threatens the health of Americans in multiple ways. By raising average temperatures, climate change increases the likelihood of heat waves, which are associated with increased deaths and illnesses. While climate change also increases the likelihood of reductions in cold-related mortality, evidence indicates that the increases in heat mortality will be larger than the decreases in cold mortality in the United States. Compared to a future without climate change, climate change is expected to increase ozone pollution over broad areas of the United States, especially on the highest ozone days and in the largest metropolitan areas with the worst ozone problems, and thereby increase the risk of morbidity and mortality. Climate change is also expected to cause more intense hurricanes and more frequent and intense storms and heavy precipitation, with impacts on other areas of public health, such as the potential for increased deaths, injuries, infectious and waterborne diseases, and stress- related disorders. Children, the elderly, and the poor are among the most vulnerable to these climate-related health effects.
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> Climate change impacts touch nearly every aspect of public welfare. Among the multiple threats caused by manmade emissions of GHGs, climate changes are expected to place large areas of the country at serious risk of reduced water supplies, increased water pollution, and increased occurrence of extreme events such as floods and droughts. Coastal areas are expected to face a multitude of increased risks, particularly from rising sea level and increases in the severity of storms. These communities face storm and flooding damage to property, or even loss of land due to inundation, erosion, wetland submergence, and habitat loss.
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> Impacts of climate change on public welfare also include threats to social and ecosystem services. Climate change is expected to result in an increase in peak electricity demand. Extreme weather from climate change threatens energy, transportation, and water resource infrastructure. Climate change may also exacerbate ongoing environmental pressures in certain settlements, particularly in Alaskan indigenous communities, and is very likely to fundamentally rearrange United States ecosystems over the 21st century. Though some benefits may help balance adverse effects on agriculture and forestry in the next few decades, the

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Generating Units, at 1 (Jan. 11, 2017) ("EPA CPP Denial of Reconsideration") https://archive.epa.gov/epa/sites/production/files/2017-01/documents/basis_for_denial_of_petitions_to_reconsider_and_petitions_to_stay_the_final_cpp.pdf.

> body of evidence points towards increasing risks of net adverse impacts on United States food production, agriculture, and forest productivity as temperatures continue to rise. These impacts are global and may exacerbate problems outside the United States that raise humanitarian, trade, and national security issues for the United States.

81 Fed. Reg. at 35,833-84. Climate change is a significant threat to the health of the American people, and its impacts are increasing both nationwide and worldwide. Rising greenhouse gas concentrations result in increases in temperature, changes in precipitation, increases in the frequency and intensity of some extreme weather events, and rising sea levels. These effects endanger our health by affecting our food and water sources, the air we breathe, the weather we experience, and our interactions with the built and natural environments including our national parks. As the climate continues to change, the risks to human health continue to grow.[47]

The most recent data before the agency indicate that climate change is an urgent and worsening global environmental crisis, and it will require every country to take steps to dramatically reduce greenhouse gas emissions. Climate change is already having a harmful impact on public health and the environment, affecting the health, economic well-being, and quality of life of Americans and populations throughout the world, especially those in the most vulnerable communities.[48]

Other recent studies have reinforced and expanded upon these conclusions. Most notably, last month, this Administration—through the United States Global Climate Research Program ("USGCRP"), a federal program for which EPA is a constituent agency, along with NASA, NOAA, the National Science Foundation, and others—issued Volume II of the Fourth National Climate Assessment ("NCA4-II"), a dire report about the likely effects of climate change on the health and welfare of Americans and the United States economy.[49] The NCA4-II is a comprehensive, interdisciplinary assessment that represents the federal government's best understanding of the consequences of climate change for the United States. It provides voluminous detailed evidence of the current and future harms and costs climate change imposes on the United States. The NCA4-II emphasizes that the degree of future harm society will experience from climate change depends upon the extent to which action is taken to mitigate emissions of climate-destabilizing greenhouse gases.

The NCA4-II describes the multiple and diverse harms that the United States is already suffering from climate change and explains that those risks will become more severe absent effective and timely action to reduce greenhouse gas emissions. The NCA4-II "draws a direct connection between the warming atmosphere and the resulting changes that affect Americans'

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[47] A. Crimmins et al., The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (U.S. Global Change Research Program 2016) http://dx.doi.org/10.7930/J0R49NQX.

[48] EPA CPP Denial of Reconsideration, at 5.

[49] USGCRP, *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States* (Nov. 23, 2018) ("NCA4-II") https://nca2018.globalchange.gov/.

lives, communities, and livelihoods, now and in the future." NCA4-II at 36. The report "documents vulnerabilities, risks, and impacts associated with natural climate variability and human-caused climate change across the United States," and "concludes that *the evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans' physical, social, and economic well-being are rising*." *Id.* (emphasis in original).

Some of the harms driven by anthropogenic climate change include "[h]igher temperatures, increasing air quality risks, more frequent and intense extreme weather and climate-related events, increases in coastal flooding, disruption of ecosystem services, and other changes increasingly threaten the health and well-being of the American people, particularly populations that are already vulnerable." *Id.* at 55. The NCA4-II details how climate change is already contributing to massive harms throughout the United States—for example, "[c]limate change is altering the characteristics of many extreme weather and climate-related events. Some extreme events have already become more frequent, intense, widespread, or of longer duration, and many are expected to continue to increase or worsen, presenting substantial challenges for built, agricultural, and natural systems." *Id.* at 66.

These impacts impose significant economic costs. The NCA4-II notes that NOAA "estimates that the United States has experienced 44 billion-dollar weather and climate disasters since 2015 (through April 6, 2018), incurring costs of nearly $400 billion." *Id.* at 66. Additionally, "[i]n 2015, drought conditions caused about $5 billion in damages across the Southwest and Northwest, as well as parts of the Northern Great Plains. . . . Two years later, in 2017, extreme drought caused $2.5 billion in agricultural damages across the Northern Great Plains." *Id.* at 67. Furthermore, in 2015 "over 10.1 million acres—an area larger than the entire state of Maryland—burned across the United States, surpassing 2006 for the highest annual total of U.S. acreage burned since record keeping began in 1960," and in 2017 "a historic firestorm damaged or destroyed more than 15,000 homes, businesses, and other structures across California," and these fires "caused a total of 44 deaths and their combined destruction represents the costliest wildfire event on record. *Id.* at 67-68.

The NCA4-II concludes that climate change "impacts are projected to intensify—but how much they intensify will depend on actions taken to reduce global greenhouse gas emissions and to adapt to the risks from climate change now and in the coming decades." *Id.* at 36. The report explains that "[m]any climate change impacts and associated economic damages in the United States can be substantially reduced over the course of the 21st century through global-scale reductions in greenhouse gas emissions, though the magnitude and timing of avoided risks vary by sector and region. The effect of near-term emissions mitigation on reducing risks is expected to become apparent by mid-century and grow substantially thereafter." *Id.* at 1,359. The NCA4-II's chapter on "Reducing Risks Through Emissions Mitigation" notes that inaction could have devastating consequences:

> In the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. Under scenarios with high emissions and limited or no adaptation,

> annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent.

Id. at 1,347. Of particular relevance to this Proposal, the NCA4-II also observes that reducing methane emissions will generate local air quality benefits in addition to climate change mitigation benefits: "methane is both a GHG and a slowly reactive ozone precursor that contributes to global background surface ozone concentrations. . . . The magnitude of the human health benefit of lowering ozone levels via methane mitigation is substantial and is similar in value to the climate change benefits." *Id.* at 523.

Last year, the USGCRP issued Volume I of the Fourth National Climate Assessment, the Climate Science Special Report.[50] That Report explained that "there is no convincing alternative explanation" for the observed warming of the climate over the last century other than human activities, that "[c]hoices made today will determine the magnitude of climate change risks beyond the next few decades," and that "[t]here is significant potential for humanity's effect on the planet to result in unanticipated surprises and a broad consensus that the further and faster the Earth system is pushed towards warming, the greater the risk of such surprises."[51] Likewise, the USGCRP issued a report in 2017 explaining that "there is no convincing alternative explanation" for the observed warming of the climate over the last century other than human activities, that "[c]hoices made today will determine the magnitude of climate change risks beyond the next few decades," and that "[t]here is significant potential for humanity's effect on the planet to result in unanticipated surprises and a broad consensus that the further and faster the Earth system is pushed towards warming, the greater the risk of such surprises."[52]

Earlier this year, the Intergovernmental Panel on Climate Change ("IPCC") issued a new report, synthesizing the latest peer-reviewed climate scientific research and concluding starkly that the time to act on the increasingly exigent circumstances is now. Based on more than 6,000 scientific references and including contributions from thousands of expert and government reviewers worldwide,[53] the IPCC report considers the effects of global warming of 1.5°C above pre-industrial levels in comparison to the previously-considered 2°C; these values represent

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[50] USGCRP, *Fourth National Climate Assessment, Volume I: Climate Science Special Report* (2017) http://science2017.globalchange.gov.

[51] *Id.* at 10, 31, 32.

[52] USGCRP, Climate Science Special Report: Fourth National Climate Assessment, Vol. I at 10, 31, 32 (Wuebbles et al., eds.), (2017) ("USGCRP 2017") https://science2017.globalchange.gov/downloads/CSSR2017_FullReport.pdf.

[53] IPCC Press Release, *Summary for Policymakers of IPCC Special Report on Global Warming of 1.5 C approved by governments* (Oct. 8, 2018) https://www.ipcc.ch/news_and_events/pr_181008_P48_spm.shtml ("IPCC (2018)"). The IPCC report was produced by 91 authors from 44 citizenships and 40 countries of residence (14 Coordinating Lead Authors, 60 Lead Authors, and 17 Review Editors) and 133 Contributing Authors, includes over 6,000 cited references, and considered a total of 42,001 expert and government review comments.

critical thresholds vis-à-vis the extent of the damage that will result from global climate change.[54] The report concludes that pathways to limit warming to 1.5°C with little or no overshoot require "a rapid phase out of CO_2 emissions and deep emissions reductions in other GHGs and climate forcers."[55] In pathways consistent with a 1.5°C temperature increase, global net anthropogenic CO_2 emissions must decline *by about 45 percent from 2010 levels by 2030*, reaching net zero around 2050 (*high confidence*).[56]

The IPCC report further explains that the approximately 1°C temperature rise that has already occurred has "resulted in profound alterations to human and natural systems, bringing increases in some types of extreme weather, droughts, floods, sea level rise and biodiversity loss, and causing unprecedented risks to vulnerable persons and populations."[57] The report elaborates on the specific nature of the threat at a 1.5°C temperature increase in comparison to a 2°C increase, indicating that the consequences of warming above 1.5°C are more devastating than previously understood and highlighting the urgency of limiting warming below this threshold. The IPCC demonstrates that a half degree Celsius of additional warming makes a vast difference in avoiding immense damage in food and water security, loss of coastal properties, extreme heat waves, droughts and flooding, migration, poverty, devastating health outcomes, and lives lost. And it leaves no doubt that emission reductions *within the next decade* will make that difference.

As EPA has recognized, 81 Fed. Reg. at 35,837, a central feature of the climate crisis is that, once emitted, greenhouse gas emissions remain in the atmosphere for decades or centuries. This means that each year of unabated emissions contributes to a growing, destabilizing stock of climate-altering gases, and that only a limited opportunity to abate emissions remains before the Earth faces long-lasting and effectively irremediable consequences. The IPCC report bolsters this conclusion, essaying the overwhelming scientific evidence for the necessity of deep and immediate greenhouse gas reductions across all sectors of the economy to avoid devastating climate change-driven damages, underscoring the high costs of inaction or delays, *particularly* in the next decade. The report emphasizes the speed with which climate change is occurring and the urgency of taking decisive steps to curtail the emissions that will lock in further warming causing ever more severe harms: "If the current warming rate continues, the world would reach human–induced global warming of 1.5°C around 2040," and "[l]imiting warming to 1.5°C depends on GHG emissions *over the next decades*."[58] Existing national emission-reduction pledges are insufficient to limit global warming to 1.5°C, the report explains, "even if they are supplemented with very challenging increases in the scale and ambition of mitigation after 2030."[59] Thus, critical emission reductions must occur *before* 2030. Limiting global temperature

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[54] IPCC (2018) at 3-6. The IPCC Special Report on Global Warming found that many of the most disastrous outcomes of climate change would occur between 1.5°C and 2°C, rather than between 2°C and 2.6°C as considered in the IPCC's Fifth Assessment Report. *See, e.g.*, IPCC (2018) 3-12, 3-13.

[55] *Id.* at Chapter 2, 2-28.

[56] *Id.* at Summary for Policymakers, SPM-15.

[57] *Id.* at 1-7.

[58] *Id.* at at 1-45, 2-4 (emphasis added).

[59] *Id.* at at 2.4; *see also id.* at 2-90, 4-5.

increases to 1.5°C will require action at "a greater scale and pace of change" than ever before,[60] , including "very ambitious, internationally cooperative policy environments that transform both supply and demand."[61] "[E]very year's delay before initiating emission reductions reduces by approximately two years the remaining time available to reduce emissions to zero."[62]

Amazingly, despite these dire conclusions from the top scientists (including EPA scientists) in the U.S. government and the world's foremost scientific body on climate change, EPA's Proposal would significantly *increase* methane emissions from the oil and gas sector. This industry is, along with agriculture, one of the two biggest sources of methane in the United States,[63] and according to data from the Greenhouse Gas Reporting Program, oil and natural gas operations are the second largest stationary source of overall GHG emissions in the United States, second only to fossil fuel electricity generation. 81 Fed. Reg. at 35,830. The IPCC reports that, to avoid the worst consequences of climate change, there must be "major reductions in greenhouse gas emissions in all sectors," *id.* at 2-92, and that such reductions "will require substantial societal and technological transformations." *Id.* at 1-11. For the United States, any strategy to curtail domestic emissions must encompass steep cuts to oil and gas methane pollution. EPA's proposal moves in precisely the opposite direction.

In sum, the scientific record is now overwhelming that climate change poses grave harm to public health and welfare; that its hazards have become even more severe and urgent than previously understood; and that avoiding devastating harm requires substantial reductions in greenhouse gas emissions, including from the critically important oil and gas sector, within the next decade.

B. EPA's failure to consider the facts of climate change or to justify its decisions to weaken standards in the face of those facts is both contrary to its statutory mandate and to the record before it, and is thus arbitrary and capricious.

Despite the overwhelming record evidence of the hazards of climate change, EPA's Proposal utterly fails to examine (let alone to take a serious look at) the health and environmental risks posed by emissions of greenhouse gases. The Proposal makes no effort to address any of the known facts about climate change and its effects, even while EPA proposes regulatory changes that would significantly increase greenhouse gas emissions. Relatedly, it makes no effort whatsoever to reconcile its decision to substantially weaken methane standards with the scientific consensus that major emission reductions *now* are vital to avoid extreme climate harms from warming over 1.5°C.

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[60] *Id.* at 4-5
[61] *Id.* at 2-5.
[62] *Id.* at 1-19*; see also id.* at 2-47 ("The later emissions peak and decline, the more CO2 will have accumulated in the atmosphere.")
[63] *See* EPA, Overview of Greenhouse Gases (Oct. 31, 2018) https://www.epa.gov/ghgemissions/overview-greenhouse-gases.

This is not just bad policy; it is unlawful. EPA is bound by the Clean Air Act to protect the public health and welfare, and section 111 requires EPA to prescribe standards to limit emissions that cause or contribute to air pollution endangering public health and welfare, 42 U.S.C. § 7411(b)(1)(A). That mandate fulfills Congress's general direction in the Act to "protect and enhance" air quality, 42 U.S.C. § 7401(a), and as well as the statute's purpose of mitigating the "mounting dangers to the public health or welfare" caused by air pollution. 42 U.S.C. § 7401(a)(2). In its Proposal, EPA cannot satisfy these requirements without grappling with (and somehow reconciling) the facts about the health and environmental hazards at issue, and without making a rational choice that gives effect to the Clean Air Act's protective mandates in light of the record facts. In the face of the severe and imminent threat of a destabilized climate, stripping away existing protections—with absolutely no explanation or discussion of the result of doing so or alternative protective measures—is a violation of the statute.

Similarly, under basic requirements of administrative law, agencies must consider all "relevant factors," and "examine the relevant data and articulate a satisfactory explanation for its action." *State Farm*, 463 U.S. at 42–43. Contrariwise, agency action is arbitrary, capricious, and unlawful where "the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." *Id.* at 43. Moreover, reasoned decisionmaking requires that, in developing a proposal, an agency must have "weighed competing views, selected a [solution] with adequate support in the record, and intelligibly explained the reasons for making that choice." *FERC v. Elec. Power Supply Ass'n*, 136 S. Ct. 760, 784 (2016). It must demonstrate a "rational connection" between the record facts and its policy choice. *State Farm*, 463 U.S. at 43.

EPA's Proposal falls short of these requirements. Methane-driven climate change is not an ancillary concern here; it is necessarily a central topic of this rulemaking. The reasonableness of a given policy response (such as strengthening or weakening standards) necessarily depends upon the severity, imminence, and remediability of the hazard. EPA cannot entirely ignore either the fact of climate change itself or the indisputable conclusion that the Proposal doubles down on the very harms that climate change causes. Instead, it must confront the scientific record, which it acknowledged as recently as 2016, and its own previous conclusion that climate change is not just some vague problem, but "the United States' most important and urgent environmental challenge"[64] for which delayed action comes at a huge cost. If, by weakening standards already on the books, EPA means to reverse its conclusions about climate change, it has unlawfully failed to notice of such a reversal, 42 U.S.C. 7607(d)(3); 5 U.S.C. 553(b), (c); *see also Fox Television*, 556 U.S. at 515 ("[T]he requirement that an agency provide reasoned explanation for its action would ordinarily demand that it display awareness that it is changing position. An agency may not, for example, depart from a prior policy *sub silentio* or simply disregard rules that are still on the books."). Nor has EPA provided any basis for questioning the scientific record of climate change or departing from its prior findings. If the agency now believes that scientific findings on climate change in the administrative record and in recent reports by the

[64] EPA, CPP Denial of Reconsideration at 1 (Jan. 2017).

USGCRP and IPCC, it must set forth its reasoning for that conclusion. Having failed to do so, the Proposal is thus arbitrary and capricious and an abuse of discretion.

EPA may attempt to argue that any emissions increase due to the Proposal would be negligible, methane from the oil and gas sector constitutes just a small fraction of global GHG emissions. This is a specious line of reasoning. As noted, the oil and gas sector is the second largest stationary source of overall GHG emissions in the United States, which is second only to China as the world's largest emitter climate pollutants. Thus, in both absolute and relative terms, oil and gas methane emissions are, in fact, enormous.[65]

More importantly, this argument would stifle *any* serious action to reduce climate pollution. Addressing the threat of climate change will necessitate reductions from individual source categories that, standing alone, represent what appears to be a small fraction of the overall problem. Indeed, EPA itself so concluded in its 2009 endangerment finding:

> [N]o single greenhouse gas source category dominates on the global scale, and many (if not all) individual greenhouse gas source categories could appear small in comparison to the total, when, in fact, they could be very important contributors in terms of both absolute emissions or in comparison to other source categories, globally or within the United States. If the United States and the rest of the world are to combat the risks associated with global climate change, contributors must do their part even if their contributions to the global problem, measured in terms of percentage, are smaller than typically encountered when tackling solely regional or local environmental issues. The commenters' approach, if used globally, would effectively lead to a tragedy of the commons, whereby no country or source category would be accountable for contributing to the global problem of climate change, and nobody would take action as the problem persists and worsens.

74 Fed. Reg. 66,543 (Dec. 15, 2009). EPA has not offered—and could not offer—any reasoned explanation for abandoning these findings or this approach.

Furthermore, applied generally, such fatalistic reasoning could undermine or even preclude all regulation of emissions of greenhouse gases—indeed would often foreclose efforts to control emissions of *any* pollutant that comes from many different sources—contrary to section 111's directive to reduce pollution that endangers public health and welfare. *See, e.g.*, *Massachusetts*, 549 U.S. at 524. Because all of the individual steps needed to address the problem would have relatively small effects viewed in isolation, such reasoning amounts to the

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[65] *See Massachusetts v. EPA*, 549 U.S. 497, 524 (2007) ("Reducing domestic automobile emissions is hardly a tentative step. Even leaving aside the other greenhouse gases, the United States transportation sector emits an enormous quantity of carbon dioxide into the atmosphere."); *Coal. for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, 128 (D.C. Cir. 2012), *aff'd in part, rev'd in part sub nom. Util. Air Regulatory Grp. v. EPA*, 573 U.S. 302 (2014) (approving EPA's finding that MY2012-2016 light duty vehicle GHG standards "result in meaningful mitigation of greenhouse gas emissions").

assertion that it is not worth doing *anything* to address the most urgent problem facing humanity. To the extent EPA concludes that the existing standards are not a sufficient step towards addressing that problem, the solution is to adopt more stringent standards, not to weaken those already in place.

The proposed rollback also constitutes an unexplained, unjustified reversal of EPA's own recently reaffirmed positions on the question of the need for reducing greenhouse gas emissions immediately. As the passage quoted above from the 2016 Rule demonstrates, just two years ago, EPA expressly acknowledged that the nature of the climate change hazard urgently requires timely reductions in emissions. 81 Fed. Reg. at 35,834-37. Yet, in the Proposal—without having provided the slightest explanation or evidence to support a contrary view—EPA is rushing in the opposite direction, weakening standards already in effect and thereby causing the release of an enormous additional quantity of greenhouse gas emissions. This unexplained, unjustified change in position is unlawful.[66] In essentially ignoring the principal health and environmental risks at issue, and in proposing a weakening of standards even as the science signals the urgent need for pressing action, EPA is proposing an arbitrary and unexplained about-face.

III. The Proposal's Blanket State Equivalency Determinations Do Not Meet the Requirements of Section 111(h).

In the 2016 Rule, EPA recognized the importance of designing the NSPS to complement state efforts to proactively and rigorously reduce methane emissions at the state level, 81 Fed. Reg. 35,871, and provided that operators could use the alternative means of emission limitation ("AMEL") provisions under section 111(h) to achieve federal compliance by satisfying applicable state requirements that were more protective than the 2016 standards. Along with its proposal to dramatically weaken the federal standards, EPA now proposes to designate various state standards as AMEL in one fell swoop. In doing so, the agency has both lowered the bar for determining equivalency and ignored the critical analytical underpinnings of any such a determination, which are meant to ensure that any such alternative actually delivers equivalent emission reductions to the public.

As a result, instead of providing a protective federal emissions floor on which all Americans can rely while recognizing leading state standards, the Proposal dilutes federal requirements to the verge of irrelevance and defers to any state standard that seems to be remotely similar. The effect of these combined actions frustrates the core purpose of the NSPS and revives some of the key problems that the Clean Air Act was enacted to address in the first place by exposing Americans in different states to substantially different levels of harmful oil and gas sector air pollution. Accordingly, the Proposal is both bad policy and unlawful. Indeed, the blanket state equivalency determinations exceed the Administrator's authority in multiple respects. First, they exceed the Administrator's authority by making a qualitative rather than quantitative determination that those state-level programs that EPA has designated as AMEL will

[66] See *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117 (2016); *Fox Television*, 556 U.S. at 502; *Motor Vehicle Mfrs. Ass'n of the United States v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983); *Fox Television Stations*, 556 U.S. at 515; *id*. at 537 (Kennedy, J., concurring).

achieve a reduction in emissions of any air pollutant at least equivalent to reductions under the NSPS. Second, EPA has not demonstrated that its blanket determinations will achieve a reduction in emissions at least equivalent to even the weakened federal standards contained in the Proposal. Third, to the extent those weakened provisions are not finalized or do not survive judicial review, the state equivalency determinations, even if they were authorized by the Act, could not stand.

Section 111 of the Act governs NSPS for new stationary sources. Under section 111(h)(3), the Act provides for AMEL for certain sources:

> If after notice and opportunity for public hearing, any person establishes to the satisfaction of the Administrator that an alternative means of emission limitation will achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such air pollutant achieved under the requirements of paragraph (1), the Administrator shall permit the use of such alternative by the source for purposes of compliance with this section with respect to such pollutant.

42 U.S.C. § 7411(h)(3). The current NSPS provides that "owners and operators may . . . submit an application requesting that EPA approve certain state requirement[s] as 'alternative means of emission limitations' under the NSPS for their affected facilities." 81 Fed. Reg. at 35,871. Such an application must demonstrate that the emissions reductions achieved under the state program would be "at least equivalent to the emission reduction achieved under the NSPS standards for a given affected facility." *Id.* (emphasis added). This provision is fully consistent with requirements of section 111(h), as reflected by the agency's historical practice with regard to AMELs. Table 1 summarizes past AMELs that have been approved by EPA.

Table 1. Summaries of all 111(h)(3) AMEL Approvals Issued by EPA

Title	Federal Register Citation	Summary (including how EPA quantified equivalency determinations)
Notice of Final Approval for an Alternative Means of Emission Limitation at ExxonMobil Corporation; Marathon Petroleum Company, LP (for Itself and on Behalf of Its Subsidiary, Blanchard Refining, LLC); Chalmette Refining, LLC; and LACC, LLC	83 Fed. Reg. 46939 (Sept. 17, 2018)	Approves individual AMELs for several companies to operate flares and MPGFs at refineries in Texas and Louisiana and to operate flares at a chemical plant in Louisiana. Specifies, quantitatively, the alternative operating conditions that will allow the facilities to remain in compliance in 111(h)(3)'s equivalency standard. In quantifying the equivalency determination, EPA specified the Net Heating Value allowable at each flare.
Notice of Final Approval for an Alternative Means of Emission Limitation at Chevron Phillips Chemical Company LP	82 Fed. Reg. 27822 (June 19, 2017)	Approves CP Chem's operation of a multi-point ground flare (MPGF) at their ethylene plant in Baytown, Texas, and operation of an MPGF at their polyethylene plant in Old Ocean, Texas. The notice specifies operating conditions to meet the AMELs, as well as monitoring, recordkeeping, and reporting requirements. The operating conditions specified will "achieve a reduction in emissions at least equivalent to the reduction in emissions being controlled by [the regular requirements]." These operating conditions are broken down into specific, numerical requirements and the notice discusses how to calculate those.
Notice of Final Approval for the Operation of a Pressure-Assisted Multi-Point Ground Flare at Occidental Chemical Corporation	81 Fed. Reg. 23480 (Apr. 21, 2016)	Approves AMEL request for operation of MPGF at Occidental's ethylene plant in Ingleside, Texas. The notice specifies operating conditions and monitoring, recordkeeping, and reporting requirements for demonstrating compliance with the AMELs. The notice contains similar specificity to the previously detailed AMEL approvals in this table. This notice also includes a framework for streamlining future pressure-assisted MPGF AMEL requests.
Notice of Final Approval for the Operation of Pressure-Assisted Multi-Point Ground Flares at The Dow Chemical Company and ExxonMobil Chemical Company and Notice of Receipt of Approval Request for the Operation of a Pressure-Assisted Multi-Point Ground Flare at Occidental Chemical Corporation	80 Fed. Reg. 52426 (Aug. 31, 2015)	Approves AMEL request for operation of MPGF at Dow's Freeport, Texas plant and ExxonMobil's Baytown, Texas and Belvieu, Texas plants. The notice specifies operating conditions and monitoring, recordkeeping, and reporting requirements for demonstrating compliance with the AMELs. The notice contains similar specificity to the previously detailed AMEL approvals in this table.

EPA now proposes to change the current standards by granting blanket AMEL equivalence determinations for certain state programs (or aspects of state programs). 83 Fed. Reg. at 52,080 (EPA "ha[s] identified aspects of certain existing state fugitive emissions programs that we propose to find to be at least equivalent to the proposed amendments in this action."). In making these state-level equivalency determinations, EPA compared the "components that were included in the fugitive emissions programs, the affected facilities, the effective date(s) of the program, approved monitoring instruments, fugitive emissions definitions, monitoring frequencies, repair and resurvey timelines, and delay of repair (DOR) provisions" of the Proposal with the states' programs. *Id.* EPA explains that state-level LDAR standards were selected as presumptively equivalent if their program components were substantially similar to the (weakened) NSPS components. As we describe below, EPA's policy changes in this regard are inconsistent with the requirements of section 111(h).

A. EPA must conduct a quantitative analysis to approve an AMEL and may not average qualitative factors.

The determination that an AMEL will "achieve a reduction in emissions of any air pollutant at least equivalent" to reductions under the NSPS necessarily requires EPA to conduct a *quantitative* assessment of emissions reductions that a state program would achieve as compared to the NSPS. Furthermore, even if a quantitative assessment were not required, EPA's approach of "combining . . . aspects of the state requirements to formulate alternatives," 83 Fed. Reg. at 52,081, to determine equivalency is not a permissible or reasonable approach.

1. Equivalency determinations must be quantitative.

EPA's equivalency determinations set forth in a memorandum in the Proposal's docket ("2018 Memo")[67] were erroneously made based on program components, and not on numerical equivalency of emissions reductions. The agency's analysis is largely qualitative, evaluating whether a state has regulations that are similar to EPA's regulations, rather than evaluating the quantitative equivalence of emissions reductions achieved by those regulations. The 2018 Memo contains no numerical analysis whatsoever, but offers only a side-by-side comparison of state and federal regulations. In contrast, past AMEL approvals under this provision were based on detailed quantitative determinations. (*See supra* Table 1 for citations to and summaries of AMEL approvals and the quantitative determinations those approvals entailed.) In those approvals, EPA evaluated each facility to determine the exact emissions levels that would be achievable at that facility, and then compared those levels to the emissions levels achievable under the present NSPS.

Based on both the plain text of the statute and past EPA interpretations of the requirements under 111(h)(3), EPA's qualitative comparison of states program components to federal requirements under the NSPS is legally insufficient. Consistent with the statutory text,

[67] U.S. EPA, Dkt. No. EPA-HQ-OAR-2017-0483, Memorandum on Equivalency of State Fugitive Emissions Programs for Well Sites and Compressor Stations to Proposed Standards at 40 CFR Part 60, Subpart OOOOa (Apr. 12, 2018) [hereinafter "2018 Memo"].

under the current standard, any facility wishing to qualify for an AMEL would have to apply to EPA and demonstrate that "emission reduction achieved under the state requirement(s) is at least equivalent to the emission reduction achieved under the NSPS standards for a given affected facility." 81 Fed. Reg. at 35,871. Whereas under both the current standards and the statutory text itself, the applicable comparison is of the emission *outcomes* that are achievable by state and federal programs, respectively, under the Proposal, the comparison would be of the respective *methods* used by these programs. That does not meet the statutory requirement that an applicant "establish" that the AMEL "*will achieve*" reductions in emissions "at least equivalent to" the reduction achieved under the federal standards. 42 U.S.C. § 7411(h)(3). Without a quantitative comparison, it is impossible to determine whether an AMEL will, in fact, "achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions" that would result from the NSPS. The Proposal's revised AMEL language is therefore conflicts with the Clean Air Act and is unlawful.

2. Qualitative determinations are particularly ill-suited to assessing LDAR equivalency.

As EPA recognized in the 2016 Rule, the federal LDAR program consists of numerous elements that interact dynamically. It entails detailed practices required for monitoring, detecting, recording, and repairing leaks; specified thresholds for determining when a leak has occurred; requisite timeframes within which these actions must occur; and mandatory frequencies for completing these tasks in a given period. Thus, while some aspects of a state-level program may be more protective than their federal analogs, others may not be, making qualitative comparisons particularly ill-suited to ensuring two sets of LDAR standards achieve equivalent emission reductions. EPA's discussion in the Proposal recognizes as much, noting (for example) that standards with more frequent monitoring requirements but a higher leak detection threshold compared to the EPA standards are nonetheless probably equivalent:

> EPA believes that more frequent monitoring warrants allowance of a higher fugitive definition because larger fugitive emissions will be found faster and repaired sooner, thus reducing the overall length of the emission event.

83 Fed. Reg. at 52,080. However, qualitative comparisons simply cannot determine the net effects of program elements that point in opposite directions (i.e., where one program element would suggest greater reductions, the other less). And, EPA does not do the quantitative work of determining whether its above assertion—that sources will achieve the same reduction in emissions even if they are allowed higher fugitive emissions because of more frequent monitoring requirements—is actually true or not. Accordingly, EPA's "belief" that all of the state standards it has identified are equivalent falls far short of the statutory requirement that an AMEL "*will achieve* a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions" achieved by the section 111 standard. 42 U.S.C. 7411(h)(3).

Where EPA has spelled out its methodology for determining equivalency before, it has used a requirement-by-requirement determination rather than one that blends requirements

together. For example, in the regulatory preamble to EPA's proposed Subpart E amendments, EPA described equivalency requirements as follows:

> Fundamentally, you must demonstrate that your alternative requirements will achieve the same (or more) emissions reductions of the same pollutants from the same sources that will be regulated by the Federal standard and that they will achieve the reductions no later than the Federal standard …. In order to evaluate your submittal in a timely way, we would expect you to develop and submit a side-by-side comparison of your requirements and the Federal rule. This comparison would cover specific elements pertaining to the applicability of the standard to subject sources, the emissions limit (and its associated requirements such as test methods, averaging times, and work practice)."[68]

Similarly, in describing the equivalence methodology for VOC emissions under sections 301(a) and 111 of the Act, EPA specified that "[t]he Administrator may condition the approval of equivalence on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment, design, and operational requirements." 40 C.F.R. § 60.484 (2018). Unlike the side-by-side comparison done in the Proposal, these methodologies, in addition to a side-by-side comparison, also require a discussion of the *actual emissions reductions* that will be achieved by certain methods. EPA thus erred by failing to account for all of the dynamic interactions among LDAR program elements, which is not adequate for equivalency determinations under section 111(h)(3).

B. A quantitative assessment of the programs EPA proposes to recognize demonstrates that several will not secure reductions equivalent to either the Proposal or the 2016 standards.

In an analysis attached and described in greater detail in Appendix A,[69] we quantitatively compared the state programs that EPA has proposed to deem equivalent with both EPA's Proposal and the 2016 NSPS. The analysis includes a detailed comparison of the scope of coverage of these various programs, differences in key provisions, and resulting differences in emissions. We summarize some of the key findings here.

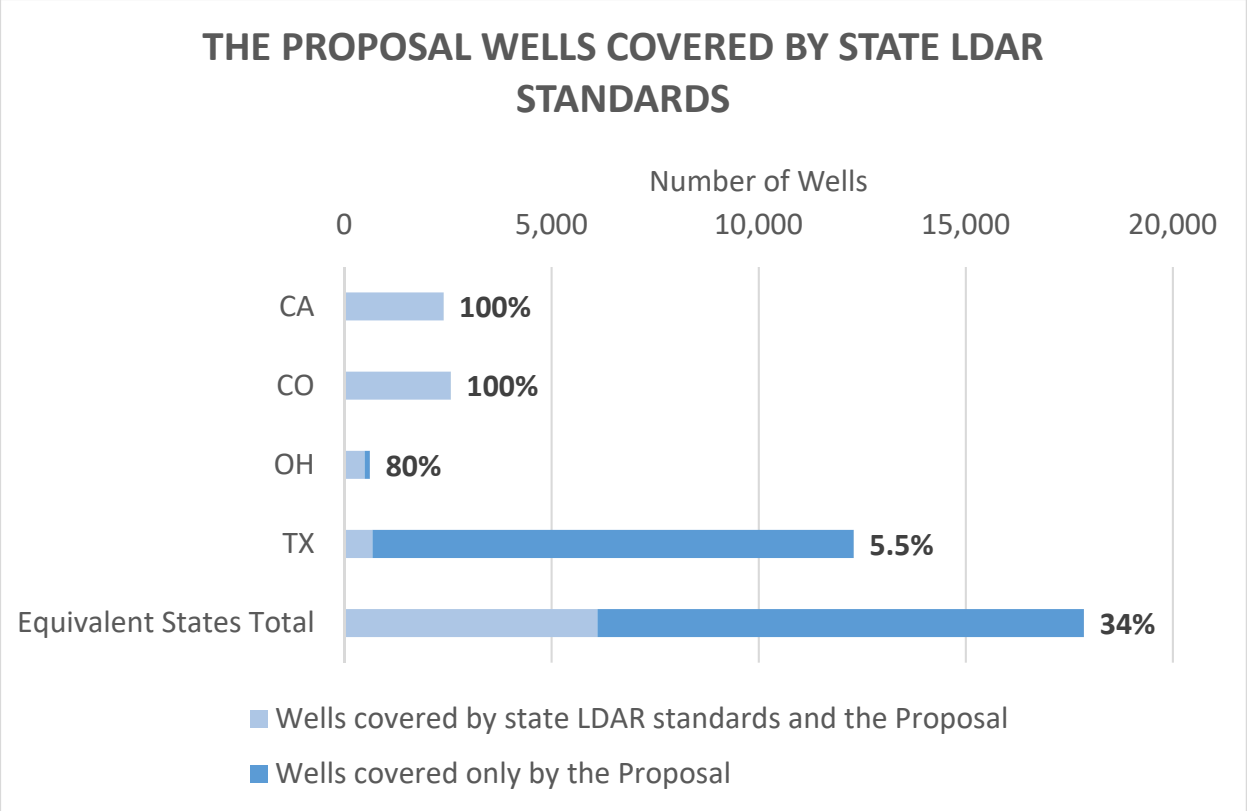
Several of the state programs EPA analyzed have applicability thresholds or apply only to certain types of wells, whereas both the NSPS and EPA's Proposal apply to all new and modified wells. Accordingly, differences in applicability across these programs (even if monitoring requirements for covered sources are the same) can result in fewer emission reductions. For example, in Texas, the LDAR requirement only applies to wells with very high uncontrolled emissions (>10 or 25 tons per year (tpy)), an estimated 5.5% (as many as 11% and as few as 2.2%) of the NSPS-covered wells. Utah likewise has an emissions threshold below which LDAR

[68] Approval of State Programs and Delegation of Federal Authorities, 64 Fed. Reg. 1880, 1908 (Jan. 12, 1999).

[69] Appendix A, Renee McVay and Kate Roberts, EDF, *Assessment of State-Level Fugitive Emissions Programs in Comparison to EPA NSPS Reconsideration Proposal* (December 2018).

requirements do not apply, but because of the limited duration of the comment period, we were unable to perform the same permit-based analysis that we performed for Texas.[70] Ohio's requirements apply to only a certain type of well—horizontal, unconventional wells—which we assess to be the majority (but not all) of the new and modified wells in the state. Combined, the state regulations that EPA has identified as having "equivalent" fugitive emission programs cover only 34% of the total wells covered by the EPA's Proposal (and the NSPS) in these states. Figure 1,[71] below, shows the coverage of programs in Colorado, California, Ohio, and Texas, and Appendix A provides greater details on the calculations underpinning this Figure.

Figure 1 Wells Covered by State LDAR Standards Compared to EPA's Proposal (or NSPS)



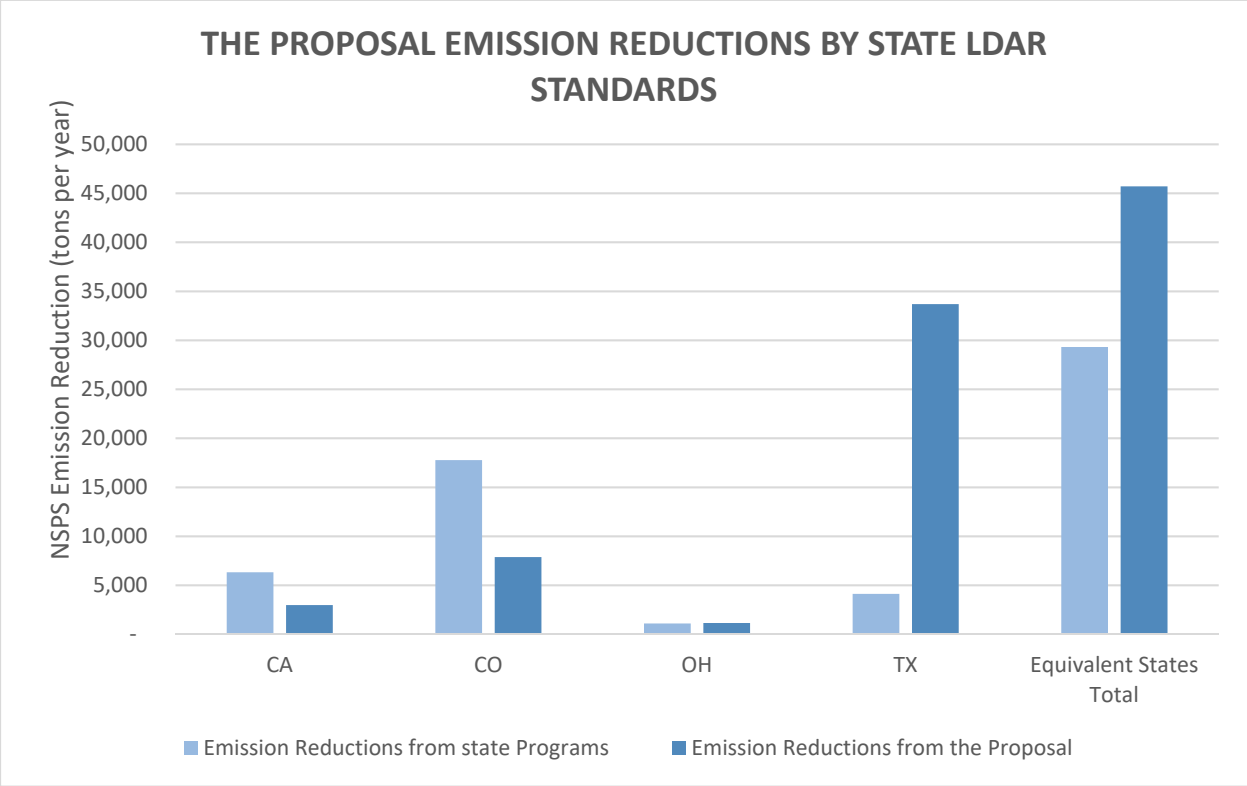
Moreover, even for the sources that are subject to state programs, those programs vary in stringency and may not secure the same level of reductions as EPA standards. For example, Ohio

[70] As we describe in Appendix A, our analysis of the Texas Program involved examination of thousands of state permits.

[71] Pennsylvania's LDAR program under GP-5 covers unconventional well sites that are new and modified after August 8, 2018. Our analysis includes NSPS-affected wells drilled after September 18, 2015, so we do not include Pennsylvania wells, because nearly all of those wells were drilled before GP-5 became effective. At minimum, it is essential that EPA ensure that wells drilled in Pennsylvania prior to August 8, 2018 continue to apply NSPS requirements.

and Texas provisions allow for inspection frequency to decrease based on the percentage of components leaking. Figure 2 below illustrates the estimated emissions reductions from well sites within each state under consideration for equivalency. The following estimates are conservative, as they only take into account monitoring frequency and not differences in initial monitoring or repair requirements between the states and the EPA Proposal.

Figure 2 Wells Emission Reduction (2018 Proposal vs. State Standards)



This assessment shows that both Ohio[72] and Texas[73] programs would secure fewer emissions than the 2018 proposal. While California and Colorado meet the emission reduction

[72] Ohio state regulations denote that horizontally drilled, unconventional wells are covered. For these wells, Ohio requires quarterly monitoring for one year, then semiannual or annual (based on 2% leak rate). Data from the City of Fort Worth Natural Gas Air Quality Study (2011) shows that sites with less than 2% leaking components constitute 90% of total emissions and over 80% of sites. Because the quarterly monitoring impacts would likely not extend past the first year for these sites, this analysis assumes that 90% of Ohio emissions would undergo annual monitoring, and 10% would undergo semiannual monitoring. This brings the total emissions reductions in Ohio below what would be achieved under the Proposal.

[73] In Texas, only 5.5% of wells are required to perform LDAR. Assuming that the highest emitting wells will perform LDAR, only 12% of the emissions that would be reduced under the Proposal would be removed under Texas regulation. Furthermore, provisions allow for

levels accomplished by the Proposal, 65% of the 45,700 tons per year of methane that would be reduced by the Proposal in California, Colorado, Ohio, and Texas are lost due to a lack of coverage in Ohio and Texas. Under the Proposal, California and Colorado would account for a 10,800 tpy reduction in methane emissions, while Texas and Ohio would reduce a combined 34,800 tpy. Under state regulations alone, Texas and Ohio are only estimated to reduce 5,200 tpy. Even when accounting for larger reductions in emissions in California and Colorado due to higher monitoring frequency under state standards (an additional 13,200 tpy reduced above the NSPS),[74] there is still a net loss of 36% of the total emissions that would be reduced by the Proposal.

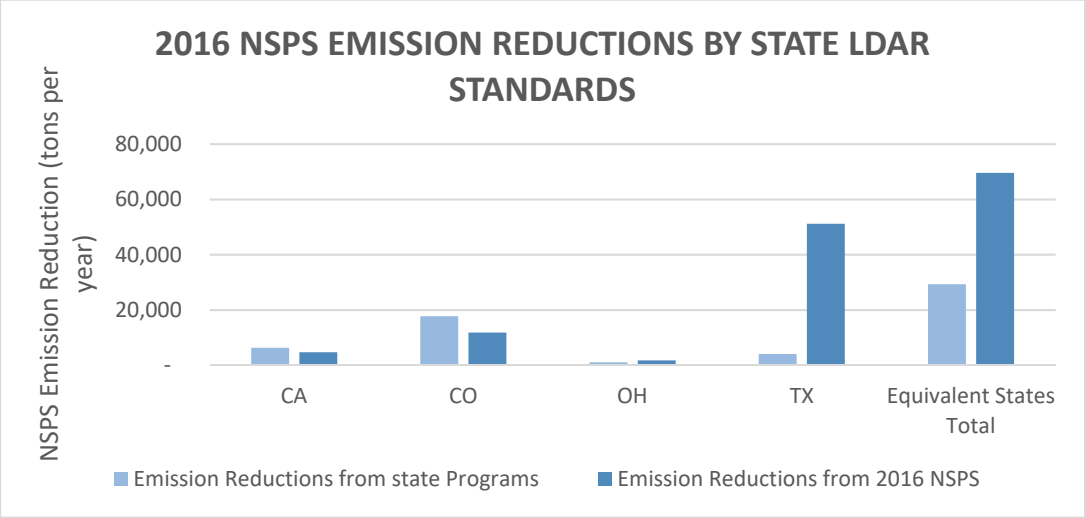
Because the Proposal weakens the original 2016 NSPS, we also compared state LDAR standards to the 2016 NSPS requirements. When compared to the original 2016 NSPS requirements and accounting for greater than NSPS level reductions in California and Colorado,[75] there is a net loss of 58% of the 69,600 tpy of emissions that would be reduced under the 2016 NSPS.

inspection frequency to decrease based on the percentage of components leaking. In addition, in Texas, the emission threshold for repair for certain sources is higher than the Proposal.

[74] Importantly, EPA cannot rely on the emissions reductions achieved by state standards in Colorado and California to offset the additional emissions allowed by the Proposal's equivalency determination in other states. The emissions reductions due to state standards in Colorado and California would happen regardless of whether the Proposal is finalized. Furthermore, it would be deeply contrary to the goal of conformity in the Clean Air Act to have leading states emissions reductions offset those of lagging states.

[75] The fact that Colorado's and California's standards achieve better emissions reductions than both the Proposal and the 2016 NSPS underscores that the Proposal is far too weak. EPA is obligated to consider what standards achieve in practice. The agency must explain why it is proposing to adopt standards far less stringent than those in Colorado or California, given that they are adequately demonstrated and achievable, and indeed, should explain why it is not proposing to *strengthen* the NSPS on the basis of this information.

Figure 3: 2016 NSPS emissions reductions compared to equivalent state reductions



As these charts demonstrate, not only did EPA fail to do a quantitative emissions comparison, but if it had, it would have determined that many of the state programs it proposes to deem equivalent are not equivalent (even as compared to EPA's unlawfully weak Proposal). Accordingly, neither "any person" nor EPA has demonstrated that the Proposal's blanket equivalency determinations "will achieve" reductions equivalent to even the weakened federal standards, and EPA may not lawfully allow sources in these states to comply with state programs in lieu of the federal standards to the detriment of the public.

C. Even if EPA's state equivalency determinations were adequate, they would still violate the Clean Air Act because they rely on EPA's unlawful adoption of the weak Proposal.

As described *supra* § I, the Proposal sets unlawfully weak standards of performance. To the extent that the state equivalency determinations made in this Proposal and in EPA's accompanying memo are lawful (and they are not, for the reasons described herein), they are still illegitimate because they are based on the legally deficient standards that EPA now proposes.

More specifically, even if blanket equivalency determinations based on averaging the qualitative aspects of states' LDAR programs were legitimate, those determinations would reflect the equivalence of state programs with a federal standard that is not sufficiently protective of human health and not based in sound data and analysis. If the baseline for the equivalency determination (i.e., the revised federal standard) is unlawful, so must be the equivalency determination itself. The provision in section 111(h)(3) allowing AMELs is intended to create some flexibility for facilities in complying with the NSPS. However, it still requires a strict adherence to the standards of performance to achieve a certain level of emissions reduction. Allowing facilities to comply with a level of emissions reduction that was unlawfully designated in the first place does not fulfil the purposes of the section.

Here, EPA has only evaluated state programs and proposed equivalency determinations for state programs in reference to the Proposal's weakened LDAR standards. In so doing, EPA has failed make its AMEL determinations in regard to the more protective LDAR standards set forth in the current standards. For instance, EPA has not compared the requisite frequency of state-level monitoring requirements to the requirements in the current NSPS for semiannual inspections at well sites and quarterly inspections at compressor stations. Nor has EPA indicated how changes in monitoring frequency stringency would change the agency's averaging of qualitative aspects of state programs. The agency thus has no basis to conclude that the state-level programs it has evaluated for AMEL purposes actually comply with the Clean Air Act's requirements.

Finally, and relatedly, both the text and purpose of section 111(h)(3) demonstrate that an AMEL should be approved *after* finalization of a federal standard through an adjudicatory proceeding when "any person" establishes equivalency to the Administrator. Only then can the applicant and the public know to which standard equivalency must be demonstrated. The Proposal flips this on its head by proposing equivalency not *after* setting a final federal standard, but *concurrently* with its proposed substantive revisions to that standard. Thus, the agency proposes to make AMEL determinations *before* it actually decides upon the standard to which equivalency must be made—*not* after "any person" has shown equivalency, but merely at the Administrator's say-so. The public cannot adequately comment under these circumstances. where the federal standard is a moving target, and no person has even attempted to make the statutorily-required demonstration of equivalency. For these reasons and those discussed above, EPA's AMEL determinations are unlawful and must not be finalized.

D. EPA's proposed changes to deem certain state requirements equivalent to the NSPS are unclear.

We believe that EPA's approach to state equivalency suffers from a number of important legal and technical flaws. It is also vague to the point of making meaningful comment (and compliance) difficult. To the extent EPA moves forward with its approach, the agency must clarify aspects of its proposed regulatory text to begin to correct some of the deficiencies identified in our analysis.

For instance, EPA says it is determining that "aspects" of state LDAR programs are at least equivalent to the Proposal (examining affected fugitive components, monitoring instruments, fugitive definitions, monitoring frequency, repair deadlines, delay of repair provisions, and recordkeeping), but then also says that it is "proposing combining those aspects of the state requirements to formulate alternatives to the relevant portions of the fugitive emissions standards." 83 Fed. Reg. at 52,081. The scope of program coverage is one of the key parameters not explicitly reflected in EPA's analysis and one (as in the case of Texas) that results in significant differences between state standards and either the NSPS or the agency's Proposal.

The regulatory text of the proposal as written is ambiguous—for example, operators that fall below thresholds provided in state standards may nonetheless claim they are electing to comply with state requirements (notwithstanding the fact that those state requirements would

impose no state-level monitoring obligations). Such an approach would clearly not be "equivalent" to compliance with the federal standards, and so, at minimum, EPA must clarify that the AMEL provisions are only available for sources that are otherwise subject to mandatory state LDAR requirements. Below, we suggest language that may help to close this loophole in Texas:

> E.g. 60.5399a(m): "Alternative fugitive emissions requirements for the collection of fugitive emissions components located at a well site in the state of Texas. An affected facility, which is the collection of fugitive emissions components, as defined in §60.5430a, located at a well site in the state of Texas may elect to comply with the monitoring, repair, and recordkeeping requirements in the Air Quality Standard Permit for Oil and Gas Handling and Production Facilities, section (e)(6), effective November 8, 2012, or at 30 Tex. Admin. Code §116.620, effective September 4, 2000, as an alternative to complying with the requirements in §60.5397a(f)(2), (g)(2) through (4), (h), and (i) of this subpart, **provided that the well site exceeds the 10 or 25 ton per year VOC emissions thresholds and so is required to perform LDAR surveys** and provided the monitoring instrument used is a Method 21 instrument and that the leak definition used for Method 21 monitoring is an instrument reading of 2,000 ppm or greater."

Though making these adjustments will not cure the other deficiencies associated with EPA's AMEL determinations, to the extent EPA moves forward with such an approach, the agency must ensure that there are not important loopholes in its regulations that would allow facilities otherwise be subject to the NSPS to escape monitoring requirements.

IV. The Proposal Violates Section 307 of the Clean Air Act.

In a transparent attempt to remedy its evidentiary shortcomings, the Proposal effectively seeks to graft an information collection request ("ICR") onto its proposed substantive amendments, though without following the Clean Air Act's procedural requirements for an ICR.[76] As discussed throughout these comments, the revisions included in the Proposal are largely based on speculative "concerns" and "uncertainties," rather than factual data. Instead of gathering data to address these "concerns" and "uncertainties" *before* issuing the Proposal (or even analyzing relevant data in its possession), EPA seeks data and other factual information *through* the rulemaking. The Clean Air Act does not permit this. Section 307 of the statute

[76] This is not the first time that EPA has used the wrong tool in its attempt to roll back the NSPS. Approximately one year ago, EPA published a "Notice of Data Availability," in relation to its attempt to suspend certain NSPS provisions, which did not make any data available but instead *solicited* data and offered a new, *post hoc* legal theory to justify a predetermined regulatory proposal. *See* Joint Comments, Notices of Data Availability on Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Stay of Certain Requirements and Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Three Month Stay of Certain Requirements, EPA-HQ-OAR-2017-0346-0367 (Nov. 14, 2017).

mandates that, *in a proposed rule itself*, EPA must provide the public with the "factual data on which the proposed rule is based," as well as "the methodology used in obtaining the data and in analyzing the data." 42 U.S.C. § 7607(d)(3). If EPA seeks to obtain factual data to support its desired policy ends, the Clean Air Act provides a *different* tool for that: a section 114 information collection request. *See id.* § 7414 ("For the purpose of (i) developing or assisting in the development of … any performance standard under section 7411 of this title … (1) the Administrator may require any person who owns or operators any emission source" to provide information.).

Should EPA gather data through this Proposal and then seek to rely upon it, EPA may not finalize *this* proposed rule, but must instead make that data available to the public for comment through a new proposed rule. *See, e.g., American Medical Ass'n v. Reno*, 57 F.3d 1129, 1133 (D.C. Cir. 1995); *Connecticut Light & Power Co. v. NRC*, 673 F.2d 525, 530-31 (D.C. Cir. 1982) ("An agency commits serious procedural error when it fails to reveal portions of the technical basis for a proposed rule in time to allow for meaningful commentary."); *Kennecott Corp. v. EPA*, 684 F.2d 1007, 1018 (D.C. Cir. 1982) (setting aside regulation where agency had not provided underlying factual data in proposed rule); *Daimler Trucks N. Am. LLC v. EPA*, 737 F.3d 95 (D.C. Cir. 2013) (setting aside EPA rule for failure to provide adequate notice and comment); *Costle*, 657 F.2d at 398 ("If, however, documents of central importance upon which EPA intended to rely had been entered on the docket too late for any meaningful public comment prior to promulgation, then both the structure and spirit of section 307 would have been violated.").

If EPA actually wishes to resolve the uncertainties it identifies, it should follow the course laid out in the statute, collect the relevant data through an information collection request, and *then* propose to revise the standards based on actual evidence. That way, stakeholders could actually meaningfully comment on the facts underlying EPA's proposed rule, as required by the Clean Air Act. It may not shoehorn an information collection request into a proposed rule that lacks a proper evidentiary basis, shutting stakeholders out of the process by precluding comment on any data collected in response.

A. The Clean Air Act requires a proposed rule to include all supporting factual data.

Notice and comment rulemaking requires an agency to disclose the bases for its proposed regulations, and "serves three distinct purposes." *Small Refiner*, 705 F.2d at 547. These include "(1) to ensure that agency regulations are tested via exposure to diverse public comment, (2) to ensure fairness to affected parties, and (3) to give affected parties an opportunity to develop evidence in the record to support their objections to the rule and thereby enhance the quality of judicial review." *Am. Coke & Coal Chems. Inst. v. EPA*, 452 F.3d 930, 938 (D.C. Cir. 2007); *Util. Solid Waste Activities Grp. v. EPA*, 901 F.3d 414, 442 (D.C. Cir. 2018). While these requirements also apply to general rulemaking under the Administrative Procedure Act, in the Clean Air Act, Congress provided even more rigorous requirements to ensure that both the public and regulated community will have an adequate basis on which to comment on EPA proposals, a necessity given the highly complex issues addressed under the statute. *See, e.g.,*

Schiller v. Tower Semiconductor, Ltd., 449 F.3d 286, 300 n.14 (2d Cir. 2006) (explaining that in Section 307(d) Congress provided specific procedures for notice and comment that go beyond what is required under the APA).

In particular, section 307(d) mandates that EPA include in a proposed rule, among other things:

> (A) the factual data on which the proposed rule is based;
> (B) the methodology used in obtaining the data and in analyzing the data; and
> (C) the major legal interpretations and policy considerations underlying the proposed rule.

42 U.S.C. § 7607(d)(3); *see also Kennecott Corp.*, 684 F.2d at 1018. The Act also mandates that "[a]ll data, information, and documents referred to in this paragraph on which the proposed rule relies shall be included in the docket *on the date of publication of the proposed rule*." 42 U.S.C. § 7607(d)(3) (emphasis added). Thus, "the comments of other interested parties do not satisfy an agency's obligation to provide notice." *Nat'l Black Media Coal. v. FCC*, 791 F.2d 1016, 1023 (D.C. Cir. 1986).

There is a reason for these requirements. The public can only meaningfully analyze and comment upon a proposed rule if it has the data supporting the proposed rule. *See Prometheus Radio Project v. FCC*, 652 F.3d 431, 450 (3d Cir. 2011) ("The opportunity for comment must be a meaningful opportunity. That means enough time with enough information to comment and for the agency to consider and respond to the comments.") (citing *Rural Cellular Ass'n v. FCC*, 588 F.3d 1095, 1101 (D.C. Cir. 2009)). It is impossible for the public to meaningfully comment on EPA's proposed revisions where those revisions are based solely upon "concerns" and "uncertainties" and EPA has not provided any facts or analysis for the public to review and critique.

The Administrator cannot, under section 307(d), make a proposal and solicit data to support that proposal only through comments, as he appears to be doing here. That would deprive the public of the opportunity to comment on the data that section 307(d)(3) requires EPA to supply at the time of the proposal. Here, instead of presenting the public with the factual data upon which the proposed amendment is based, EPA is using the Proposal to gather data to support its preferred and predetermined result—significantly weakening the NSPS. The proper order under the Act is to gather the data that allegedly supports the rule *first* and then make that data available for comment through a proposal. Here, to the extent the Administrator gathered or gathers any data at all to support his preferred policy outcome, it does not appear that the public will ever be allowed to comment on that data, undermining the entire purpose of notice and comment. *See Small Refiner*, 705 F.2d at 549-50 ("EPA must *itself* provide notice of a regulatory proposal. Having failed to do so, it cannot bootstrap notice from a comment."); *see Costle*, 657 F.2d at 398 (public must be able to meaningfully comment on factual underpinnings of a rule).

In addition, in various places throughout the Proposal, EPA states that it has considered "available data," but never explains what that "available data" is or whether it is data submitted

to EPA through the NSPS compliance reporting requirements. *See, e.g.*, 83 Fed. Reg. at 52,062 ("EPA has reviewed the data provided by the petitioner, *as well as other data that have become available* since promulgation of the 2016 NSPS OOOOa…"), 52,068 ("other available information"). EPA cannot vaguely refer to available information, but must make clear precisely what data it is relying on, and make that data available to the public for comment.

B. Instead of including supporting factual data, the Proposal seeks supportive factual data.

Instead of providing factual data in support of the proposed revisions, however, EPA is using this proposed rule to collect information in support of the proposed revisions. The Proposal is replete with such requests, sometimes in great detail. For example:

- *EPA is requesting data to support changing the monitoring frequency for well sites.*

The NSPS requires facilities to engage in semi-annual monitoring of fugitive emission components for all well sites. *See* 42 C.F.R. § 60.5397a(g)(1). EPA concluded that semi-annual monitoring would be cost-effective, and would result in greater emission reductions than annual monitoring. 81 Fed. Reg. at 35,856.

In the Proposal, EPA now proposes to amend this requirement to require only annual monitoring for non-low-production well sites, and biennial monitoring for low-production sites. 83 Fed. Reg. at 52,062-66. For the non-low-production sites, although EPA recognizes that even under its updated model plant analysis, semiannual monitoring remains cost-effective, the agency surmises that it "*may have overestimated* the emissions reductions and, therefore, the cost effectiveness, due to gaps in available data and [other] factors." *Id.* at 52,062 (emphasis added). Thus, EPA is "soliciting comment and information that would support" its new monitoring requirement proposal. *Id.* at 52,064; *see also id.* ("EPA is requesting information on any analyses performed on the emission reductions achieved with OGI monitoring at different monitoring frequencies and the data underlying those analyses"); ("We are soliciting information to evaluate how the percentage of fugitive emissions identified changes with frequency to revise the model plant analysis").

The Proposal goes into great detail in specifying the data it seeks to collect. For example, EPA requests that:

> The data should include information on when the well site began producing, the start date of the fugitive program at the well site, the frequency of monitoring, an indication of the location of the well site *(e.g.,* basin name or state), and how the surveys are performed, including the monitoring instrument used and the regulatory program followed. We are also soliciting comment and supporting data on the stepped monitoring frequency for non-low production well sites, including information to determine the appropriate period for more frequent monitoring prior to stepping down to less frequent monitoring.

Id. at 52,066.

Similarly, with regard to low production wells, EPA posits that the agency "*may have overestimated* emissions and the potential for emission reduction" from these wells, and on that basis proposes to change the monitoring requirement from twice per year to once every two years, or four times less monitoring. *Id.* at 52,068. And as with the non-low-production wells, EPA then states that it is "soliciting comment on the biennial monitoring requirement," as well as "data on the number of" production and processing equipment at these sites. *Id.* at 52,069. Further, EPA discusses "concerns" regarding the impact of monitoring on small businesses, and "solicit[s] information confirming or refuting this concern including analyses of the number of wells that may be shut in as a result of requiring fugitive emissions monitoring and how these concerns may be based on production level." *Id.* at 52,067. EPA specifies that:

> At a minimum, any information provided should include the costs of implementing the fugitive emissions requirements compared to the profitability of the well site over the life of the well site from first production through shut in. Further, any information provided should include information as to the length of the life of the well site, beginning at first production, and by how much that total duration would be shortened by the shut in, as well as information as to total production over the life of the well site, beginning at first production, and the amount of production that would be reduced by the shut in.

Id. EPA explains that such information would "further support our proposals regarding monitoring frequency." *Id.*

- *EPA is requesting data to support changing the monitoring frequency for compressor stations.*

While the NSPS requires quarterly monitoring of fugitive emission components from all compressor stations, *see* 42 C.F.R. § 60.5397a(f), (g), the Proposal co-proposes to reduce that monitoring to either once-per-year or twice-per-year. 83 Fed. Reg. at 52,069-72. Although EPA acknowledges that it has no data supporting this change, and that the "unique operating characteristics of compressor stations may support more frequent monitoring," the Proposal solicits "additional data that will allow for further analysis" and "that can be used to evaluate if changes are necessary to the model plants" used to determine the monitoring frequency. *Id.* at 52,069-70; *id.* at 52,071 ("The EPA is soliciting comments and information that will allow us to further refine our model plant analysis"; "soliciting comment on quarterly monitoring"; and "soliciting data in order to understand" these emissions). Once again, EPA specifies the data it would like to collect in great detail:

> Additionally, we are soliciting data in order to understand how the percentage of identified fugitive emissions may change over time; the data should include the date of construction of the compressor station, information on when the compressor station began its fugitive program, the frequency of monitoring, an indication of the

location of the compressor station, and how the surveys are performed, including the monitoring instrument used and the regulatory program followed.

Id. at 52,071.

- *EPA is requesting data to support changing the scope of the potential exemption from well site pneumatic pump requirements.*

The NSPS allowed companies to obtain an exemption from well site pneumatic pump requirements for existing facilities. *See* 42 C.F.R. § 60.5393a(b)(5). However, because, for *new* facilities, any such concerns "can be addressed in the site's design and construction," the exemption process does not apply to those facilities. 81 Fed. Reg. at 35,849.

In the Proposal, EPA now proposes to expand this exemption to new facilities as well, on the basis of a "concern that even at a greenfield site, there *may be* unique process or control design requirements that may not be compatible with controlling pneumatic pump emissions." 83 Fed. Reg. at 52,061 (emphasis added); *see also id.* (providing two examples of what a new "site design *may* require" that could make the required pumps infeasible). EPA thus requests comment on "whether the scenarios described above" in fact are examples where pumps may be infeasible, "as well as other examples of technical infeasibility for a greenfield site." *Id.; see also id.* (stating that "scenarios raised in petitions for reconsideration *suggest that there might* be cases of technical infeasibility") (emphasis added).

* * *

This is not an exhaustive list of all the areas in which EPA is using the Proposal to collect data and information that might support its proposals. But EPA may not put the cart before the horse. Should EPA wish to rely on any data or information collected through the Proposal, it may not finalize the Proposal without making that data and information available for public comment.[77] In the absence of such data, commenters cannot meaningfully comment on alleged "concerns" and "uncertainties" that have no basis in fact. They cannot perform analysis on or refute the facts; in other words, their ability to "develop evidence in the record to support their objections to the rule" is severely hampered. *Int'l Union, United Mine Workers of Am.*, 407 F.3d at 1259. This undermines the entire purpose of the Clean Air Act's requirements for notice and comment. *See Am. Coke & Coal Chems. Inst.*, 452 F.3d at 938.

[77] This also includes areas where EPA is not now proposing changes, but is nonetheless soliciting data that might justify such changes. *See, e.g., 83* Fed. Reg. at 52,075 (maintaining initial monitoring deadline, but soliciting comment on extending the deadline up to three times as long). As with the rest of the Proposed Rule, EPA may not complete such changes without issuing a new proposal in which all the data supporting such changes is disclosed and discussed, allowing the public a meaningful opportunity to respond. *See also id.* at 52,075 (proposing to modify repair requirements, and requesting data on site-specific examples that might justify the changes); 52,079 (same regarding professional engineer certifications).

C. The compliance data EPA already possesses must be made public to permit meaningful comment on the Proposal.

While basing the Proposal on unsubstantiated "concerns" and "uncertainties," EPA completely ignores that it has in its possession two years' worth of data from compliance reports that would shed light on many of the "concerns," "uncertainties," and questions posed in the Proposal. Indeed, EPA goes so far as to point out that "[t]here are several well sites that have incorporated fugitive monitoring programs prior to the 2016 NSPS OOOOa for various purposes, including compliance with state and local requirements," and declare that "[d]ata from these programs could provide the information necessary to refine our model plant analysis." 83 Fed. Reg. at 52,066 ("requesting information that has been collected from implementing fugitive monitoring programs,"); *see id.* at 52,070 (similar). But EPA *never* acknowledges that the NSPS, which has been in effect for over two years, itself requires submission of relevant data through monitoring reports. *See* 81 Fed. Reg. at 35,846-47 (outlining the data reporting requirements, including initial notifications and annual reporting, under the NSPS).

To make matters worse, EPA has refused to comprehensively release this data in response to requests under the Freedom of Information Act ("FOIA"), 5 U.S.C. § 552, *as amended*. Although the Environmental Defense Fund and Clean Air Task Force submitted FOIA requests more than a year ago seeking the compliance reports, EPA has only produced a portion of this data (after significant delay), and has extensively delayed releasing the bulk of it based on purported claims regarding confidential business information ("CBI"). EPA cannot proceed with the Proposal while at the same time refusing to publicly release all the data it already possesses concerning industry compliance with the Rule.

The NSPS requires regulated companies to submit these annual reports, with the initial reports due no later than 90 days after the end of the first compliance period, which ended on July 31, 2017, and annually thereafter. 81 Fed. Reg. at 35,846. The annual reports "include information on all affected facilities that were constructed, modified or reconstructed during the previous year," including, for example, with respect to fugitive emissions:

> the date and time of the surveys completed during the reporting year, the name of the operator performing the survey; the ambient temperature, sky conditions, and maximum wind during the survey; the type of monitoring instrument used; the number and type of components that were found to have fugitive emissions; the number and type of components that were not repaired during the monitoring survey; the number and type of difficult- to-monitor and unsafe-to-monitor components that were monitored; the date of the successful repair of the fugitive emissions component if it was not repaired during the survey; the number and type of fugitive emission components that were placed on delay of repair and the explanation of why the component could not be repaired and was placed on delay of repair; and the type of monitoring instrument used to resurvey a repaired component that could not be repaired during the initial monitoring survey…

Id. Compliance reports—which include all of this information from each affected source and which were in EPA's possession at the time it issued the Proposal or came into EPA's possession shortly thereafter—contain information critical to assessing the feasibility and cost-effectiveness of the NSPS and any purported need to relax the standards. For example, EPA indicates in the Proposal that although its modeling indicates that semiannual fugitive emissions monitoring at non-marginal well sites is cost-effective, EPA is "unable to conclude that semiannual monitoring is cost effective" based upon purportedly inadequate data. 83 Fed. Reg. at 52,065. EPA, however, has not made public (and does not appear to have itself evaluated) information in the compliance reports, including data on average survey times, that suggests fugitive monitoring costs are lower than estimated in the analysis for the NSPS. Data on average survey time would directly inform the cost-effectiveness of the NSPS (indeed EPA's analyses in the TSD includes express assumptions about these survey times). Yet, instead of making this information public and presenting the factual data that regulated entities submitted, EPA has affirmatively shielded most of this information from public scrutiny. It is arbitrary and capricious not to take this available data into account in promulgating an NSPS revision, and a failure to make this information available for public comment renders it impossible for interested parties to provide meaningful comments on EPA's proposed revisions.

Notably, in the 2016 Rule, EPA did intend to make this information available to the public 30 days after submission. *Id.* at 35,853 ("This information must be included in the annual report made available to the public 30 days after submission…."). EPA suggested that the purpose of making these data available was "to expand transparency" and to improve the rulemaking process for future revisions of the NSPS. *Id*. at 35,869-70. EPA also established a separate mechanism for submitting confidential business information. *Id*. at 35,928. Soon after the Administrator published the Proposal in the Federal Register, Environmental Commenters requested that EPA fulfill its promise to make these data publicly available and *then* give commenters a reasonable time thereafter to comment on EPA's new Proposal. Letter from Rosalie Winn, EDF Attorney et al., to USEPA Acting Administrator Andrew Wheeler (Nov. 1, 2018). The Administrator provided no response.

Moreover, the compliance reports collect "emission data" within the meaning of section 114 of the Clean Air Act, and so EPA is required by the statute to make this information public. Consistent with this statutory duty, the NSPS regulations state that reporting parties "must submit reports to the EPA via the [Compliance and Emissions Data Reporting Interface ("CEDRI")]." 40 C.F.R. § 60.5422a(b)(11); *see also id.* § 60.5422a(a). The NSPS rule stated that reports submitted pursuant to the regulations would be made electronically available on EPA's WebFIRE website, that this website would be "easily accessible to everyone" and "provide a user-friendly interface that any stakeholder can access," and that "[b]y making the records, data and reports addressed in [the NSPS] readily available, the EPA, the regulated community and the public will benefit when the EPA conducts its CAA-required reviews." 81 Fed. Reg. 35,824, 35,870. Additionally, the CEDRI website states: "**Important note:** CEDRI **does not** support collection of *confidential business information (CBI)* within any of the reports that are submitted in CEDRI by industry." EPA, *Compliance and Emissions Data Reporting Interface (CEDRI)*.4 EPA's designation of CEDRI as the proper platform for reporting compliance, along with its comments in the NSPS, suggest that it contemplated compliance data collected in the reports

would not contain confidential business information and all compliance data would ultimately be made public, consistent with Clean Air Act requirements.

On November 1, 2017, the Environmental Defense Fund ("EDF") submitted a request under the Freedom of Information Act ("FOIA"), U.S.C. § 552, for all records received by EPA related to reporting made pursuant to the NSPS, 40 C.F.R. Part 60 Subpart OOOOa. While EPA has released some reports to EDF pursuant to that request, and has made some reports submitted via CEDRI available through EPA's public WebFIRE database, the agency has not yet made publicly available all of the compliance reports that have been submitted, despite its clear obligation under the Clean Air Act to do so. EPA has indicated it is withholding roughly half of the first annual compliance reports it possesses from public disclosure due to their supposed inclusion of CBI. *See* Email from Peter Bermes, Attorney-Advisor, EPA, to Samantha Caravello, EDF (April 27, 2018). Furthermore, the reports received appear to represent an even smaller fraction of the wells subject to the standards, based on a review of the number of wells subject to the NSPS in the Drillinginfo database.

An initial analysis of the limited number of first annual compliance reports that are available on EPA's WebFIRE database demonstrates that the reports offer key data that is directly relevant to the NSPS Reconsideration Proposal rulemaking. The reports include data on the types of components found most frequently with leaks, the time for a surveyor to conduct an inspection, and the percent of leaking components repaired. The second annual reports will provide an abundance of additional significant data. These data can speak to some of EPA's claimed uncertainties and likewise provide vital insight into compliance costs for the NSPS, and on whether EPA overestimated costs to operators in the NSPS rulemaking and NSPS Reconsideration Proposal. Indeed, as explained in detail below, the limited compliance reports that EPA has released through FOIA requests tend to contradict EPA's unsupported suggestions that its current assessment of the cost-effectiveness of the NSPS is overestimated.

Instead of analyzing the factual data that regulated entities submitted in their compliance reports, making it public so that stakeholders can analyze it, and placing it in the docket for the NSPS Reconsideration, EPA has apparently decided instead to ignore that data in updating its analysis.[78] Indeed, EPA did not mention that a mere two weeks after its Proposal it would be receiving the second round of annual reports, much less await that relevant data in order to inform its Proposal. It would be arbitrary and capricious not to take this available data into account in promulgating a final rule, and a failure to make this information fully available for public comment renders it impossible for interested parties to fully consider it and provide meaningful comments on all aspects of the proposal.

[78] A review of the 82 supporting documents EPA placed in the docket after it published the Proposal suggest that none of these items analyze, rely upon, or even reference the compliance reports that EPA has received.

D. The data requested in the Proposal can only be appropriately collected through an Information Collection Request.

The Proposal is essentially an information collection request in the guise of an NPRM. But the Clean Air Act has a *different* provision expressly designed for this purpose: a Section 114 Information Collection Request ("ICR"). 42 U.S.C. § 7414. Under Section 114, any owner or operator who "may have information necessary" to, *inter alia*, develop "any standard of performance under section 7411," may be required by EPA to, *e.g.*, "establish and maintain records"; "install, use, and maintain such monitoring equipment"; "sample such emissions"; or "provide such other information as the Administrator may reasonably require." *Id.* Accordingly, while the Proposal repeatedly solicits data from industry, EPA should be asking for this data in an ICR. This makes sense in the statutory scheme. Congress required that EPA make public the data supporting a proposed rule to enable meaningful comment, and empowered EPA to collect the data necessary to inform a proposal through an ICR. EPA has flipped this, and in doing so, made meaningful comment impossible.

An ICR also would provide EPA with much more relevant data than a simple request for information. In particular, while, as a result of the Proposal, industry is free to submit whatever data it likes, and thus to selectively provide information in a manner that supports the results sought by the submitter, an ICR can require *all* facilities to provide *all* the information relevant to the request, thereby providing EPA (and the public) with a full picture of the matters under consideration.

Indeed, it bears emphasizing in this regard that in 2016 EPA *initiated an ICR regarding fugitive methane emissions from existing oil and gas facilities*. 81 Fed. Reg. 66,962 (Sept. 29, 2016). The ICR would have collected information including major equipment and component counts at low-production wells and the effectiveness of any ongoing leak detection and repair program to which the reporting facility was subject (both areas for which EPA now professes it has uncertainties that cause it to doubt the cost-effectiveness of the NSPS).[79] Unfortunately, before this information was obtained, in March, 2017 EPA formally withdrew the ICR. *See* 82 Fed. Reg. 12,817 (Mar. 7, 2017). Although EPA claimed the ICR was being withdrawn in order "to assess the need for the information that the agency was collecting through these requests, and reduce burdens on businesses while the Agency assesses such need," *id.*, EPA never issued any follow-up ICR or otherwise endeavored to collect this information. Moreover, while, in November, 2018, EPA issued two "Notice(s) of Data Availability" ("NODA") concerning the oil and gas NSPS,[80] those NODAs did not actually provide the public with data that might support

[79] *See* Information Collection Request Supporting Statement at 95, EPA ICR No. 2548.01 (Nov. 9, 2016) https://www.epa.gov/sites/production/files/2016-11/documents/oil-natural-gas-icr-supporting-statement-epa-icr-2548-01.pdf; *see also* EPA Fact Sheet at 1 https://www.epa.gov/sites/production/files/2016-11/documents/oil-gas-final-icr-factsheet.pdf.

[80] *See Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Stay of Certain Requirements*, 82 Fed. Reg. 51,788 (Nov. 8, 2017); *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: Three Month Stay of Certain Requirements*, 82 Fed. Reg. 51,794 (Nov. 8, 2017).

the Proposal, but rather sought comment on new potential legal theories that might support suspending the standards. *Id.*

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For all these reasons, EPA may not finalize the 2018 Proposed Rule. It must either disclose all the data relevant to the Rule when it is proposed, or rely on a Section 114 ICR to collect relevant information, and then release that data in a new proposal.

V. The Specific Provisions of the Proposal Are Arbitrary, Capricious, and Not Supported by Substantial Evidence.

EPA's proposed changes to weaken fugitive emissions monitoring requirements in the NSPS and deem certain state programs equivalent to the federal standards constitute quintessential arbitrary and capricious agency action. *See State Farm* 463 U.S. at 43 (agency action is arbitrary when the agency has "relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it [cannot] be ascribed to a difference in view or the product of agency expertise"); *Fox Television* 556 U.S. at 515–16 (to revise a policy, agency must show "that the new policy is permissible under the statute, [and] that there are good reasons for it" justified by the administrative record). The specific changes that EPA seeks to make in the Proposal are arbitrary in at least three ways.

First, EPA's Proposal is entirely unsupported by the agency's updated analysis and record materials. It is an axiomatic principle of administrative law that agency decisionmaking must be reasoned. *State Farm*, 463 U.S. at 43; *Ctr. for Biological Diversity v. Zinke*, 900 F.3d 1053, 1071 (9th Cir. 2018). An agency acts arbitrarily when it takes action that is not supported by substantial evidence. *See, e.g.*, *Cablevision Systems Corp. v. FCC*, 597 F.3d 1306, 1310 (D.C. Cir. 2010); *Fl. Gas Trans. Co. v. FERC*, 604 F.3d 636, 639 (D.C. Cir. 2010); *Ass'n of Data Processing Serv. Orgs. v. Bd. of Governors*, 745 F.2d 677, 683-84 (D.C. Cir. 1984). Reasoned decisionmaking requires that the agencies "weigh[] competing views, select[] a [solution] with adequate support in the record, and intelligibly explain[] the reasons for making that choice." *FERC v. Elec. Power Supply Ass'n*, 136 S. Ct. 760, 784 (2016). Agencies act arbitrarily when they take action that is not supported by substantial evidence when considering the record as a whole. In this case, EPA cannot point to substantial evidence to support the Proposal; indeed, all of the evidence supports retaining (and strengthening) the current standards.

Second, and relatedly, EPA has failed to explain how its Proposal is justified in light of the extensive legal and factual findings made in the 2016 Rule.[81] While agencies may reconsider

[81] EPA developed an extensive factual record to support the current NSPS. In addition to the mandatory notice and comment procedure, EPA issued white papers for peer review and public input to facilitate a more complete understanding of data on emissions and controls for oil and gas facilities. Through this enhanced process, which included more than 900,000 public comments and three public hearings, EPA "improved [its] understanding of the methane and

and revise their policies, before doing so they must demonstrate "that the new policy is permissible under the statute, [and] that there are good reasons for it," *Fox Television*, 556 U.S. at 515–16, "justified by the rulemaking record," *Am. Petroleum Inst.*, 862 F.3d at 66 (quoting *State Farm*, 463 U.S. at 42). Reasoned decisionmaking in the context of a change in policy or legal interpretation also requires that an agency demonstrate awareness of, and fully explain any departure from, the "facts and circumstances that underlay or were engendered by a prior policy." *Fox Television*, 556 U.S. at 516.[82] "An agency cannot simply disregard contrary or inconvenient factual determinations that it made in the past." *Id.* at 537 (Kennedy, J., concurring). Where an agency is operating against a factual record that contradicts its new policy, reasoned decisionmaking also requires that the agency "provide a more detailed justification than what would suffice for a new policy created on a blank slate." *Id.* at 516.[83]

Third, EPA's Proposal fails to take into account significant new data and analyses that support maintaining the current NSPS. EPA is required to examine all relevant data and articulate a satisfactory explanation for its action, including a "rational connection between the facts found and the choice made." *State Farm*, 463 U.S. at 43; *see also Genuine Parts Co. v. Envtl. Prot. Agency*, 890 F.3d 304, 313 (D.C. Cir. 2018) (holding that EPA failed to consider an important aspect of the problem by ignoring relevant evidence in the rulemaking record). This explanation requires EPA to provide "sufficient clarity or specificity" that goes beyond a mere "conclusory statement," to weigh competing views, to examine the relevant information, and to show that the data relied upon is accurate and defensible. *Am. Min. Cong. v. Envtl. Prot. Agency*, 907 F.2d 1179, 1190–91 (D.C. Cir. 1990); *Int'l Fabricare Inst. v. Envtl. Prot. Agency*, 972 F.2d 384, 392 (D.C. Cir. 1992); *FERC v. Elec. Power Supply Ass'n,* 136 S. Ct. 760, 784 (2016); *Dist. Hosp. Partners v. Burwell*, 786 F.3d 46, 57 (D.C. Cir. 2015). Agencies must use "the best information available" in reaching their conclusions, and cannot lawfully rely on outdated

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VOC emissions from these sources and the mitigation techniques available to control them," including an abundance of available, adequately demonstrated, and cost-effective technology to limit methane and VOC emissions. 80 Fed. Reg. at 35,842, 35,827, 56,595. The Agency also found that the 2016 Rule would achieve cost-effective emission reductions, explaining what it considered to be a reasonable threshold for cost-effectiveness and why the various requirements were determined to be cost-effective. *Id.*

[82] *See also Pub. Citizen*, 733 F.2d at 98 (agency must "'cogently explain'" basis for suspending rule) (quoting *State Farm*, 463 U.S. at 48); *Organized Village of Kake v. USDA*, 795 F.3d 956, 968-969 (9th Cir. 2015); *AMB Onsite Services-West v. NLRB*, 849 F.3d 1137, 1146 (D.C. Cir. 2017).

[83] *See Perez v. Mortg. Bankers Ass'n*, 135 S. Ct. 1199, 1209 (2015). *See Air All. Houston*, 906 F.3d at 1067; *Am. Petroleum Inst. v. Envtl. Prot. Agency*, 862 F.3d 50, 69 (D.C. Cir. 2017); *see also Organized Village of Kake*, 795 F.3d at 959 (rejecting agency's policy reversal that was premised on factors that "the prior rulemaking had specifically considered and rejected" and that relied on "contradictory factual findings without any additional environmental analysis or material change in 'the overall decisionmaking picture.'"); *Humane Society of the United States v. Locke*, 626 F.3d 1040, 1051 (9th Cir. 2010) (finding an agency action arbitrary and capricious because it did not confront "inconsistencies" between the previous factual record and new facts considered in repealing a rule).

information as circumstances change. *Flyers Rights Education Fund v. FAA*, 864 F. 3d 738, 745 (D.C. Cir. 2017); *cf. Catawba County v. EPA*, 571 F.3d 20, 45 (D.C. Cir. 2009). To that end, EPA may not rely on a preferred data set to justify a rule while disregarding or failing to address stronger evidence pointing in the opposite direction. *Ctr. for Biological Diversity*, 900 F.3d and 1071; *see also Dist. Hosp. Partners, L.P. v. Burwell*, 786 F.3d 46, 56–57 (D.C. Cir. 2015) ("[A]n agency cannot ignore new and better data."); *Sierra Club v. . Envtl. Prot. Agency*, 671 F.3d 955, 968 (9th Cir. 2012) ("[W]e should not silently rubber stamp agency action that is arbitrary and capricious in its reliance on old data without meaningful comment on the significance of more current compiled data.").

Indeed, the Proposal is truly remarkable for the thorough lack of any evidence or reasoned analysis to support the course of action that EPA now prefers: to substantially weaken the NSPS. The only thing that seems to explain the Proposal is the fact that White House officials at the Office of Management and Budget ("OMB") exerted sustained and considerable pressure on EPA to relax the 2016 standards. In other words, the Proposal reflects this administration's sustained attack on climate and clean air protections; it is not the result of reasoned agency decisionmaking. This is made plain from documents contained in the administrative docket. *See* Appendix B, *Communications between White House and EPA*. If technical considerations and actual reasoned analysis had been paramount, EPA would have had no basis to revise the NSPS. As a result, the Proposal is arbitrary and capricious.

In the discussion that follows, we discuss this conclusion with regard to EPA's specific proposed changes to the current NSPS. While the discussion focuses on EPA's proposed approach to weakening certain standards, our critique applies equally to any alternative approach EPA may pursue that would weaken standards below those required by the 2016 Rule. Indeed, to the extent the agency revisits these standards at all, the only reasonable action that is consistent with EPA's statutory mandate and the record evidence is to strengthen the 2016 requirements.

A. The proposed changes to the fugitive emissions requirements undermine the efficacy of the NSPS at reducing pollution and are unsupported by the evidence.

In the Proposal, EPA seeks to weaken the monitoring frequency requirements for all well sites (and, in particular to, relax requirements for the newly-proposed subcategory of "low production" wells) and compressor stations, and extend the time allowed for repairs of detected leaks. If the Proposal is finalized, the result would be a dramatically weaker set of standards that allow significant additional emissions of methane, VOCs, and HAPs. By EPA's own estimates, the Proposal will result in up to 480,000 tons of methane pollution, 124,000 tons of VOC pollution, and 4,690 tons of HAP pollution by 2025. 83 Fed. Reg. at 52,059, 52,060. As discussed herein, these proposed changes violate EPA's duties under the Clean Air Act and are arbitrary and capricious.

1. EPA's proposed changes to fugitive emissions requirements at non-low-production wells are arbitrary, unlawful, and unsupported by the evidence.

For well sites with at least 15 barrels of oil equivalent ("BOE") production per day, EPA proposes to double the required interval between inspections for fugitive emissions—from semiannual to annual inspections. EPA attempts to justify this weakening of the standards *not* based on its updated analysis in the TSD or other supporting documents—which EPA acknowledges show that "semiannual monitoring may appear to be cost-effective"—but instead on so-called "concerns" or "uncertainties" that EPA alleges may have caused the agency to have "overestimated the emission reductions and, therefore, the cost effectiveness" of semiannual monitoring. 83 Fed. Reg. at 52,062.

EPA's proposed change to annual monitoring for non-low-production well sites is unlawful for at least four critical reasons: (1) it is unsupported by the agency's own analysis, which shows semiannual monitoring to be cost-effective for reducing both methane and VOC pollution, and the agency cannot rely on vague "concerns" to justify a change that runs contrary to the agency's own evidence; (2) the alleged concerns and uncertainties identified by the agency cannot legally support EPA's proposed change and, in any event, are factually incorrect; (3) the industry data cited by EPA are deeply flawed (as the agency itself recognizes) and do not support a weakening of the standards; and (4) the best available evidence indicates that methane emissions from the oil and gas sector in general, and non-low-production wells in particular, are far higher than estimated by EPA, costs of monitoring are lower than estimated by EPA, and therefore the agency is *underestimating* the emissions reductions achieved by the current NSPS, along with the cost-effectiveness of those reductions.

a. EPA's own analysis supports semiannual monitoring at non-low-production wells.

EPA's proposal to reduce the monitoring frequency at non-low-production wells from semiannual to annual monitoring is contradicted by the agency's own analysis. Both EPA's analysis in support of the NSPS and the 2018 Proposal and its supporting documents demonstrate that semiannual monitoring is the BSER because it is feasible, cost-effective, and delivers necessary emission reductions.

EPA's findings in the 2016 Rule and supporting analyses were rigorous and amply support the finding that semiannual monitoring was the BSER. In its 2016 rulemaking, EPA analyzed optical gas imaging ("OGI") and Method 21 monitoring at annual, semi-annual, and quarterly frequencies. EPA concluded that semi-annual OGI monitoring was the BSER for fugitive emissions surveys and, upon further analysis, that Method 21 was an acceptable alternative option.

In order to conduct its analysis of the BSER in both the 2016 Rule and the 2018 Proposal, EPA first developed model plant emissions baselines based on component counts and emissions

factors.[84] EPA then evaluated control techniques for fugitive emissions from production facilities and compressor stations. EPA analyzed three parameters of LDAR, including (1) emissions reduction potential, (2) cost impacts, and (3) secondary impacts. The emissions reduction potential analysis in the 2018 TSD indicates no change in reduction potential percentages for the frequencies analyzed in the 2016 TSD. *Compare* 2016 TSD at 39-42 *with* 2018 TSD at 23-26. EPA also did not change any assumptions or findings in the secondary impacts section. In fact, the secondary impacts section in the 2018 TSD appears unchanged from the 2016 TSD, as it outlines impacts for semiannual LDAR at well sites and quarterly LDAR at compressor stations. *Compare* 2016 TSD at 46 *with* 2018 TSD at 30. The only update EPA made to its cost assumptions in the 2018 TSD was to apply a GDP Inflator value to the costs in the 2016 TSD, but this does not reflect substantive changes in capital or operating cost assumptions. *See* 2018 TSD at 27.[85]

In addition to this minor change in cost assumptions, there are two other impacts to cost-effectiveness for the various monitoring frequencies in the 2018 TSD: the separation of low-producing facilities from non-low producing ones, and updates to the baseline emissions for model plant well sites. In its 2018 TSD analysis, EPA finds the cost-effectiveness for semiannual monitoring at non-low producing wells is actually better (i.e., more cost-effective) than the cost-effectiveness for semiannual LDAR at well sites represented in the 2016 TSD. As discussed below, the baseline emissions assessed by EPA for non-low producing wells increased from the 2016 TSD to the 2018 TSD, resulting in both more substantial and more cost-effective reductions.

EPA provides no explanation for why semi-annual LDAR is identified as BSER in the 2016 TSD, but not in the 2018 TSD, especially considering that, for non-low producing wells, the cost-effectiveness and overall reductions are better in the 2018 TSD. Given that most parameters considered in the BSER analysis do not change and that the changes to the baseline calculations make semi-annual LDAR an even more cost-effective option than presented in the

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[84] EPA calculates uncontrolled leak emissions from these sites using a two-step process: (1) Create model plants, each with an inventory of fugitive emissions components—that is, equipment components which are susceptible to leaks and therefore a source of possible fugitive emissions. The model plant also tracks the service for each component—the fluid handled by the component (gas, light liquid, or heavy liquid). (2) Multiply the component count, in various fluid services, by emissions factors appropriate for those components, in the various services. A single emissions factor is used for each component/service; this emissions factor is appropriate for uncontrolled emissions and accounts for the fact that components without LDAR programs in place, some components will leak (with various emission rates) and others will not have detectable leak emissions. The sum of the products of the component counts and the emission factors gives the baseline (uncontrolled) fugitive emissions from the model plant. The occurrence rate of fugitive emissions – that is, the percentage of components with detectable leaks – is not used in this calculation. *See* 2016 TSD at 28-32; 2018 TSD at 5-12.

[85] In order to compare appropriately, the EPA 2018 TSD costs are calculated in 2016 dollars ("$2016"). The GDP Deflator value is 1.058919, as updated by the Federal Reserve Economic Data on January 26, 2018.

2016 TSD, there is no justification for EPA's decision to change BSER for LDAR to a lower frequency at non-low producing well sites.[86]

In the 2018 Proposal, EPA has largely retained the analyses that underlay the 2016 Rule, and the changes that EPA did make to its non-low-production model facility actually show that semiannual monitoring is even *more* effective than estimated in the 2016 Rule. EPA itself acknowledges that "under the updated analysis, semiannual monitoring may appear to be cost-effective." 83 Fed. Reg. at 52,062. EPA's updates to well site model facility in the 2018 Proposal *increase* methane emissions at model facility, and therefore *increase* the emissions reductions achieved by semiannual LDAR compared to the 2016 NSPS analysis. As a result, semiannual LDAR is even *more* cost-effective than EPA initially projected.

In the 2018 Proposal, EPA updated its model non-low-production well site to add emissions associated with one controlled storage vessel per model plant and an emissions factor for pressure relief devices (PRDs), such as thief hatches and pressure relief valves (PRVs). Environmental Commenters support the addition of storage vessel emissions to the model facility as these are significant sources of emissions and (as EPA recognizes) fall squarely within the definition of fugitive emission subject to the Rule. However, as EPA notes, the agency's own updated approach likely still *significantly underestimates* the emissions associated with storage tanks. First, EPA uses data from a study that utilized helicopter-based OGI monitoring to create an emissions factor for PRDs—however, that study only identified large emissions due to detection limitations with aerial OGI monitoring, and thus provides a lower-bound estimate of emissions from storage tanks and PRDs. As EPA "acknowledge[s]… emissions are likely underestimated when using this information because small or medium sized emissions would not be visible during an aerial OGI survey." 83 Fed. Reg. at 52,063. Furthermore, EPA assumes that detected emission sources have an emission rate of exactly 1 gram of methane per second, based on the study's detection limit of 1 – 3 grams hydrocarbons per second. In reality, detected sources could emit at a rate much higher than the detection limit, and therefore EPA's estimate is a very conservative lower bound.[87]

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[86] EPA's changes at low-production well sites are likewise unfounded, which we discuss below. *Infra* § V(1)(e)(2).

[87] A more accurate estimate of tank fugitive emissions can be determined from Alvarez *et al.* 2018, a peer-reviewed paper published in *Science* in June 2018 (discussed more fully below). Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCIENCE 186 (2018) http://science.sciencemag.org/content/361/6398/186. The paper synthesized multiple data sources including site-level measurements from over 400 U.S. well pads to estimate that 2015 national oil and gas supply chain methane emissions are 13 million metric tons CH4. Based on a comparison to site-level estimates, 4.2 MMT CH4 was attributed to abnormal and otherwise avoidable emissions at onshore production sites. This value is approximately four times higher than an estimate based on the EPA PRD emission factor. Although "abnormal emissions" from Alvarez *et al* is more inclusive than controlled tank fugitive emissions, it is appropriate to use in this context because the emissions represent sources that could be detected and mitigated during leak detection and repair surveys. This potentially

EPA acknowledges that its updates to its model facility analysis *increase* methane emissions at the model facility, and therefore *increase* the emissions reductions achieved by semiannual LDAR compared to the 2016 NSPS analysis: "By adding storage vessels to the model plant, base emissions from a well site are estimated to be larger, and the reductions due to the monitoring and repair requirements have also increased compared to the base emissions and emission reduction estimates used in the 2016 NSPS OOOOa RIA." 2018 RIA at 1-4-1-5. Indeed, EPA's baseline emissions increase for natural gas well sites from 5.50 tons/year of methane in the 2016 analysis to 5.91 tons/year of methane in the 2018 analysis; for oil well sites with a gas-to-oil ratio ("GOR") of less than 300 from 1.23 tons/year of methane in the 2016 analysis to 2.06 tons/year of methane in the 2018 analysis; and for oil well sites with a gas-to-oil ratio (GOR) of more than 300 from 2.75 tons/year of methane in the 2016 analysis to 3.0 tons/year of methane in the 2018 analysis. 2016 TSD at 31-32; 2018 TSD at 20. Due to the increase in the amount of baseline emissions, EPA's 2018 analysis also shows that the emissions reductions benefits of semiannual monitoring are greater than the agency estimated in 2016.

As a result of these additional emissions reductions, EPA's 2018 analysis shows that semiannual monitoring is actually significantly *more* cost-effective, on a dollars-per-ton-of-methane-reduction basis, than the agency found was reasonable in the 2016 standards. In the 2016 NSPS, the agency found that "control costs for both semiannual and annual monitoring are cost-effective," and finalized semiannual monitoring as the BSER because semiannual monitoring secured greater emissions reductions than annual monitoring. 81 Fed. Reg. at 35,856. In the 2016 analysis, the agency calculated annual control costs for semiannual monitoring of $1,415/ton of methane reduction without gas savings and $1,183/ton of methane with gas savings, under a single pollutant approach. 2016 TSD at 54. In the 2018 analysis, EPA now estimates that semiannual monitoring for non-low-production wells is significantly less expensive, with annual control costs of $1,164/ton of methane reduction without gas savings and $965/ton of methane with gas savings. 2018 TSD at 32. Essentially, the agency's own updated 2018 analysis shows that semiannual monitoring is actually nearly *20% less costly* than what the agency found to be "cost-effective" in the 2016 NSPS.[88] Table 2, below, summarizes EPA's own changes in methane emissions factors and cost-effectiveness of semiannual monitoring between the 2016 Rule and 2018 Proposal.

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could include sources from uncontrolled storage tanks, such as a stuck separator dump valve that causes produced gas to be emitted out the tank hatch.

[88] There are slight differences in the cost-effectiveness numbers in the 2016 Rule and the 2018 proposal due to the agency's updates of costs to 2018 dollars.

Table 2: Baseline Methane Emissions, Reductions, and Cost-Effectiveness for Semiannual Monitoring at Non-Low-production Sites (Comparison Between 2016 and 2018 EPA Analysis)

	Baseline Emissions (tpy)		Emissions Reductions (tpy) (60% reduction)		Cost-Effectiveness Methane Single Pollutant ($/ton)			
					Without Savings		With Gas Savings	
	2016	2018	2016	2018	2016	2018	2016	2018
Gas Well	5.50	5.91	3.3	3.546	$1,415	$1,164	$1,183	$965
Oil Well >300 GOR	2.75	3.0	1.65	1.8				
Oil Well <300 GOR	1.23	2.06	0.738	1.236				

In the 2018 Proposal, EPA has not explained why it is now finding that semiannual monitoring for non-low-production wells is not cost-effective, despite the fact that the control costs per ton of methane reduction are far lower than what the agency found cost-effective in the 2016 NSPS. EPA has not even explained how it is evaluating what is "cost-effective," including what dollars-per-ton of emissions reductions range it would find to be cost-effective, much less explained how its changes to the standards based on its new "cost-effective" determinations are justified under the BSER standard of the Clean Air Act.

In the Proposal, EPA does not explain what its threshold for cost-effectiveness is, whether it agrees or disagrees with the agencies prior cost-effectiveness thresholds, why it thinks its alleged uncertainties push the requirements above some unstated cost-effectiveness threshold, whether it agrees or disagrees that cost-effectiveness should be judged by comparison to industry capital expenditures or revenue, or *any* of the relevant factors to lawfully considering cost-effectiveness. EPA cannot "simply disregard contrary or inconvenient factual determinations," *Fox Television*, 566 U.S. at 537 (Kennedy, J., concurring), and would implement a weaker standard that is completely unmoored to the factual record before the agency.

EPA states that it "applied the two approaches used in the 2016 NSPS OOOOa (single and multipollutant approaches) . . . ." 83 Fed. Reg. 52065. This is true as far as it goes, but what EPA does not explain is why—notwithstanding that it concluded that under both approaches the NSPS is *more cost-effective* for non-low-production wells than EPA previously found—it is now seeking to weaken the NSPS. In 2016, EPA's calculation of the cost-effectiveness of various standards was only part of EPA's cost consideration approach. In addition to calculating the cost

per ton of emission reduced in the 2016 Rule, EPA also performed a capital expenditures analysis and an annual revenues analysis "to further inform our determination of whether the cost of control is reasonable," 80 Fed. Reg. 56,617, approaches EPA failed to take here. Each analysis was thoroughly analyzed and integral to EPA's cost consideration for the purposes of its BSER determination, yet EPA disregarded those analyses entirely in the cost consideration for the Proposal.

In the place of those two analyses, the 2018 TSD instead presents "incremental" costs—the additional cost incurred to achieve any additional emission reductions between options—using *only* a single pollutant approach. 2018 TSD 58-62. This analysis is problematic, both because it relies solely on a single pollutant approach for evaluating control costs, and because looking at the marginal cost of additional emissions reductions under different monitoring stringencies presents a skewed perspective on the value of those emissions reductions. First, as EPA explains, under the single pollutant approach for evaluating cost effectiveness, "all costs are applied to one pollutant and zero cost to the other." 2018 TSD at 59. The NSPS has important benefits in reducing *both* dangerous methane and dangerous VOC emissions. Ascribing the full costs of any regulation that drives both of these reductions to only one of them (as is done under the single-pollutant approach) would constitute double-counting of costs, and be arbitrary and capricious.[89] EPA noted as much when it first considered these standards in 2015: the single pollutant approach "over-estimates the cost of obtaining emissions reductions with a multipollutant control as it does not recognize the simultaneity of the reductions achieved." 80 Fed. Reg. at 56,617. EPA does not explain why it considers a single pollutant approach appropriate in light of the agency's prior determination. Furthermore, EPA never explains how it compares the incremental costs between different stringency levels. Simply looking at the "incremental" difference in costs between different stringency levels ignores the benefits of *emissions reductions* under different stringencies. Indeed, evaluating this metric is simply another way the agency overstates costs and understates benefits.

The most glaring departure from the 2016 cost consideration approach, however, is EPA's utter lack of explanation for how it compared the cost-effectiveness of different LDAR frequencies, and why it determined that the cost-effectiveness of semiannual LDAR is unacceptable. In the 2016 Rule, EPA provided reasoned explanations for what costs were reasonable, comparing the results of its analyses with prior rulemakings and examining costs in light of overall industry revenues and capital expenditures. Here, EPA completely fails to provide the same level of explanation for how it determines costs are unreasonable, or explain why it has departed from its prior conclusions. The Agency has also failed to provide a good reason (nor is there one grounded in the statute) for why EPA can now completely change the way it approached cost considerations. EPA must explain whether it takes a different view of what is a reasonable level of cost-effectiveness than it did in 2016. If so, it must explain why thresholds that it earlier concluded were cost-effective it no longer considers cost-effective. Indeed, EPA does not even seek to explain, *see Fox Television*, 566 U.S. at 537, why it believes the "uncertainties" worsen the cost-effectiveness so much as to fall below the thresholds it earlier deemed reasonable (perhaps because any such explanation would be unlawful under the statute).

[89] *See* CATF et al. Comments at 20.

Ultimately, while EPA claims that it "identified several areas of our analysis that indicate we *may* have overestimated the emission reductions and, therefore, the cost effectiveness, due to gaps in available data and factors that *may* bias the analysis towards overestimation of reductions," 83 Fed. Reg. at 52,062 (emphasis added), EPA has identified no evidence that would change the parameters of its 2016 analysis. The agency therefore cannot rely on these alleged "concerns" to adopt a monitoring frequency that is not supported by the analysis that the agency did conduct—particularly when in its updated analysis, the agency acknowledged it had previously *underestimated* emissions, and therefore underestimated the cost-effectiveness of semiannual monitoring.

b. EPA's so-called "concerns" regarding emissions reductions achieved by semiannual monitoring do not support a weakening of the standards.

EPA identifies three "concerns" that it alleges may have caused the agency to overestimate emissions reductions achieved by semiannual monitoring: (1) the percent emission reduction achieved by OGI inspections at different monitoring frequencies; (2) the occurrence rate of fugitive emissions at different monitoring frequencies; and (3) the initial percentage of components identified with fugitive emissions. 83 Fed. Reg. at 52,063.

It is arbitrary for EPA to rely on alleged "concerns" to make changes unsupported by the agency's analysis. EPA's vague and unsupported allegations of "uncertainty" cannot serve as its "reasoned explanation." *See Pub. Citizen v. Fed. Motor Carrier Safety Admin*., 374 F.3d 1209, 1221 (D.C. Cir. 2004) ("Regulators by nature work under conditions of serious uncertainty, and regulation would be at an end if uncertainty alone were an excuse to ignore a congressional command to 'deal[ ] with' a particular regulatory issue."); *Small Refiner,* 705 F.2d at 531 ("As an initial matter, we cannot agree with EPA's view of how much factual support it needs to justify a decision to regulate. EPA has undoubted power to regulate even where the evidence is difficult to come by, uncertain, or conflicting. But the agency must make a reasonable effort to develop the facts. Where it has not made that effort, EPA cannot regulate on the basis of a guess about what the facts might be.") (internal quotations omitted).

Moreover, *none* of EPA's concerns support the change from semiannual to annual monitoring—either because the evidence EPA cites for the basis for its concern suggests EPA *underestimated* emissions reductions achieved with semiannual monitoring, as with EPA's concern regarding the percent emission reduction achieved by OGI, or because the issue itself is utterly unrelated to site-level methane emissions and may even indicate that EPA overestimated the costs of the standards, as with the change in percentage of leaking components over time and the initial percentage of leaking components. Furthermore, the agency's evaluation of the industry data that allegedly supports these concerns indicates that EPA did not find the evidence credible (as discussed in detail in Appendix C, *EPA Critique of Industry Analyses*). At the same time, extensive evidence supports EPA's 2016 determinations (maintained in the TSD for the Proposal) regarding the emissions reductions achieved by semiannual monitoring. Indeed, as discussed *infra*, current evidence indicates EPA is actually underestimating the emissions

reductions achieved by semiannual monitoring. Finally, EPA's approach to these "uncertainties" is arbitrary because the agency has only credited uncertainties that it believes (wrongly) might support a weakening of the standards, and disregards uncertainties that the agency has in support of strengthening the standards. Each of the alleged uncertainties is discussed below.

i. The percent emission reduction achieved by OGI inspections at different monitoring frequencies

The first "concern" raised by EPA relates to the percent emission reduction achieved by OGI inspections at different monitoring frequencies. 83 Fed. Reg. at 52,063. Remarkably, for this proposition, EPA cites an industry-sponsored report that suggests that the EPA's estimated control efficacy of quarterly OGI inspections is *too low*, and that EPA relied on a comparison to Method 21 control effectiveness to derive OGI control effectiveness. *Id.* at 52,064. This so-called concern related to the control effectiveness of OGI does not support weakening the fugitive emissions monitoring frequency—if anything, the industry-supplied data suggests that semiannual monitoring actually secures *greater* emissions reductions than estimated by EPA (and is therefore *more* cost-effective).

Notably, EPA evaluated, and rejected, similar issues when raised by industry in the 2016 rulemaking:

> The potential emission reduction percentages used for the BSER analysis for the final rule are based on fugitive emissions data from the EPA Equipment Leak Protocol document and EPA's engineering judgment and not fully on the Colorado cost-benefit analysis. We reviewed data from the Colorado cost benefit analysis, ICR leak analysis and calculated emission reductions by monitoring frequency and leak definition using data and procedures in the EPA Protocol document. In addition, we performed a sensitivity analysis based on the midpoints of the Method 21 emission reduction efficiency percentages, which were determined to be 55, 65, and 75 percent for annual, semiannual and quarterly monitoring, respectively. Even based on this conservative analysis, the EPA finds that the chosen monitoring frequencies are the BSER for these sources. The EPA additionally concluded that the 40, 60, and 80 percent emission reduction efficiency percentages are reasonable and accurate.

EPA, *Responses to Public Comments on the EPA's Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources* ("2016 RTC"), Dkt. No. EPA-HQ-OAR-2010-0505-7632, Ch. 4, 4-27 to 4-28 (May 2016) at 4-27 to 4-28. EPA has arbitrarily failed to explain why it now finds industry concerns warrant a change in the standards, when it previously rejected similar arguments. *See Organized Village of Kake*, 795 F.3d at 959 (rejecting agency's policy reversal that was premised on factors that "the prior rulemaking had specifically considered and rejected" and that relied on "contradictory factual findings without any additional environmental analysis or material change in 'the overall decisionmaking picture.'")

During its reconsideration, EPA evaluated the specific concerns raised by industry on this topic, and again found them unpersuasive. *See* EPA Analysis of Fugitive Emissions Data Provided by INGAA, Docket ID No. EPA-HQ-OAR-2017-0483-0038 ("EPA INGAA Memo"). EPA found the Canadian Association of Petroleum Producers report ("CAPP report"), cited by industry for the proposition that annual monitoring could secure an 80% emission reduction (which is significantly *higher* than the 40% reduction EPA had estimated). EPA specifically noted that because the programs evaluated in the CAPP report "were not regulatory actions and no information is provided in the 2014 study to demonstrate the *exact monitoring method/instrument*, *monitoring frequency*, or repair schedule for the facilities represented, EPA is not able to conclude any details about the specific monitoring programs implemented at the individual facilities." *Id.* (emphasis added).

As EPA has noted in the EPA INGAA Memo,[90] there are a number of reasons that the purported drop in leak emissions noted in the CAPP study should not be simplistically attributed to the presence of annual leak detection inspections. Most notably, the CAPP study compares measurement campaigns separated by many years, on many different facilities. As EPA noted, "only one company provided actual measurements of identified fugitive emissions for the 2014 CAPP study."[91] Additionally, the two studies that CAPP compares to estimate the change in emissions factors for components both heavily relied on estimated component counts, based on equipment counts, process diagrams, etc., rather than direct component counts. In 2014, only one company collected direct component counts, while the other six companies estimated their component counts;[92] the situation was similar in the previous study that CAPP uses to calculate "baseline" emissions in their study.[93] As CAPP noted in 2014, these estimates can be inaccurate.[94] Since the CAPP study is calculates component-weighted emissions and uses emissions factors derived by dividing identified emissions by total component counts, inaccuracies in the component count (for either the 2014 CAPP study or the previous "baseline" study) call into question the accuracy of the results.

Furthermore, even if the CAPP report were reliable evidence, it actually suggests that EPA *underestimated* the emissions reductions achieved by semiannual monitoring. In both its 2018 analysis and 2016 analysis, EPA estimates emission reductions of 40 percent for annual monitoring, 60 percent for semiannual monitoring, and 80 percent for quarterly monitoring. 83 Fed. Reg. at 52,063. According to industry, the CAPP report supports *higher* control effectiveness for OGI—90% emissions reductions with quarterly monitoring and 80% emissions reductions with annual monitoring, which suggests semiannual monitoring would result in emissions reductions between 80-90%—a control that would be higher than the 60% estimated by EPA. *Id.* at 52,064. In other words, the CAPP report actually suggests emissions reductions

[90] EPA INGAA Memo at 2-3.
[91] *Id.* at 3.
[92] CAPP 2014 Study at 6.
[93] CAPP. 1992. A Detailed Inventory of CH4 and VOC Emissions from Upstream Oil & Gas Operations in Alberta, Vol II, Development of the Inventory, Appendix 8.1 "Equipment Schedules", Picard et al, March 1992.
[94] CAPP 2014 Study at 44.

under the standards in the 2016 Rule are *higher* (and corresponding cost-effectiveness is better) than estimated by EPA, directly contradicting the conclusion that EPA draws from the alleged uncertainties that "emission reductions may have been overestimated." *Id.* at 52,063. Indeed, EPA cites no other evidence that the effectiveness of OGI LDAR is overstated.

While industry alleges EPA improperly relied on Method 21 control effectiveness to derive OGI effectiveness, as EPA explains, "while the effectiveness of the alternative Method 21 program was evaluated, it was not the sole basis of our assumptions for OGI." EPA INGAA Memo at 2. Both EPA's own analysis and independent analysis support EPA's estimate of emissions reductions of 40% with annual OGI monitoring, 60% with semiannual OGI monitoring, and 80% with quarterly OGI monitoring.

In the 2016 Rule, EPA derived its estimates about the emissions reductions achieved by OGI at different monitoring frequencies based on extensive analysis, including:

- An EPA white paper that found potential emission reductions from OGI monitoring and repair varied from 40 to 99 percent.
- A report from the Colorado Air Quality Control Commission, which estimated 40 percent reduction for annual OGI monitoring for well production tank batteries with uncontrolled VOC emissions of greater than 6 tpy or less than or equal to 12 tpy (≥ 6 to ≤ 12 tpy), 60 percent reduction for quarterly OGI monitoring for well production tank batteries with uncontrolled VOC emissions of greater than 12 tpy and less than or equal to 50 tpy (> 12 to ≤ 50 tpy), and 80 percent reduction for monthly OGI monitoring at well production tank batteries with an uncontrolled VOC emission greater than 50 tpy (> 50 tpy).
- Method 21 data from the EPA Protocol document, from which EPA estimated the percent reductions from semiannual monitoring to be 55 percent at a leak definition of 10,000 ppm and 75 percent reduction at a leak definition of 500 ppm; and potential emission reduction percentages for annual monitoring to be 42 percent at a leak definition of 10,000 ppm and 68 percent at a leak definition of 500 ppm.[95]
- A study performed by ICF using data from Subpart W, EPA/ GRI, City of Fort Worth Natural Gas Air Quality Study, UT Study - Methane Emissions in the Natural Gas Supply Chain: Production, UT Study - Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States Pneumatic Controllers and Jonah Energy LLC WCCA Spring Meeting Presentation, which determined that the Year 3 fugitive emissions reductions from a quarterly LDAR program were 78 percent.

2016 TSD at 40-42; 2018 TSD at 24-26. Based on this detailed set of analyses and data, EPA reasonably determined that "an OGI monitoring program in combination with a repair program

[95] EPA elaborated on the relationship between Method 21 instrument readings and OGI detection capabilities in the 2018 TSD: "[B]ased on our current understanding of OGI technology and the types of hydrocarbons found at oil and natural gas well sites and compressor stations, the emission reductions from an OGI monitoring and repair program likely correlate to a Method 21 monitoring and repair program with a fugitive emissions definition somewhere between 2,000 to 10,000 ppm." 2018 TSD at 25.

can reduce fugitive methane and VOC emissions from these segments by 40 percent on an annual frequency, 60 percent on a semiannual frequency and 80 percent on a quarterly frequency." 2018 TSD at 26. Furthermore, to be conservative, EPA conducted a sensitivity analysis of potential emissions reductions using the midpoint estimates from the Method 21 data, and found "comparable" emissions reductions. 2016 TSD at 42. In the Proposal, EPA has failed to explain why it now has "concerns" regarding this detailed and well-supported analysis, much less how those concerns justify a change in the standards.

In addition to the analyses relied upon by EPA and discussed above, new analysis supports EPA's estimate of emissions reductions of 40% with annual OGI monitoring, 60% with semiannual OGI monitoring, and 80% with quarterly OGI monitoring.[96] This analysis, conducted by Dr. Arvind Ravikumar, simulates emissions mitigation achieved under annual, semi-annual, and quarterly LDAR surveys using OGI-based technologies at natural gas production well sites, using the Fugitive Emissions Abatement Simulation Toolkit ("FEAST") developed at Stanford. FEAST is a dynamic simulation tool that models the evolution of leaks over time at natural gas facilities. The Ravikumar Analysis, which uses EPA's per-site baseline emissions estimates (which, as discussed below, likely significantly underestimate emissions), finds that emissions reductions achieved at different monitoring frequencies are in the range estimated by EPA, predicting emissions reductions of 32% at an annual OGI monitoring frequency and approximately 54% at a semiannual OGI monitoring frequency. This analysis further supports EPA's estimate of emissions reductions of 40% with annual OGI monitoring, 60% with semiannual OGI monitoring, and 80% with quarterly OGI monitoring.

ii. The occurrence rate of fugitive emissions at different monitoring frequencies

EPA's second "concern" is that because EPA assumed "that the percentage of components found with fugitive emissions is the same regardless of the monitoring frequency," EPA "may have overestimated the total number of fugitive emissions components identified during each of the more frequent monitoring cycles." 83 Fed. Reg. at 52,064. EPA does not explain how a change in the percentage of components found with fugitive emissions at different monitoring frequencies would have led the agency to overestimate emissions reductions, and there is no support for that proposition in the agency's own analysis of site-level emissions. This is because, as discussed in detail in our discussion of EPA's third "concern," EPA did not incorporate the percentage of leaking components into its site-level emissions estimates, and therefore "*the emissions are not affected by any changes in the percent leaking values used*." 2018 TSD at 63 (emphasis added). This decision to exclude the percentage of leaking components from emissions estimates is well-grounded, as we explain below, because leaks are stochastic with a highly skewed distribution—they occur randomly and a small number of leaks are responsible for signification emissions. The number of leaking components is therefore not correlated with total site-level fugitive emissions.

[96] Appendix D, Arvind Ravikumar, Impact of Survey Frequency on Emissions Mitigation at Oil and Gas Sites (December 2018) ("Ravikumar Analysis").

Indeed, if the number of leaks does decline with subsequent inspections, while that is irrelevant for determining site-level emissions reductions, it does suggest that EPA *overestimated the repair costs* associated with semiannual monitoring, as the number of repairs could be less than the 8 components with fugitive emissions that EPA assumes will need to be repaired per year with semiannual monitoring. *See infra*; *see also* 83 Fed. Reg. at 52,064.

Finally, evidence suggests that while the number of leaks detected with fugitives monitoring does decline over time, there is a leveling off of the number of leaks detected after initial inspections to a steady state, underscoring the need for frequent monitoring to identify high fugitive emissions events soon after they occur. Data from the Colorado Department of Public Health and Environment in its annual LDAR Report for the 2017 reporting year[97] ("2017 Colorado Report") suggests that while the number of leaking components reported does decline after initial inspections, the number of leaking components appears to level off to a steady state with time, indicating that frequent monitoring does continue to detect new leaking components. Moreover, continued, frequent LDAR is essential to maintain this lower, steady-state and prevent affected sites from reverting back to pre-inspection levels of fugitive emissions.

The 2017 Colorado report summarizes data submitted by 138 companies covering 562,021 inspections[98] at 20,719 different facilities; on average there were 27 inspections per facility during the year, or approximately one every two weeks at each facility. During these inspections, a total of 17,254 leaks were detected, and 16,975 of them were repaired before the end of the reporting year. At the end of the reporting period only 324 leaks remained on the "Delay of Repair" list for these companies. The most common components found with leaks were connectors, valves, and pressure relief devices, in order—these component types accounted for 93 percent of detected leaks. The reported data strongly supports the need for frequent LDAR at natural gas production facilities to reduce total methane losses.

Despite a relatively high inspection frequency (every two weeks on average, compared to every 6 months under semiannual fugitives monitoring as required in the current NSPS),[99] detected leaks have not fallen to zero in Colorado. Instead, while the number of leaks detected fell significantly from the first to the second year of implementation of Colorado's LDAR program, the number of detected leaks decreased only marginally from the second to third year of the program, as shown in Figure 4 below.

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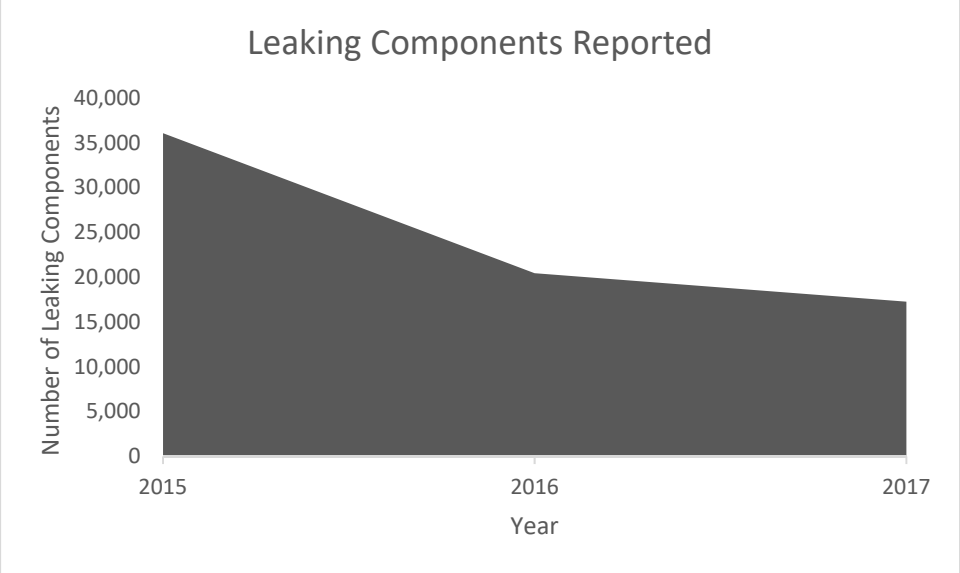
[97] Colorado Department of Public Health and the Environment, *LDAR Annual Report (2017) Summary* (Aug. 22, 2018) https://www.colorado.gov/pacific/cdphe/2017-ldar-annual-reports-regulation-7-section-xvii.

[98] These inspections include both those that utilize an approved instrument method to detect leak (i.e. Method 21 or OGI), and those that utilize only audio, visual, and olfactory inspection methods.

[99] This includes non-instrument based inspection, though, when looking only at instrument-based requirements, Colorado's average inspection frequency is still greater than twice per year.

Figure 4: Number of Leaking Components Detected 2015-2017 in Colorado



The reported data shows that leaks can and do occur at any time at a given facility. As a result, frequent, regular inspections are needed to detect new leaks soon after they occur. While LDAR has been effective at reducing leaks in Colorado, the opposite will almost certainly be true as well—if LDAR requirements were relaxed, leak rates would increase to pre-inspection levels.

The Colorado data is consistent with other data from producers[100] and expert analyses[101] which show that frequent LDAR is necessary to reduce leaks and continued, frequent LDAR is necessary to maintain low leak levels.

iii. The initial percentage of components identified with fugitive emissions

The third "concern" raised by EPA to argue that the agency may have overestimated emissions reductions achieved by more frequent monitoring is "the value that the EPA uses as an initial percentage [of components with fugitive emissions] in the model plant analysis." 83 Fed. Reg. at 52,064. EPA cites to information submitted by API to suggest that the agency is "concerned that 1.18 percent [assumption for initial leak rate] is too high," and ultimately that EPA's "analysis may still overestimate emission reductions." *Id.* at 52,065. This "concern" cannot support a weakening of the fugitive emissions standards because the percentage leak rate is irrelevant for determining site-level emissions and emissions reductions, as EPA itself acknowledges, and independent data confirms. The initial leak rate is simply not part of the

[100] *See, e.g.*, Jonah Energy LLC, *Presentation at WCCA Spring Meeting* at 17 (May 8, 2015) https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7062.
[101] *See, e.g.*, ICF International, prepared for Environmental Defense Fund, *Leak Detection and Repair Cost-Effectiveness Analysis* (prepared Dec. 4, 2015; revised May 2, 2016) https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7633.

formula by which EPA calculates emissions and, as the data we discuss below confirms, is not a predictor of site level fugitive emissions. Furthermore, as documented by EPA itself and discussed in detail in Appendix C, EPA did not find the API data reliable and declined to change its assumptions based on that data, which shows a wide range of leak rates that vary significantly with site location.

It is entirely unclear why EPA considers the alleged uncertainty—the initial percent leaking components—to be relevant for evaluating the emissions reductions achieved by the current standards. As EPA explains in the analysis for the Proposal, "since we utilize the average emissions factors [for determining site-level emissions]… *the emissions are not affected by any changes in the percent leaking values used*." 2018 TSD at 63 (emphasis added). In other words, the initial percent of leaking components has no impact on how EPA has calculated emissions at sites, or the emissions reductions achieved by the current standards. Therefore, EPA's attempt to rely on so-called uncertainties about the percent leaking values to justify a weakening of the standards because of alleged concerns that the percent leaking values may have led EPA to overestimate emissions reductions is arbitrary on its face.[102]

As EPA explains, "the *only* effect the percent leaking has on the cost of control is due to a change in the cost of repairs." 2018 TSC at 63 (emphasis added). Despite the criticisms that EPA has about the reliability of the leak rate data submitted by industry,[103] the agency conducted a sensitivity analysis using that data to determine how the cost of control of different monitoring frequencies would change if, indeed, initial leak rates were different than estimated by EPA. That analysis shows that as leak rate declines, the cost-effectiveness of the standards actually *improves*, because repair costs are lower with lower leak rates. *See* 2018 TSD at 64-66. For example, EPA compared the costs of control at well sites between EPA's assumed 1.18% leak rate, and a .54% leak rate derived from API's data. That analysis showed that for semiannual monitoring, the cost of control at a non-low-production well site under the single pollutant approach dropped from $1,164 per ton of methane, assuming a 1.18% leak rate, to $1,140 per ton of methane, assuming a .54% leak rate. *Id.* at 64. In other words, even if EPA did overestimate the initial percentage of leaking components, EPA considered this possibility and the agency's own sensitivity analysis suggests the EPA *overestimated compliance costs* rather than *overestimated emissions reductions*, and thus *underestimated cost-effectiveness.* Indeed, the

[102] Furthermore, in the 2016 Rule, EPA clarified that while it "acknowledge[d] that the highest rate of leaking components is likely to be detected during the initial monitoring, with the percentage of leaking components subsequently leveling off at a lower rate… the *control efficiencies estimated for the analyses represent the later, steady-state conditions and do not reflect the large initial reductions*, which would be achieved regardless of the frequency of subsequent monitoring." 2016 RTC at 4-470 (emphasis added). EPA entirely disregards that factual finding in the Proposal. *See Fox,* 566 U.S. at 537.

[103] *See* EPA, *EPA Analysis of Well Site Fugitive Emissions Monitoring Data Provided by API* (April 17, 2018). This memo, discussed in detail in Appendix C, details EPA's concerns over various uncertainties with API's leak rate data, including the lack of information on well site age, OGI procedures, environmental conditions, production at surveyed sites, the universe of components monitored, and actual equipment counts at surveyed sites.

agency's own analysis shows that the standards are even *more* cost-effective on a dollars-per-ton basis if the initial percentage of leaking components is lower. EPA's determination to weaken the fugitive emissions requirements in light of this analysis is arbitrary.

Moreover, regardless of EPA's approach to conducting its regulatory analysis, independent data confirms that total, site-level methane emissions are not related to the percentage or number of leaking components. Indeed, there is overwhelming evidence that leak emissions follow a skewed, highly-heterogeneous distribution, with a relatively few number of sources accounting for a large portion of emissions. Under these circumstances, the percentage or number of leaking components is not correlated with total site-level emissions, since a single large leak can have higher emissions than the aggregate of numerous small leaks.

We empirically examined the relationship between the number of leaking components and site level methane emissions, using data from the City of Fort Worth Study Air Quality Study, which includes both component level emissions information and site-level data. Figure 5 compares site-level emissions to the percentage of leaking components and demonstrates that there is no correlation between site-level emissions and the percent of leaking components—indeed, the individual sites with the highest emissions had fairly low percentages of leaking components.[104] Similarly, Figure 6 shows data from *Allen et al* 2013, which likewise indicates there is no statistical relationship between the number of leaking components at a site and total site-level emissions ($R^2 = 0.07$).[105] Given that there is no relationship between the percentage of leaking components and site level emissions, as EPA implicitly recognized when it declined to include the percentage of leaking components as a factor for determining emissions and emissions reductions in its analysis, EPA cannot reasonably rely on uncertainties over either the initial percentage of leaking components, or changes in the percentage of leaking components over time, to conclude that EPA had overestimated potential reductions due to LDAR.

[104] Data for this analysis is included as Appendix K. As discussed *supra* § III, data from the City of Fort Worth Natural Gas Air Quality Study (2011) also shows that sites with less than 2% leaking components constitute 90% of total emissions.
[105] Data for this analysis is included as Appendix J.

Figure 5: Site Methane Emissions (lb per year) Versus Percent Leaking Components

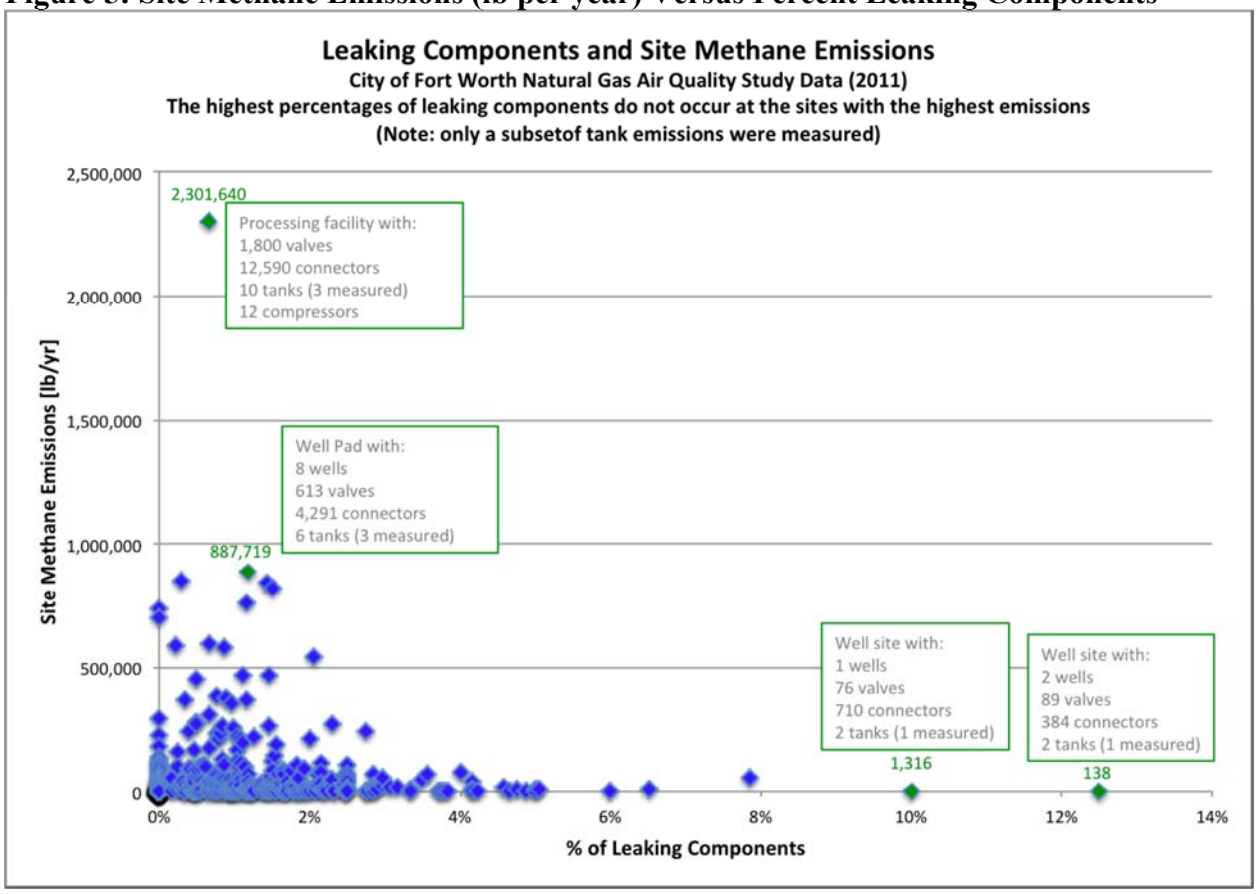
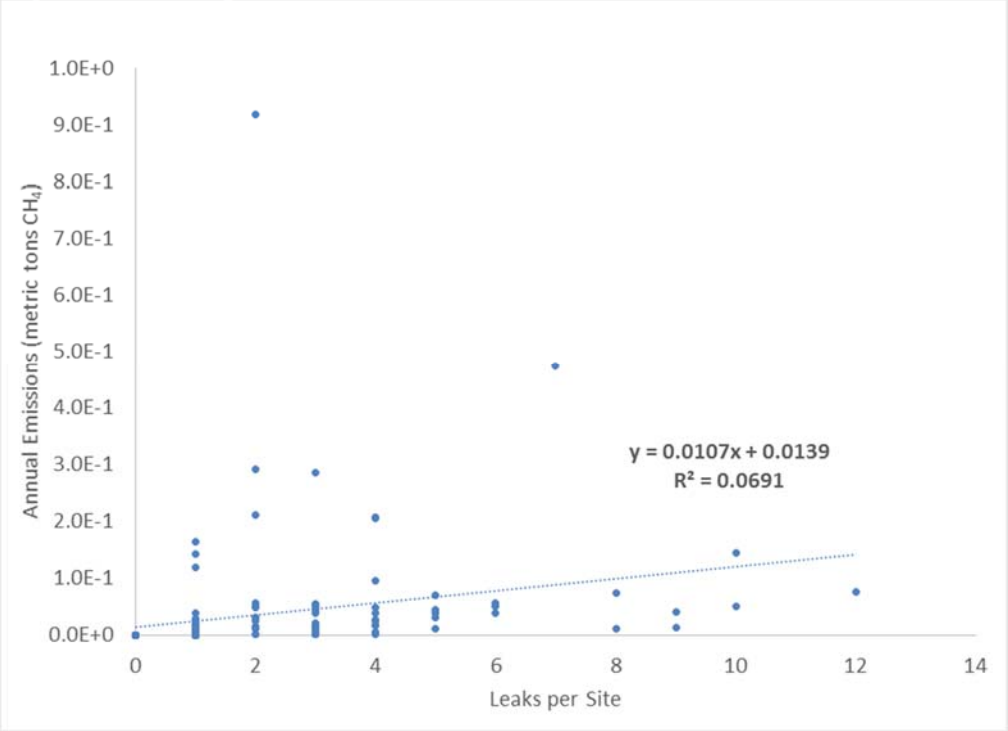


Figure 6: Leaks per Site Versus Annual Emissions for Data in Allen et al 2013



Finally, the *type* of components that are frequently found with fugitive emissions are more relevant to determining site-level emissions than the *number* of components that are found leaking (or percentage), as certain components, such as thief hatches, are associated with far higher emissions (as EPA's model plant analysis recognizes). An analysis of the NSPS compliance reports available publicly shows that vent/thief hatches are the most frequently leaking components at well sites—accounting for approximately 37% of leaks.[106] These components are associated with higher emissions, and EPA does not appear to have considered the types of leaking components and the magnitude of those leaks in their analysis, which would further undermine the purported basis for the agency's concerns.

* * *

As we discuss earlier, *supra* § V, these "concerns" are largely distinct from the concerns EPA raised in its proposed suspension rule or notices of data availability. They do, however, have one thing in common with the concerns the agency raised in its NODA—EPA's view that the concerns allegedly support weakening the standards. But even if EPA could rely on uncertainties to support its proposal (which it cannot) and these uncertainties were legitimate and factually supported (they are not), EPA's approach to assessing uncertainties would still be arbitrary and illegal. This is because the agency has only relied on those uncertainties that support its preferred outcome of weakening the standards while completely disregarding other,

[106] Appendix E, Dana Lowell, MJ Bradley & Associates, *Analysis of OOOOa Annual Air Emission Reports* (December 2018) ("MJB Well Site Memo").

important uncertainties that the agency has identified and that support strengthening the standards. Indeed, as EPA recognized in the 2018 Proposal, 83 Fed. Reg. at 52,063, the agency likely significantly underestimates fugitive site level emissions. Indeed, while EPA now includes an emissions factor representing controlled storage tanks in its model plant, the agency recognizes that its approach almost certainly understates emissions. *Id.* ("we acknowledge that the emissions are likely underestimated when using this information"). As we discuss below, and as EPA recognizes, *see id.*, the underestimation of methane emissions from affected sources may be significant and would suggest that the standards will achieve greater emission reductions in an even more cost-effective manner. EPA cannot arbitrarily choose among the uncertainties the agency itself has identified to select only those that support its (and industry's) preference to weaken the standards. *See Ctr. for Biological Diversity*, 900 F.3d at 1071 (agency may not use weak evidence as its justification for a rule when there is stronger evidence pointing in the opposite direction).

c. The industry studies cited by EPA are deeply flawed, as the agency recognizes, and do not support a weakening of the standards.

EPA cites, and includes in the docket for this rulemaking, a series of industry-sponsored studies that provide data purportedly supporting a weakening of the LDAR requirements. The agency has also included memos describing its analysis of the submitted data.[107] As the agency's own analysis of this data demonstrates, these industry analyses are unreliable and do not support a weakening of the standards. Appendix C provides a detailed summary of the data and commentary supplied by the American Petroleum Institute (API), Interstate Natural Gas Association of America (INGAA), and GPA Midstream, along with EPA's detailed critiques of those analyses.

d. The latest scientific evidence indicates that EPA is significantly underestimating methane emissions from non-low-production wells while overestimating the costs of fugitive emissions monitoring, and that therefore semiannual monitoring is even more cost-effective than projected by EPA.

EPA utterly ignores new scientific evidence that indicates EPA has dramatically underestimated methane emissions from oil and gas production, and therefore *underestimated* the benefits of frequent monitoring. The minor (and unsupportive and irrelevant) uncertainties alleged by EPA are dwarfed by the extensive evidence showing that EPA has underestimated methane emissions from the oil and gas sector and therefore underestimated the emissions reductions achieved by the 2016 NSPS.

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[107] *See* EPA MEMO to Docket No. EPA-HQ-OAR-2017-0483, August 27, 2018, EPA Analysis of Fugitive Emissions Data Provided by INGAA; EPA MEMO to Docket No. EPA-HQ-OAR-2017-0483, April 17, 2018, EPA Analysis of Compressor Station Fugitive Emissions Monitoring Data Provided by GPA Midstream; EPA MEMO to Docket No. EPA-HQ-OAR-2017-0483, April 17, 2018, EPA Analysis of Well Site Fugitive Emissions Monitoring Data Provided by API

Analysis updating EPA's methane emissions factors for well sites and cost assumptions to reflect the latest evidence indicates that the semiannual monitoring requirements in the 2016 NSPS are far more cost-effective at cutting methane emissions at non-low-production wells than estimated by EPA—over 20 times more cost-effective on a dollars-per-ton of methane emissions reduction basis than EPA projects.[108] It would be manifestly arbitrary for EPA to ignore the latest, best scientific evidence, which strongly supports semiannual monitoring, at the same time the agency claims "uncertainties" can justify weakening the standards. *See Flyers Rights Education Fund*, 864 F. 3d at 745 (agencies must use "the best information available" in reaching their conclusions, and cannot lawfully rely on outdated information as circumstances change).

i. The latest evidence indicates that EPA is significantly underestimating methane emissions.

The latest evidence indicates that EPA is significantly underestimating the amount of methane emitted by the oil and gas sector. A recent study that synthesized previously published data to quantify methane emissions across the oil and gas supply chain, published in June 2018 in *Science* ("Synthesis") found that methane emissions from the sector were *60% higher* than estimated by EPA's inventory:[109]

> Methane emissions from the U.S. oil and natural gas supply chain were estimated by using ground-based, facility-scale measurements and validated with aircraft observations in areas accounting for ~30% of U.S. gas production. When scaled up nationally, our facility-based estimate of 2015 supply chain emissions is 13 ± 2 teragrams per year, equivalent to 2.3% of gross U.S. gas production. This value is ~60% higher than the U.S. Environmental Protection Agency inventory estimate, likely because existing inventory methods miss emissions released during abnormal operating conditions. Methane emissions of this magnitude, per unit of natural gas consumed, produce radiative forcing over a 20-year time horizon comparable to the CO2 from natural gas combustion. Substantial emission reductions are feasible through rapid detection of the root causes of high emissions and deployment of less failure-prone systems.[110]

Notably, the Synthesis found that methane emissions from the production and gathering segments of the oil and natural gas supply chain were particularly underestimated in EPA's inventory. Furthermore, the Synthesis postulates that this underestimate is due to high-emission

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[108] Appendix F, Hillary Hull, EDF, *NSPS LDAR Methane Cost-Effectiveness Analysis – Source Counts, Baseline Emissions, and Costs* (December 2018). This reflects methane emissions reductions on a dollars-per-ton basis under a single-pollutant approach, after gas savings are taken into account.

[109] Alvarez *et al.* The Synthesis and supporting materials have been submitted in the regulatory docket for this rulemaking.

[110] *Id.* at 1.

events at a subset of sites—precisely the abnormal operating conditions identified and remedied by frequent fugitive emissions monitoring. The Synthesis found that:

> [T]he reason for such large divergence [between EPA's inventory and the Synthesis's bottom-up (BU) approach] is that sampling methods underlying conventional inventories systematically underestimate total emissions because they miss high emissions caused by abnormal operating conditions (e.g., malfunctions). Distributions of measured emissions from production sites in BU studies are invariably "tail-heavy," with large emission rates measured at a small subset of sites at any single point in time. Consequently, the most likely hypothesis for the difference between the EPA GHGI and BU estimates derived from facility-level measurements is that measurements used to develop GHGI emission factors undersample abnormal operating conditions encountered during the BU work. Component-based inventory estimates like the GHGI have been shown to underestimate facility-level emissions, probably because of the technical difficulty and safety and liability risks associated with measuring large emissions from, for example, venting tanks such as those observed in aerial surveys.[111]

Evidence from the Synthesis strongly indicates that EPA has underestimated methane emissions at oil and gas facilities, and therefore underestimated the emissions reductions achieved by the current NSPS. It would be arbitrary and capricious for EPA to not fully evaluate this evidence and account for it when revising the standards.

Using site-level measurement data from over 1,000 sites in eight U.S. basins, Dr. Mark Omara of EDF conducted a technical analysis of the foregone emissions reductions that would result from the changes to the well site monitoring in the 2018 Proposal.[112] These data are described in detail by Omara et al. (2018).[113] The Omara analysis utilizes these actual, site-level measurements to update fugitive emissions factors for the model facilities developed by EPA. The analysis shows that EPA significantly underestimates emissions at both low and non-low-production well sites, with mean fugitive methane emission factors for sites that are 2 to 5 times higher than EPA's estimates. The analysis concludes that that EPA's Proposal will result in an increase of approximately 162,000 tons/year emissions, or a 42% increase from the baseline emissions under the 2016 NSPS. The tonnage increase is 2.9 times higher than EPA's estimate. On average, emissions for non-low-production sites increase by 41%.

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[111] *Id.* at 1-2.

[112] Appendix G, Omara, M., A Technical Analysis of the Forgone CH4 Emissions Reductions as a Result of EPA's Proposed Reconsideration of the 2016 NSPS Standards for Oil and Gas Production Sites (Dec. 2017) ("Omara Analysis").

[113] Omara, M. *et al.* Methane emissions from natural gas production sites in the United States: Data synthesis and national estimate. (2018), https://pubs.acs.org/doi/10.1021/acs.est.8b03535.

Table 3: Baseline fugitive CH_4 emissions and forgone emission reductions in 2025.

	Baseline CH4 emissions (tons)		CH4 emissions from NSPS recon. (tons)		Forgone emission reductions in 2025 (tons)	
	EDF analysis	TSD	EDF analysis	TSD	EDF analysis	TSD
non-low Prod: Gas	37,046	26,687	51,443	N/A	14,398	43,708
non-low Prod: Oil > 300 GOR	259,664	67,612	374,794	N/A	115,130	
non-low Prod: Oil < 300 GOR	58,950	8,553	76,989	N/A	18,038	
low Prod Sites: Gas	3,780	4,599	6,115	N/A	2,335	12,242
low Prod Sites: Oil > 300 GOR	13,982	6,990	20,841	N/A	6,860	
low Prod Sites: Oil < 300 GOR	9,544	8,668	14,417	N/A	4,873	
Total	**382,965**	**123,109**	**544,599**	**179,059**	**161,634**	**55,950**

ii. The latest evidence indicates that EPA is overestimating the costs of fugitive emissions monitoring.

Multiple studies have shown that frequent LDAR at new and existing facilities is a highly cost-effective way to reduce emissions,[114] underscoring the flaws in EPA's conclusions about the cost-effectiveness of LDAR monitoring. Despite the availability of new evidence regarding the costs of fugitive emissions, including compliance reports for the standards submitted to EPA, EPA has arbitrarily failed to update its compliance cost estimates to account for information indicating that fugitives monitoring costs are lower than EPA estimates.

(a) Available information from NSPS compliance reports indicates EPA overestimated LDAR costs.

EPA overestimates the time, and therefore the cost, to complete LDAR surveys. EDF commissioned MJ Bradley & Associates to analyze data submitted by oil and gas production companies in compliance with the reporting requirements of Subpart OOOOa. These Air Emission Reports were accessed via EPA's WebFIRE website or obtained through FOIA requests, and include reports from reporting years 2017 and 2018, and represent the publicly available subset of all NSPS compliance reports. Of the 1,449 well-site LDAR surveys with start and end time data, 58 percent completed the LDAR survey in less than thirty minutes, 83 percent

[114] ICF International, *Leak Detection and Repair Cost Effective Analysis*, https://www.edf.org/sites/default/files/content/edf_ldar_analysis_120415_v7.pdf.

took less than one hour, and only seven percent of LDAR surveys took more than two hours per well site.[115] The average reported time to conduct the LDAR surveys was 0.72 hours per well site across the entire data set.[116] Review of survey start and end times for multiple surveys conducted on the same day by the same surveyor indicates that the time between ending a survey at one site and starting a survey at the next site ranged from less than five minutes to more than 2 hours, with an average of 30 minutes.[117] Therefore, for the LDAR survey times included in this dataset, the average time to conduct a survey, including travel time between sites, was approximately 1.25 hours per site. This estimate is corroborated by reports submitted by Oasis Petroleum, which did not include survey start and end time, but did show that a single LDAR surveyor conducted an average of 5 surveys per day. This implies that the average LDAR survey time for this company, including travel time between sites, was 1.3 – 1.6 hours per site, assuming a 6.5- to 8-hour work day (net of breaks).[118]

In its supporting cost analysis spreadsheet, EPA indicates that an OGI camera survey will take 6.1 hours per site—or an average of 3.05 hours per well per LDAR survey.[119] The data submitted by oil and gas companies on their annual emission reports and analyzed by MJ Bradley indicates that the average LDAR survey time was approximately 1.25 – 1.60 hours/well/survey, including travel time.[120] The AER data therefore indicates that EPA's estimate of LDAR costs may overstate the labor effort for LDAR surveys by 2.9 – 3.6 hours per well, and 5.8 – 7.2 hours per site, per year, for semi-annual LDAR.[121] Utilizing an average in-house labor cost of $61.21/hr (EPA assumption), EPA's estimate of LDAR costs for oil and gas wells may be overstated by 15% - 19% ($355 - $440/site/year).[122] Utilizing an implied outside contractor labor cost of $104/hour (derived from EPA's cost spreadsheet), EPA's estimate of LDAR costs for oil and gas wells may be overstated by 26% - 32% ($603 - $749/site/year).[123]

MJ Bradley's analysis included LDAR survey data from over 3,200 unique well pads and over 3,800 unique surveys – all of which EPA has in its possession. It would be arbitrary for EPA to disregard this data in estimating fugitive emissions monitoring costs. Indeed, EPA—unlike Environmental Commenters—has access to *all* of the compliance reports from 2017 and 2018. Yet, despite the fact that compliance costs are directly relevant to an assessment of the cost-effectiveness of the standards—EPA did not do any similar analysis and, moreover, has refused to comprehensively release compliance data to the public.

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[115] *Id.* at 3.
[116] *Id.*
[117] *Id.*
[118] *Id.* at 4.
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] *Id.*
[123] *Id.*

(b) Evidence from industry and the states shows that LDAR programs are feasible and cost-effective.

Evidence from companies and states implementing fugitive emissions programs indicates that frequent LDAR monitoring is feasible and cost-effective.

For instance, ExxonMobil's production subsidiary XTO cut methane leaks by nine percent in one year, after implementing a voluntary LDAR program and other "operational improvements" across its production and midstream operations in 2017.[124] An Executive Vice President at Shell captured the sentiment, "[m]ost of the things we've done have actually been more commercial than we thought. Either the opportunity was richer than we thought, in terms of the leakage that we found, or the cost of mitigation was actually less than what we had believed it to be going into this."[125] A recent survey in Colorado found that seven out of ten oil and gas producers said benefits of regularly checking equipment for leaks outweigh costs.[126]

Further, in September of 2018, the Oil and Gas Climate Initiative set a collective methane target for member companies to meet by 2025. That target would reduce the collective average methane intensity of its aggregated upstream gas and oil operations by one-fifth to below 0.25 percent, with the ambition to achieve 0.20 percent, corresponding to a one-third reduction.[127] While these voluntary commitments do not and cannot substitute for strong federal standards, they do demonstrate that fugitive emissions monitoring is cost-effective.

Data from oil and gas producing companies and methane mitigation companies consistently confirms that EPA has overestimated the costs to complete LDAR surveys. One leak detection company, Jonah Energy, documented a 75 percent reduction in leak detection over the past five years in Wyoming.[128] Jonah Energy also found that total LDAR program costs decreased from $99 per inspection in the first year to $29 per inspection in the fifth year—EPA's

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[124] Press Release, ExxonMobil, ExxonMobil's XTO Energy Announces Progress on Methane Emissions Reduction Program (June 25, 2018) https://news.exxonmobil.com/press-release/exxonmobils-xto-energy-announces-progress-methane-emissions-reduction-program.

[125] Ben Ratner, *Methane Rollbacks Create Moment of Truth for Oil and Gas Executives*, Energy Exchange Blog (Sept. 12, 2018) http://blogs.edf.org/energyexchange/2018/09/12/methane-rollbacks-create-moment-of-truth-for-oil-and-gas-executives/.

[126] Keating Research, Inc., *The Colorado Case Study On Methane Emissions: Conversations with The Oil And Gas Industry* (Apr. 10, 2016) http://keatingresearch.com/wp-content/uploads/2016/04/Colorado-Methane-Regulation-7-Survey-Research-Memo-4-10-2016-Final-Version.pdf.

[127] Press Release, Oil and Gas Climate Initiative, Oil and Gas Climate Initiative Sets First Collective Methane Target for Member Companies (Sept. 24, 2018) https://oilandgasclimateinitiative.com/oil-and-gas-climate-initiative-sets-first-collective-methane-target-for-member-companies/.

[128] Wyoming Public Media, http://wyomingpublicmedia.org/post/wy-approves-strict-air-pollution-regs-pinedale; Wyoming Department of Environmental Quality, http://deq.wyoming.gov/aqd/rule-development/resources/proposed-rules-and-regulations/.

estimated cost of $635 per survey for an outside contractor is more than 21 times higher than Jonah Energy's most recent actual cost data.[129] Further, each year the total value of the captured gas across Jonah Energy's LDAR program offset LDAR survey costs by at least $10,000 per year, including one year where the captured gas resulted in more than $90,000 net in savings.[130] Texas-based Rebellion Photonics has stated that its own leak detections services cost $250 per site – 60 percent lower than EPA's estimate.[131] FLIR Systems reports that LDAR inspections conducted by third party service providers may cost as little as $141 per site– 75 percent lower than EPA's estimate.[132] Yet another company, Target Emission Services, found, based on its own data that LDAR monitoring costs for compressor stations are $1,220, inclusive of onsite monitoring, travel expenses, and reporting, per survey, compared to EPA's estimate of $2,300.[133] This results in a "net present value" of its LDAR program of $1,122 per survey and a payback period due to gas savings of 12 months.

Similarly, several states across the country have considered costs in successfully implementing LDAR programs and found costs lower than estimated by EPA, including in Colorado, where the LDAR program applies to new and existing facilities and requires LDAR monitoring based on the risk of emission, with the largest producing sites performing monthly monitoring. After the first year of LDAR monitoring in Colorado, fugitive emissions were decreased by 75 percent, with no complaints to the state about the cost of compliance. Colorado estimated the costs per inspection to be around $450 per inspection.[134] These standards have been so successful that Colorado recently moved to strengthen them.[135] Pennsylvania likewise

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[129] WCCA Spring Meeting, Jonah Energy Presentation, May 8, 2015 delivered by Paul Ulrich. It is unclear if this assumed one or two well sites per inspection. This comment assumes that each inspection consisted of one well; however, if the inspection includes two wells (as EPA assumes), then EPA's cost estimate is over 40 times higher than Jonah Energy's actual LDAR survey costs data.

[130] The first year resulted in a net savings of $22,159, $10,955 in the second year, $90,577 in the third year, $41,256 in the fourth year, and $28,691 in the fifth year.

[131] Rebellion Photonics comments at the EPA public hearing on the proposed NSPS OOOOa rule in Dallas, TX on September 23, 2015, https://www.edf.org/sites/default/files/content/attachment_1_-_rebellion_epa_hearing_testimony.pdf.

[132] FLIR Systems, (Apr. 22, 2016) https://www.regulations.gov/?elq=3ff5b8047ab24463aa9991e03f221745%26elqCampaignId=1306#!documentDetail;D=BLM-2016-0001-9035.

[133] Terence Trefiak, Target Emission Services, *NSPS OOOOa Monitoring Case Study* (Mar. 7, 2018), Docket ID No. EPA-HQ-OAR-2017-0483-0031.

[134] Colorado Air Quality Control Emission, Regulatory Analysis of Regulations 3, 6 and 7, https://www.edf.org/sites/default/files/content/regulatoryanalysisattachment2013-01217.pdf (estimate based on the hourly cost ($134) times 3.4 hours=$456), https://www.edf.org/sites/default/files/content/regulatoryanalysisattachment2013-01217.pdf.

[135] Press Release, Colorado Oil & Gas Association and Environmental Defense Fund – Joint Statement on Air Quality Control Commission Vote on New Air Regulation, (Nov. 16, 2017)

found that LDAR costs were lower than estimated by EPA, estimating that monitoring two to four times per year would be between $750 and $1,500 for each pad or site.[136]

This data indicates EPA likely significantly overestimated LDAR costs. It is arbitrary for EPA to ignore this data in the Proposal.

iii. As a result, semiannual monitoring at non-low-production wells is even more cost-effective than projected by EPA.

In the TSD for the Proposal, EPA includes updated cost-effectiveness figures for LDAR at production facilities and compressor stations. Commenter EDF analyzed the cost-effectiveness of LDAR for those facility types using EDF's analysis of source counts and model facility baseline emissions for production facilities,[137] which, as discussed above, include more accurate site-level emissions estimates, and published studies for compressor station emissions.[138] EDF also analyzed the impacts of reducing the costs associated with LDAR at well production facilities based on the MJ Bradley analysis of costs. Based on these updates, EDF's analysis indicates that LDAR for all facility types is universally more cost-effective than calculated by the EPA in the analysis for the Proposal—both when more realistic estimates for emissions and costs are considered separately, and when those updated estimates are considered together.[139]

EDF calculated cost-effectiveness of methane emissions reductions at low and non-low-production facilities with and without gas savings for the frequencies analyzed by the EPA under the single pollutant approach.[140] EDF includes results for three scenarios: (1) updates to the baseline methane emissions factors and source counts only (Figure 7), (2) updates to the costs only (Figure 8), and (3) updates to source counts, emissions factors, and costs (Figure 9). As illustrated, the cost-effectiveness based on this actual data is consistently lower than the EPA figures. When the source counts, baseline methane emissions factors, and facility costs are

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https://www.edf.org/media/colorado-oil-gas-association-and-environmental-defense-fund-joint-statement-air-quality.

[136] PA TSD at 86-87.

[137] Appendix G, Mark Omara, *A technical analysis of the forgone methane emissions reductions as a result of EPA's proposed reconsideration of the 2016 NSPS standards for oil and gas production sites*.

[138] Zimmerle et al., *Methane Emissions from the Natural Gas Transmission and Storage System in the United States*, 49 (15) ENVT'L SCI. & TECH. 9374, 9378 (2015) ("Zimmerle et al 2015"); Marchese et al., Methane Emissions from United States Natural Gas Gathering and Processing, 49 (17) ENVT'L SCI. & TECH. 10718, 10721 (2015) ("Marchese et al 2015").

[139] Appendix F, Hillary Hull, EDF, *NSPS LDAR Methane Cost-Effectiveness Analysis – Source Counts, Baseline Emissions, and Costs* (December 2018).

[140] While these calculations utilize a single pollutant approach for illustrative purposes, this does not imply that EPA's reliance *solely* on a single pollutant approach would be appropriate. As discussed above, the single pollutant approach compares the full costs of a regulation that delivers reductions of multiple pollutants to the benefits of reducing only one of them, and thus makes costs per ton of emission reduction appear artificially high.

updated to reflect EDF and MJB analysis, EDF calculates that semiannual LDAR is *95% less expensive* on a dollars-per-ton-of-methane-reduction basis at non-low-production wells, after gas savings are taken into account, than estimated by EPA in the 2018 TSD.

Figure 7: Comparison of EPA estimates for single pollutant OGI cost-effectiveness for production facilities with EDF estimates based on updates to the baseline methane emissions factors and source counts only

Production	Frequency	Without Savings ($/ton)					With Savings ($/ton)				
		EPA (2014)	EDF (2014)	EDF (2017)	EDF vs. EPA (2014)	EDF vs. EPA (2017)	EPA (2014)	EDF (2014)	EDF (2017)	EDF vs. EPA (2014)	EDF vs. EPA (2017)
Non-Low Producing Sites	Annual	$979	$277	$268	-72%	-73%	$781	$198	$70	-75%	-91%
	Stepped	$1,041	$294	$285			$842	$198	$87	-76%	-90%
	Semi-annual	$1,164	$329	$319			$965	$264	$121	-73%	-88%
Low Producing Sites	Biennial	$1,104	$859	$727	-22%	-34%	$906	$767	$529	-15%	-42%
	Annual	$1,360	$1,058	$895			$1,140	$767	$697	-33%	-39%
	Stepped	$1,445	$1,124	$952			$1,247	$767	$753	-38%	-40%
	Semi-annual	$1,616	$1,257	$1,064			$1,396	$767	$866	-45%	-38%

Note: Assumed same cost per facility as EPA in "1-Proposed Rule OOOOa TSD Section 2 OGI Well Pad Model Plant Costs" workbook.

Figure 8: Comparison of EPA estimates for single pollutant OGI cost-effectiveness for production facilities with EDF estimates based on updates to the costs only

Production	Frequency	Without Savings ($/ton)			With Savings ($/ton)		
		EPA	EDF - Cost Adjusted	EDF vs. EPA	EPA	EDF - Cost Adjusted	EDF vs. EPA
Non-Low Producing Sites	Annual	$979	$749	-24%	$781	$557	-29%
	Stepped	$1,041	$796		$842	$605	-28%
	Semi-annual	$1,164	$890		$965	$700	-28%
Low Producing Sites	Biennial	$1,104	$845	-24%	$906	$634	-30%
	Annual	$1,360	$1,040		$1,140	$827	-27%
	Stepped	$1,445	$1,105		$1,247	$782	-37%
	Semi-annual	$1,616	$1,236		$1,396	$1,020	-27%

Note: Sources and baseline emissions reflect EPA values to illustrate effect of change in cost.

Figure 9: Comparison of EPA estimates for single pollutant OGI cost-effectiveness for production facilities with EDF estimates based on updates to the baseline methane emissions factors and source counts and costs

Production	Frequency	Without Savings ($/ton)					With Savings ($/ton)				
		EPA (2014)	EDF (2014)	EDF (2017)	EDF vs. EPA (2014)	EDF vs. EPA (2017)	EPA (2014)	EDF (2014)	EDF (2017)	EDF vs. EPA (2014)	EDF vs. EPA (2017)
Non-Low Producing Sites	Annual	$979	$212	$205	-78%	-79%	$781	$13	$7	-98%	-99%
	Stepped	$1,041	$225	$218			$842	$27	$20	-97%	-98%
	Semi-annual	$1,164	$252	$244			$965	$53	$46	-94%	-95%
Low Producing Sites	Biennial	$1,104	$657	$556	-40%	-50%	$906	$459	$358	-49%	-60%
	Annual	$1,360	$809	$685			$1,140	$611	$487	-46%	-57%
	Stepped	$1,445	$860	$728			$1,247	$662	$530	-47%	-58%
	Semi-annual	$1,616	$961	$814			$1,396	$763	$616	-45%	-56%

Note: Assumed same cost per facility as EPA in "1-Proposed Rule OOOOa TSD Section 2 OGI Well Pad Model Plant Costs" workbook.

2. EPA's proposal to weaken fugitive emission requirements for low-production wells is unsupported, arbitrary, and unlawful.

EPA has also proposed to dramatically weaken LDAR requirements for low-production wells—which the agency defines as wells with average combined oil and gas production less than 15 BOE per day. For these wells, EPA proposes to reduce fugitives monitoring by 75%—from semiannual to biennial inspections. As we describe more fully below, the agency rests this proposed change on a flawed rationale that is disconnected from the supporting evidence it offers and otherwise raises unfounded and generalized concerns about uncertainties and compliance costs that likewise do not support its Proposal. Finally, we offer additional evidence demonstrating that low-production wells are a significant source of emissions and that frequent LDAR at these sites remains the best system of emission reductions to address them.

a. EPA's asserted basis for subcategorizing low producing wells and developing a separate, lower-emitting model facility for these sources is arbitrary and capricious.

In the final 2016 Rule, EPA did not separately categorize low and non-low-production wells because the agency indicated that:

> [L]ow production well sites have the same type of equipment (e.g. separators, storage vessels) and components (e.g. valves flanges) as well sites with production greater than 15 boe per day. Because we did not receive additional data on equipment or component counts for low production wells, we believe that a low production well model plant would have the same equipment and component counts as a non-low production well site.

81 Fed Reg. 35,856. Accordingly, for both lower and higher producing well sites, EPA required semi-annual monitoring.

EPA now proposes to reverse course and weaken low-production well requirements from semiannual to biennial monitoring. As a basis for this change, EPA claims it now has evidence that low-production well sites have fewer emissions, equipment, and components than non-low-production sites. The principal (if not only) piece of evidence EPA offers in support of its proposed change is well site data taken from an air quality study done in the Dallas/ Fort Worth area ("Fort Worth Study") that is not new, and was considered by EPA in 2016.[141] This study included emissions, equipment, and component counts from 300 wells in the Dallas/Fort Worth area (27 of which were low-producing gas wells).[142]

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[141] Eastern Research Group, *The Natural Gas Air Quality Study (Final Report)* (July 13, 2011) http://fortworthtexas.gov/gaswells/air-quality-study/final/.

[142] In the Proposal, EPA states that "[f]ollowing promulgation of the 2016 NSPS OOOOa, information was received which contained component level emissions information for well sites in the Dallas/Fort Worth area (herein referred to as the "Fort Worth Study")." 2018 TSD at 13. This is incorrect, as the agency was aware of—and relied upon—the Fort Worth Study during the

EPA indicates that it used the component count information from the low-production wells in the Fort Worth Study and compared that information to EPA's non-low-production gas model plant in order to develop scaling factors, which EPA then applied to the <300 GOR oil well model plant and the >300 GOR oil well model plant (because the Fort Worth Study included no measurements for these sources). 82 Fed. Reg. 52,086. In the 2018 TSD, EPA provides greater detail on this approach:

> We used the average count of major production and processing equipment that was reported for the 27 low production wells sites that was reported for the 27 low production well sites as the basis for the natural gas well model plant for low production well sites. Because the fugitive emissions component counts were not available for each individual piece of major production and processing equipment, we used the average fugitive emissions component counts per major production and processing equipment obtained from the 1996 EPA/GRI Study . . . .
>
> Additionally, consistent with the information presented in 2.3.1, we included 1 controlled storage vessel per low production model plant and 2 wells per model plant. Therefore, the main difference between the non-low production and low production model plants is realized in the number of major production and processing equipment, other than controlled storage vessels.

2018 TSD at 13. Figure 10, below, reproduces the portions of Tables 2-1 and 2-2 in the TSD that show the changes EPA made between the agency's non-low-production and low-production gas model facilities, highlighting that EPA's low-production model facility contains one fewer meters/piping and one fewer in-line heaters resulting in fewer total components.

2016 Rule's rulemaking. *See, e.g.*, 2015 TSD at 56 (noting that the Fort Worth Study exhibited skewed distribution of emissions from surveyed well sites); 81 Fed. Reg. 35,860 (discussing Forth Worth Study). In addition to supporting the notion of skewed distribution of emissions from surveyed well sites (aka, super emitters), EPA used the study's 375 well pads and the 17 different owners of those pads as support for the final rule's requirement for operators to create a fugitive emissions monitoring plan within company-defined areas. 81 Fed. Reg. 35,860-61. Notably, EPA did not rely upon the Fort Worth Study to create a low-production model plant like EPA does now, despite having the same information on the study's "27 low-production well sites." The Agency must explain why this study *now* persuades it to weaken the standards when it did not in 2016—i.e., why it comes to a different conclusion based upon the same facts.

Figure 10: Tables 4 and 5 from EPA Memo Comparing Low-production Equipment and Component Counts to EPA Model Plant

Table 2-1. Average Fugitive Emissions Component Count for Non-Low Production Well Site Model Plants

Production Equipment	Model Plant Equipment Counts	Average Component Count Per Unit of Model Plant[a]				
		Valves	Connectors	OELs	PRVs	Thief Hatches
Non-Low Production Natural Gas Well Site Model Plant						
Wellheads	2	19.0	74.0	2.0	0.0	--
Separators	2	43.0	137.0	8.0	3.0	--
Meters/Piping	2	26.0	96.0	1	1.0	--
In-Line Heaters	1	14.0	65.0	2.0	1.0	--
Dehydrators	1	24.0	90.0	2.0	2.0	--
Storage Vessels	1	--	--	--	--	1.0
	Rounded Total	127.0	462.0	14.0	7.0	1.0

Table 2-2. Average Fugitive Emissions Component Count for Low Production Well Site Model Plants

Production Equipment	Model Plant Equipment Counts	Average Component Count Per Unit of Model Plant[a]				
		Valves	Connectors	OELs	PRVs	Thief Hatches
Low Production Natural Gas Well Site Model Plant						
Wellheads	2	19.0	74.0	2.0	0.0	--
Separators	2	43.0	137.0	8.0	3.0	--
Meters/Piping	1	13.0	48.0	1.0	0.5	--
In-Line Heaters	0	0.0	0.0	0.0	0.0	--
Dehydrators	1	24.0	90.0	2.0	2.0	--
Storage Vessels	1	--	--	--	--	1.0
	Rounded Total	100.0	349.0	12.0	5.0	1.0

EPA's rationale for and approach to subcategorizing low-producing wells along with the evidence the agency offers to support its conclusions are arbitrary and capricious for several reasons.

First, and most basically, the Fort Worth Study includes no information on either meters/piping or in-line heaters, so it is unclear how the agency could, purportedly relying on that data, reduce the frequency of these types of equipment in its low-production model facility. Indeed, EPA's own analysis of the Fort Worth Study, reproduced in Figure 11 below, clearly indicates that information on these two types of equipment was "not reported." EPA provides no explanation for this.

Apart from this clear error, a closer examination of data on equipment, component counts, and emissions at the 27 low-production sites in the Fort Worth Study reveals that these facilities are at least as complex and high emitting as EPA's non-low-production model plant. Figure 11, below, reproduces Tables 4 and 5 from EPA's own analysis of the Fort Worth Study.[143] Table 4 compares major equipment counts for EPA's non-low-production model plant to the low-production sites in the Fort Worth Study. Table 5 similarly compares component counts—valves and connectors—between these two data sources. Here, we focus on comparison with dry gas sites in the Fort Worth Study both because EPA appears to have relied on this comparison in the 2018 TSD and because these sites constitute well over 90% of the measurements in the Fort Worth Study.[144]

The Table in Figure 11 shows that for all major pieces of equipment, the Fort Worth Study reported that the dry gas low-production wells had equipment counts as high as or *higher* than EPA's non-low-production model plant. Indeed, these low-production Fort Worth sites included an average of 1 more storage tank and 1 more compressor than EPA's non-low-production model facility—both of which are very significant emissions sources.[145] Similarly, though Table 5 in Figure 11 appears to misstate the number of components in EPA's model facility,[146] the Fort Worth Study shows that those low-production facilities had component counts similar to or far greater than EPA's non-low-production model facility. In particular, the Fort Worth sites had 108 valves compared to 127 valves in the EPA non-low-production model facility and 735 connectors compared to 462 connectors in the EPA non-low-production model facility. Finally, EPA's preamble includes information on emissions from low-production sites in the Fort Worth Study, noting that, when emissions from storage tanks are considered,[147] these

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[143] EPA, Analysis of Low-production Well Site Fugitive Emissions from the Fort Worth Air Quality Study (May 8, 2018) ("Fort Worth Study Memo").

[144] Alternatively, EPA could have averaged dry and wet gas sites, but because only two wet gas sites were measured, averaging in this way would not affect the equipment count comparison and would only very incrementally affect component count comparisons. Because EPA's analysis does not make clear how the agency approached this issue and because incorporating wet gas sites into the average has little to no affect, we focus on the dry gas comparison for simplicity. However, comparing to all sites (dry and wet gas) would yield the same results.

[145] For instance, EPA attributes the following components to a gathering and boosting station compressor: 71 valves, 175 connectors, 3 open-ended lines, and 4 pressure relief valves. TSD at 16, Table 2-4.

[146] Table 5 attributes 19 valves and 74 connectors to EPA's non-low-production model facility, though from Figure 11, below, it is clear that these values are only for the wellhead. TSD at 12, Table 2-1. The total number of valves and connectors in EPA's model facility is 127 and 462 respectively. *Id.*

[147] EPA also presents emissions figures excluding tank-related emissions. However, elsewhere in the preamble and TSD, EPA underscores that emissions from controlled tanks are properly counted as fugitives, *e.g.* TSD at 4, 7, and (appropriately) includes these emissions in its own model plant analysis. Therefore, it is likewise appropriate to compare the Fort Worth Study emissions information (including tank-related emissions) to EPA's model plant. Moreover,

sites had fugitive emissions of 13 tons per year of methane. 83 Fed. Reg. at 52,068. This is over twice as high as EPA's non-low-production gas well model facility, which the agency concludes will emit 5.91 tons per year of methane. 2018 TSD at 20.

Figure 11: Tables 4 and 5 from EPA Memo Comparing Low-production Equipment and Component Counts to EPA Model Plant

Table 4. Comparison of Equipment Counts for Low Production Well Sites

	EPA Model Plant[a]	Dry Gas Well Site[b]	Wet Gas Well Site[b]
Wells	2	2	1
Tanks[c]	1	2	2
Compressors	NA	1	0
Separators	2	2	1
Dehydrators	1	1	0
Meters/Piping	2	Not reported	Not reported
In-Line Heaters	1	Not reported	Not reported

[a] The equipment counts in this model plant represent the non-low production natural gas well model plant in order to compare if the equipment counts are different based on production.

[b] Note: Values for each equipment type are rounded, consistent with the treatment of equipment counts in the model plant analysis. These values represent the average equipment counts reported for each subcategory identified in the Fort Worth Study.

[c] It was not apparent from the data set if the storage vessels were controlled at these well sites. The EPA Model Plant assumes that at least 1 storage vessel is controlled at the well site, though other storage vessels may be present.

regarding EPA's separate request for comments concerning storage tank applicability requirements, Environmental commenters agree with EPA that "[o]perators should ensure that the determination of the potential for VOC emissions reflects each storage vessel's actual configuration and operational characteristics." 83 Fed. Reg. 52,085. As EPA notes, calculating potential emissions by averaging across tanks within a battery is inappropriate where throughput flows disproportionately through one of the tanks. *Id.*

Table 5. Comparison of Component Counts for Natural Gas Well Sites

	Valves	Connectors
EPA Model Plant[a]	19	74
Non-Low Production Well Sites in Fort Worth Study		
Dry Gas	206	1,541
Wet Gas	126	974
Low Production Well Sites in Fort Worth Study		
Dry Gas	108	735
Wet Gas	59	413

[a] The equipment counts in this model plant represent the non-low production natural gas well model plant in order to compare if the equipment counts are different based on production.

This is quintessentially arbitrary and capricious decisionmaking. Indeed, the only actual data EPA purports to rely on (discussed earlier and reproduced in the table above) shows that low producing wells are as complex (or more so) and have greater emissions than EPA's non-low-production model plant. EPA, however, proposes to draw the exact opposite conclusion from this data. Nor can the agency lawfully support its conclusion by cherry picking one piece of data—the incrementally smaller number of valves in the Fort Worth Study—while disregarding the extensive evidence in this same dataset which points the other direction (including the greater number of connectors, tanks, and compressors at these same sites). At base, the data in the Fort Worth Study supports EPA's original conclusion in the 2016 Rule—that low-production wells have similar major equipment, components, and emissions to EPA's non-low-production well site. Moreover, to the extent that the data in the Fort Worth Study supports any subcategorization, it shows that very high production wells can have emissions far higher than EPA's model facility.[148] States like Colorado have standards that reflect an approach along these lines—requiring up to monthly LDAR at the largest well sites.[149]

Finally, even if the agency's approach to low-production gas wells was reasonable (which it is not), the agency's determinations concerning low-production oil wells would nonetheless be arbitrary and capricious. EPA concedes that the Fort Worth Study, on which it relies, only includes information about gas wells. *E.g.* 2018 TSD at 13. Lacking information

[148] For instance, EPA notes that high production wells in the Fort Worth data set emitted, on average, 33 tons per year of methane, more than 5 times higher than EPA's non-low-production model facility. 83 Fed. Reg. at 52,068.

[149] Colorado Air Quality Control Commission, 5 C.C.R. 1001-9, CO Reg. 7 § XVII, XVIII (Feb. 24, 2014).

specific to oil wells, EPA nonetheless develops a scaling factor, using this gas well data to reduce component counts at each of the two oil production model plants. In the 2016 Rule, however, EPA constructed different model facilities for gas and oil well sites precisely because the agency concluded that these facilities can have different types of major equipment and components. *See* 2016 TSD at 29-32 (describing the different data sources and underlying approaches EPA used to develop the agency's gas well model plant and oil well model plants, including different equipment, like headers, located only at oil well model plants). EPA now arbitrarily disregards those prior conclusions and, without explanation, assumes that component count ratios between two gas well sites are equally predictive of component counts at oil sites. However, EPA has presented no new data to support that conclusion and cannot now lawfully rely on gas well specific data to weaken standards for oil wells, when it had previously determined that these facilities were sufficiently different to necessitate separate analytical treatment. Indeed, this approach is particularly problematic because, by 2025, EPA projects that the vast majority (nearly 90%) of NSPS affected low-production well sites will be oil sites (the very sources for which the agency has provided no data). 2018 TSD at 74.

b. Neither the additional, generalized evidence EPA provides nor the concerns the agency expresses support its Proposal to weaken low-production LDAR requirements.

Though EPA principally relies on the Fort Worth Study to support its proposed weakening of low-production well standards, the agency also refers to a literature review included in the docket and again invokes "uncertainties" as further evidence generally supporting its proposal. These are also not lawful bases supporting EPA's proposed action.

As a threshold matter, the agency concedes that the data in its literature review are not sufficiently detailed to allow EPA to evaluate the emissions from or complexity of a low-production well site as it compares to EPA's model plants. *See* 83 Fed. Reg. at 52,068 (noting that the literature review did not provide "the same level of detail regarding component counts to allow us to further refine the low-production well site model plants"). Nonetheless, EPA drew high-level conclusions from these studies, including that there is a general correlation between production and emissions, that some low-production sites can have high emissions and that tank thief hatches are a frequent source of emissions. *Id.* However, EPA has not identified or described any specific evidence in these studies that speaks to differences across the particular low-production threshold the agency identified, nor do many of the studies disaggregate emissions by production at all. In Appendix H, we have included more specific ways in which the studies EPA reviews in its supplemental analysis do not support the agency's proposal.[150]

Moreover, the agency again invokes the same uncertainties as a basis for its proposal, which, as we describe *supra*, are neither legally sufficient nor factually accurate. [151] In addition,

[150] Appendix H, David Lyon and Mark Omara, EDF, A response to EPA's memorandum on low-production well site fugitive emissions (December 2018).

[151] Notably, EPA raises concerns and uncertainties regarding the effectiveness of LDAR at annual, semiannual and quarterly frequencies, notwithstanding the extensive evidence supporting

EPA identifies two new, low-production specific uncertainties, claiming that equipment at low-production sites is likely sized smaller and so less complex than the default equipment EPA relies on for its non-low-production model site, and that the pressures associated with low-production sites would somehow lead to lower emissions. These uncertainties, as with the others the agency identified, cannot provide a legally sufficient basis to revise the standards. In any event, the data the agency elsewhere relies on undermines these claims, and the agency has made no efforts to gather relevant information through an ICR or other lawful procedure. For instance, though EPA notes the Fort Worth Study did not include component counts by equipment type, the study does include overall component counts for low-production sites, which, as we describe above, demonstrate that these facilities are as complex (or more so) than EPA's non-low-production model facility.

To the extent there are attributes associated with low-production wells that EPA has failed to account for, they suggest the agency has underestimated the benefits of leak detection and repair at these sites. Numerous datasets show that low-production sites have absolute emissions similar to higher production sites, but production-normalized loss rates that are far greater (sometimes by an order of magnitude).[152] The following recent studies indicate that marginal wells can have significant emissions:

Zavala-Araiza, et al., (2015) "Toward a Functional Definition of Methane Super-Emitters: Application to Natural Gas Production Sites," *ENVT'L SCI. & TECH.* 2015, 49, 13, at 8167−8174.

- The Barnett Shale study, which evaluated emissions from a sample made up mostly of natural gas wells, found that average emissions from low-producing wells were approximately 18.4 US ton/ year of methane – over 80% higher than the average emission rate for all wells included in the study.
- These are site-level emissions and include venting equipment like pneumatic devices and uncontrolled storage tanks that would not necessarily be addressed through an LDAR program. The data, however, suggest that improperly operating equipment are an important contributor to these high emissions. Indeed, many of the sites were functional super-emitters (with loss rates greater than 1% of production) and several of these sites had very high production normalized loss rates (greater than 50% of production) that would not be expected from properly operating facilities, even those with uncontrolled

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EPA's estimates of the effectiveness of these approaches. For low-production well sites, however, EPA proposes biennial monitoring, assuming—without *any* data—that monitoring a wellsite once every two years will secure a 30 percent reduction. EPA's analysis of the benefits of biennial monitoring is arbitrary and capricious—both because it is not grounded in any record evidence and because the agency disregards uncertainties that have elsewhere caused it concern (a fact that is especially problematic given that there is no evidence concerning the effectiveness of biennial LDAR).

[152] Our previous filings document the significant emissions from low-production wells. CATF et al. Comments at 36-41; EDF, *Low Production Well Factsheet* (Sept. 2016) *http://blogs.edf.org/energyexchange/files/2016/09/Low-Producing-Well-Supplemental-Comments_9.13.pdf?_gl=1*w27frg*_gcl_aw*R0NMLjE1Mzk5NzU2NjQuRUFJYUlRb2JDaE1JdE1Qb3JaaVQzZ0lWeC1ESUNoMndZd2RzRUFBWUFTQUFFZ0o3cmZEX0J3RQ*.

storage tanks. Moreover, preliminary analysis attempting to recreate site-level emissions measurements in the Barnett using site-level component counts and emissions factors suggests that there is a gap, with measured emissions higher than calculated component-level emissions. This suggests that improperly operating equipment or other abnormal site-level conditions that could potentially be addressed through an LDAR program were important contributors to overall emissions.

David R. Lyon et al., Aerial Surveys of Elevated Hydrocarbon Emissions from Oil and Gas Production Sites, 50 Envtl. Sci. & Tech. 4877 (Apr. 5, 2016).

- This study utilized helicopter surveys to document fugitive emissions from over 8,000 well sites in seven basins nationwide. The helicopter survey detection limit was 1 – 3 g/s total hydrocarbons, or approximately 30 to 100 tons per year, but it is likely that much of the observed tank emissions were VOCs. For instance, a study performed for TCEQ reported an average of 76% VOC in the flashing emissions of oil and condensate tanks.
- The study captured high-emitting sources and was not limited only to leaks. Similar to the Barnett, the authors concluded that not all emissions could be explained by tank flashing if all controls were operating properly. These sources could likely be addressed through a LDAR program to identify issues such as unlit flares and open hatches at controlled storage tanks.
- Based on an oil well definition of GOR ≤12,500 scf/bbl, marginal oil wells had a greater occurrence of observed hydrocarbon emissions (4.9%) compared to all wells (4.0%) in the helicopter IR survey.

M. Omara et al 2016, Methane Emissions from Conventional and Unconventional Natural Gas Production Sites in the Marcellus Shale Basin, 50 Envtl. Sci. & Tech. 2099 (Feb. 16, 2016) (DOI: 10.1021/acs.est.5b05503).

- Site-level measurements of 35 well pads in the Marcellus found 85 times higher median production-normalized CH4 emission rates from low-production, conventional wells compared to high production, unconventional wells (11% vs 0.13%). Though these wells had lower absolute emissions rates, the average emissions of conventional wells was 0.82 kg/hr, which is equivalent to 7.9 TPY methane.

As these studies document, emissions from low-production sites represent a far greater proportion of their production, and so leak detection and repair at these sites has the prospect for added benefits even beyond those at higher production sites that are often operated more efficiently.

c. Additional evidence shows that low-production well sites are a significant source of emissions.

In addition, new evidence shows that emissions from low-production wells are similar to or greater than the emissions from EPA's non-low-production model plant. In Appendix G, we attach a technical report analyzing emissions from over 1,000 well sites in eight oil and gas producing basins across the country. As described more fully in Appendix G, the technical analysis uses site level emissions information from both low and non-low producing wells along

with the fractional percentage of fugitive emissions identified in the Fort Worth Study to calculate average site level fugitive emissions.

The data show that low-production wells have higher absolute emissions than estimated by EPA. For example, the low-production gas wells in the dataset had average fugitive, site-level CH_4 emissions of 6.8 tons per year and the oil wells with GOR >300 had average fugitive, site-level CH_4 emissions of 6.4 tons per year—both of which are far higher than EPA emission factors for either low or non-low producing wells.[153] The data also demonstrate that low-production wells can have very high emissions—identifying low-production gas well sites with emissions as high as 40 tons per year methane and oil well sites (GOR >300) with emissions as high as 35 tons per year. Appendix G. All of these values represent fugitive emissions only (not total site level emissions) and are nearly ten times higher than the emissions factor EPA includes in its proposal.

The analysis uses these study measurements coupled with national activity data to further refine emissions factors for each of the types of model facilities EPA identifies (which, in almost every case, results in lower modeled site level fugitives than the average values reported in the dataset). Using this approach, we estimate average, fugitive site-level CH_4 emissions of 15.5 tons/site for a non-low-production gas site, while EPA uses an emission factor of 5.9 tons/site. Similarly, for low-production gas sites, our estimated CH_4 fugitive emission factor (6.1 tons/site) is 1.3 times higher than EPA's estimate for low-production sites, and slightly higher than EPA's estimate of baseline emissions for non-low-production gas sites. Table 4, below, summarizes our emissions factors for low and non-low-production well sites and Appendix G provides further details on how these numbers were developed.

[153] EPA's estimate for low-producing gas wells is 4.8 tpy and for non-low producing gas wells is 5.9 tons per year. EPA's estimate for oil well sites in each category is lower. The study did not include any measurements for low-production oil wells with GOR <300.

Table 4: Comparison of Emissions Factors (EDF Analysis based on Measurements from 1000 Well Sites vs. EPA Emission Factors).

	Emission factors (tpy CH4)	
	EDF analysis	NSPS TSD
non-low Prod: Gas	15.5	5.9
non-low Prod: Oil > 300 GOR	11.8	3.0
non-low Prod: Oil< 300 GOR	10.4	2.1
low Prod Sites: Gas	6.1	4.8
low Prod Sites: Oil > 300 GOR	4.7	2.6
low Prod Sites: Oil < 300 GOR	1.8[a]	1.8
Total	**---**	**---**

[a] based on EPA's NSPS TSD estimate due to lack of measurement data

As has been reported in previous studies, we attribute these discrepancies primarily to the emissions from abnormally high emitting sources, which are not adequately accounted for in EPA's emission factors. Both low-production and non-low-production high-emitting sites (super emitters) dominate total CH_4 emissions from both group of sites, accounting for 50% of the total CH_4. High-emitting sites among the low-production sites emit more than 23 tons CH_4 per site, five times above the average for low-production sites. Low-production wells also have production-normalized loss rates that are substantially higher than for non-low-production wells. For instance, on average, these sites lost 11 % of production compared to less than 1% for non-low-production wells. As described above, these higher production normalized loss rates suggest that, for the same, absolute site-level emissions, low-production wells may have greater mitigation potentials because their emissions profile indicates they are operated far less efficiently. Frequent LDAR is needed to identify and reduce emissions from these sites.

d. The costs of performing semi-annual LDAR at low-production sites are reasonable and will not lead to well shut in.

EPA likewise solicits comment on the costs of performing LDAR at low-production sites, and in particular, whether these costs would lead to adverse consequences for small operators, including well shut-ins. EPA assessed this same concern in the context of the 2016 Rule, though did not receive any data supporting it. 81 Fed. Reg. 35,856.

The agency does not offer any data in support of its concern, though updated analysis shows these costs are reasonable.[154] Notably, the low-production requirements have been in place for one-and-a-half years and EPA points to no evidence of adverse consequences or well shut-ins.

In particular, earlier in these comments, we presented cost-effectiveness numbers for low-producing wells, using updated emissions factors from our analysis in Appendix G, and both EPA cost figures and updated MJ Bradley cost figures (accounting for the shorter survey times reflected in available compliance reports). *See* Appendix F. Furthermore, while we have critiqued EPA's decision to using a scaling factor to reduce component counts at low-production wells, if the agency retains this approach, it would be arbitrary for EPA to not similarly scale survey costs at these sites. For example, the number of components directly affects survey time and repair costs, and to the extent EPA concludes these values are smaller, survey costs at low-production sites would also be lower. Accordingly, we developed a scaled, low-production survey cost of $1,871 for semiannual monitoring at a low-production well site (compared to EPA's value of $2,333, which it uses for both low- and non-low-production well sites).[155] Table 5 summarizes these costs and resulting changes in cost-effectiveness.

Table 5: Comparison of Semiannual Monitoring Costs at Low-production Wells (EPA Costs, MJ Bradley Costs, Scaled Costs).

	Survey Costs	Percentage Improvement Compared to EPA Value
EPA	$2,333	N/A
MJ Bradley	$1,584 - $1,730	26%-32%
Scaled	$1,871	20%

MJ Bradley analyzed leak detection and repair costs as a percentage of low-production well revenue.[156] For this analysis, MJ Bradley used data from Drilling Info to identify wells that were either newly-drilled or modified after September 18, 2015, and are affected by the current NSPS. The analysis then isolated the low-production wells within this set, and calculated revenue for these wells using average monthly crude oil and natural gas prices. Using EPA survey cost

[154] Commenters also submitted information on the 2015 proposal demonstrating the costs of LDAR at low producing wells were reasonable. CATF et al. Comments at 40-42.

[155] We developed this value by using the scaling factor EPA derived from the Fort Worth Study (.79) and applying that factor to those portions of EPA's cost estimate that would scale with survey time. We identified those cost elements in the MP OGI Cost tab of EPA's spreadsheet "1_-_Proposed_Rule_OOOOa_TSD_Section_2_-_OGI_Well_Pad_Model_Plant_Costs.xlsx," which is attached the TSD for the proposal. Accordingly, we scaled costs that would scale with component counts, including "OGI Camera Survey," "Repair Costs," and "Repair Component Resurvey." We did not scale other costs that are fixed and would not change with component count.

[156] Appendix I, Dana Lowell, MJ Bradley & Associates, *Analysis of Marginal Well Shut-ins* (December 2018) ("MJB Marginal Well Memo").

figures, the analysis indicates that LDAR implementation costs were less were less than 0.8 percent of annual revenue for individual wells on the margin of economic viability (i.e. those new and modified wells that have been historically shut it). These costs are well below those that EPA has determined to be reasonable.[157]

The MJB Marginal Well Memo likewise evaluates the entities that own these wells to assess concerns EPA raises that compliance costs would pose burdens on small operators. The analysis found that compliance costs were less than 0.3 percent of annual company revenue from the entire portfolio of new marginal wells, and were less than 0.2 percent of annual company revenue from the entire portfolio of new and modified wells, even for small companies. Importantly, this considers just the revenues associated with companies' new or modified wells, which are subject to the NSPS. If expanded to include revenues from all wells, these revenues would be far higher (and compliance costs as a percentage of revenue, even smaller).

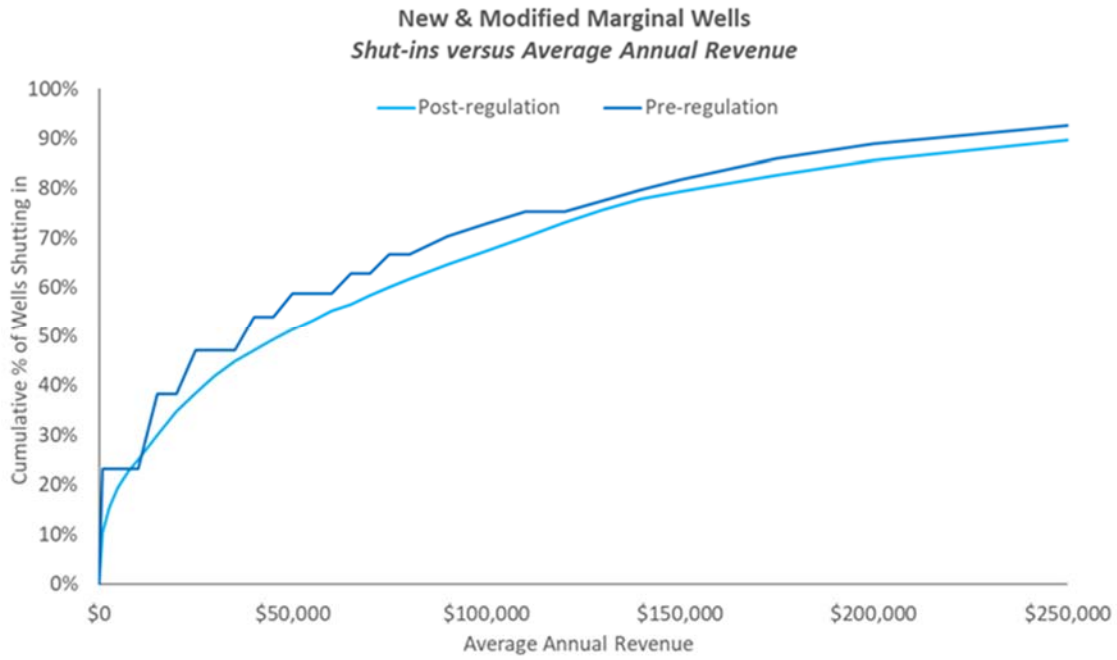
Table 6: Ownership Profile and Revenue of All New and Modified Wells

# New & Modified Wells per Company	# Companies	# New & Modified Wells		AVG Annualized Revenue per Company ($ mill)	LDAR Compliance Cost, % of Revenue
		NUM	% MARG		
1	745	745	65%	$1.7	0.07%
2	326	652	49%	$2.0	0.12%
3	163	489	48%	$5.0	0.07%
4	115	460	46%	$3.6	0.13%
5 - 9	224	1,435	38%	$8.8	0.09%
10 - 99	321	8,838	17%	$73.8	0.08%
100 - 299	60	9,911	6%	$571.6	0.04%
300 - 499	14	5,393	3%	$1,847.8	0.03%
500+	9	6,231	13%	$2,988.7	0.03%
TOTAL	**1,977**	**34,154**	**14%**		

As this revenue and cost analysis suggests, the very incremental compliance costs associated with performing LDAR at low-production sites is not likely to cause well shut-ins. The MJB Marginal Well Memo further specifically evaluated EPA's concern that compliance costs would result in low-production wells being shut-in. The analysis evaluated low-production wells drilled in the three years prior to OOOOa requirements taking affect and compared that to low-production wells subject to the standard. The analysis concluded that a variety of non-revenue related factors affect well shut-in, but nonetheless that the new and modified low-production wells that shut in during these timeframes generated nearly identical revenues. This result is not surprising given that compliance costs represent only a very small percentage of revenue, and indeed, the MJ Bradley analysis concluded that, at most, the incremental impacts of compliance costs could affect shut in rates by 0.5%. Figure 12, below sets forth these results.

[157] *See also* CATF et al. Comments at 40-41, analyzing compliance costs as a percentage of low producing well revenue.

Figure 12: Low-production Well Revenue vs. Shut-in Percentage (Pre- and Post-Regulation).



Furthermore, LDAR costs represent a small fraction of both the capital expenditures required to develop a new well and industry-wide revenues, suggesting LDAR costs are unlikely to cause low-production wells to shut-in. The juxtaposition between LDAR costs and the capital investment helps to contextualize the magnitude of these inspection costs when compared to the capital costs operators face drilling a new well. A recent report issued by the U.S. Energy Information Administration assesses capital costs for oil and gas production across the United States for the period 2006 to 2016.[158] As reported by the EIA, during that time period, the total capital costs per onshore well ranged from $4.9 to $8.3 million.[159] These per-well capital costs far outweigh the fractional, incremental cost of LDAR as estimated by EPA at $2,333 per year per two well site. Similarly, in the 2016 RIA, EPA estimated the total compliance costs for the fugitive emissions element of the rule, which includes LDAR, for Well Pads, Gathering and Boosting Stations and Transmission Compressor Stations to be $189.8 million in 2020 and $379.8 million in 2025.[160] These costs are a very small fraction—less than 0.2%—of the recent annual value of produced oil and natural gas.[161] Because LDAR costs are so small relative to

[158] EIA, *Trends in U.S. Oil and Natural Gas Upstream Costs* (March 2016), *available at* https://www.eia.gov/analysis/studies/drilling/pdf/upstream.pdf.
[159] *Id.* at 2-5.
[160] 2016 RIA at Table 3-12, Table 3-13.
[161] We have calculated the 2016 annual value of produced U.S. oil and gas as $224,497,649,000 by multiplying the total oil and gas production in 2016 by the average price of oil and gas, respectively, in 2016. Average gas and oil price for 2016 obtained from EIA for Henry Hub

total capital costs and industry revenues, it is unlikely that LDAR compliance costs would affect decisions about whether to drill new wells or shut-in wells, or otherwise harm producers or reduce new oil and gas development. Indeed, these comparisons underscore the reasonableness of semiannual LDAR at both low and non-low-production well sites.

***

We oppose EPA's proposal to separately subcategorize low-production well sites[162] and weaken requirements for these sources. To the extent the agency moves forward with this approach, however, the data make clear that low-production well sites should be subject to semiannual monitoring and, consistent with our analysis earlier in this section, higher production well sites should be subject to more frequent monitoring. Moreover, should EPA subcategorize these sources, the agency must make clear that non-low-production sites cannot become low-production sites, simply by virtue of declining production over time.

3. EPA's proposed reduction of compressor station monitoring frequencies is arbitrary, unlawful, and unsupported by evidence.

EPA trots out the same three alleged "uncertainties" in proposing to weaken LDAR requirements for compressor stations—reducing the monitoring frequency at these sources from quarterly monitoring to either semiannual or annual monitoring. As discussed *supra*, Commenters oppose these weakened standards on the basis of the resulting increased emissions and EPA's violation of its specific duties under the Clean Air Act and Administrative Procedure Act. In addition to these reasons, EPA's proposal to reduce monitoring frequency at compressor stations on the basis of so-called "uncertainties" and submissions by industry groups, 83 Fed. Reg. at 52,071, is arbitrary and unlawful for at least four reasons.

First, the agency's proposal is inconsistent with its own analysis, which shows quarterly monitoring remains the BSER. Second, neither the data submitted by industry groups nor the "uncertainties" that EPA references support weakening the standards. Third, EPA's proposal to reduce monitoring frequency is arbitrary and inconsistent with the agency's recognition that certain characteristics of compressor stations make them more leak-prone. Finally, EPA arbitrarily ignores evidence demonstrating that the costs of quarterly monitoring are significantly lower than what EPA estimates—which is further supported by independent data demonstrating that quarterly monitoring pays for itself via natural gas savings.

($2.52/MMBtu), *available at* https://www.eia.gov/dnav/ng/hist/rngwhhdd.htm, and Cushing ($43/bbl), *available at* https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D). Oil and gas production for 2016 obtained from EIA, *available at* https://www.eia.gov/totalenergy/data/monthly/pdf/sec4_3.pdf.

[162] Any EPA decision to adopt a different low-production threshold than the one included in the Proposal would be arbitrary and capricious for the same reasons as the proposed 15 boed threshold.

a. EPA's own analysis supports retaining quarterly monitoring as BSER.

In the 2016 Rule, EPA determined quarterly monitoring at compressor stations was the BSER, concluding that monitoring at that frequency was cost-effective and would deliver greater emission reductions than either semiannual or annual monitoring. 81 Fed. Reg. 35,862. In doing so, EPA developed and evaluated baseline emissions and emission reductions at different model facilities—including gathering and boosting compressor stations and transmission and storage compressor stations.

In the 2018 Proposal, EPA has retained the same model plants, baseline emissions, and emission reductions for quarterly monitoring at compressor stations. *See, e.g.*, 2018 TSD at 16-17 (describing how "[the gathering and boosting] model plant did not change from the model plant used in the 2016 NSPS OOOOa TSD"). EPA likewise retained the costs associated with monitoring at these facilities, *id.* at 27-30, and therefore, the cost-effectiveness of quarterly monitoring at these sites was the same as what it concluded in 2016.[163] The *only* basis EPA provides for significantly weakening compressor station LDAR requirements (and significantly increasing dangerous emissions) is that, due to its "uncertainties," EPA is "unable to conclude that quarterly monitoring is cost-effective for compressor stations." 83 Fed. Reg. at 52,071. These "uncertainties" are the exact same ones EPA claims also support reducing the frequency of monitoring at well sites. As we describe *supra* § I.B.3, EPA's focus on cost-effectiveness above all other considerations is unlawful, and the agency's reliance on "uncertainties" to dismiss the record before it is both illegal, *supra* § I, and wrong, *supra* § I, *infra* at § VI. The alleged "uncertainties"—even if they could be relied upon (which they cannot)—are either irrelevant or actually support a conclusion that monitoring is *more* cost-effective than EPA estimated in 2016.

However, even under the deeply flawed framework in the 2018 Proposal, the agency's proposal to weaken compressor station monitoring requirements is arbitrary and unlawful. Table 7, below, compares the cost-effectiveness of quarterly monitoring for compressors stations with EPA's proposed reduced monitoring frequency at well sites (annual for non-low-production wells and biennial at low-production wells).

[163] There are slight differences in the cost-effectiveness numbers in the 2016 Rule and the 2018 proposal due to the agencies updates of costs to 2018 dollars.

Table 7: Comparison of Cost-Effectiveness in EPA 2018 Proposal of Monitoring at Compressor Stations and Well Sites.

	Compressor Station (Quarterly)	**Non-Low-Production Wells (Annual)**	**Low-Production Wells (Biennial)**
CH_4 Cost-Effectiveness (2018 Proposal / Single-Pollutant / with Cost-Savings)	$749/ton	$1,140/ton	$906/ton

As Table 7 shows, EPA's analysis supporting the 2018 Proposal concludes that quarterly monitoring at compressor stations is even more cost-effective than EPA's proposed monitoring frequencies at well sites (annual for non-low-production and biennial for low-production). EPA does not explain how the same cost-effectiveness numbers that it determined were acceptable in 2016 are no longer so in 2018. Even more remarkably, EPA does not (and cannot) describe why $749/ton is not cost-effective for compressor station monitoring, when, in the same action, the agency proposed well site requirements that range in cost-effectiveness from between $900-$1,100—requirements for which the agency claims it has the same uncertainties that animate its "concerns" here. This is a hallmark of arbitrary and capricious decisionmaking. *See United States Sugar Corp. v. EPA,* 830 F.3d 579, 650 (D.C. Cir. 2016) ("This court has often declined to affirm an agency decision if there are unexplained inconsistencies in the final rule.") (quoting *Dist. Hosp. Partners v. Burwell,* 786 F.3d 46, 59 (D.C. Cir. 2015)); *Gen. Chem. Corp. v. United States*, 817 F.2d 844, 846, 260 U.S. App. D.C. 121 (D.C. Cir. 1987) (holding agency action to be arbitrary because its analysis was "internally inconsistent and inadequately explained").

To the extent that EPA supports this proposed reduction in monitoring frequency on the basis of broad "uncertainties" as to emissions reduction and cost-effectiveness, such justification is neither legally nor factually warranted. Commenters refer EPA to our discussion of this issue in the context of non-low-production well sites, given that EPA's "uncertainties" as to compressor stations are "the same uncertainties described previously for non-low-production well sites." 83 Fed. Reg. at 52,071. Our critiques of the alleged "uncertainties" as detailed above likewise applies to any reliance by EPA on those uncertainties to change the standards for compressor stations.

EPA's proposal to weaken LDAR requirements is wrong on every level—it is inconsistent with the statute, impermissibly relies on flawed uncertainties, and is arbitrary and capricious even on its own terms. The latter is especially evident here, where the agency's proposal flatly contradicts its approach to other standards in this same rulemaking.

b. Industry-submitted data does not support the Proposal's weakening of compressor station monitoring, as EPA concedes by not changing its analysis.

In addition, EPA cannot base its proposal to weaken compressor LDAR requirements on data submitted by the industry groups GPA Midstream ("GPA") and the Interstate Natural Gas Association of America ("INGAA"). Though these groups claim this information justifies a reduction in compressor monitoring frequency, the agency itself did not rely on the data and found it suffered from important shortcomings.

For example, with respect to the data that GPA submitted regarding emissions at 110 gathering and boosting compressor stations, EPA stated that "[i]t was difficult for us to make any conclusions from the information." 83 Fed. Reg. at 52,069. As provided in EPA's memorandum analyzing the data, this was for a number of reasons relating to data uncertainty, including:

- Only 35 percent of 110 compressor stations in the study (i.e., 38 stations) were actually monitoring pursuant to Subpart OOOOa standards, thereby reducing the value of the data based on a lack of standardization. EPA states: "Without standardization of monitoring procedures, it is not possible to determine the quality of the monitoring data and whether the survey operator accounted for environmental conditions and interferences during the survey."[164]

- The data provided no information on environmental conditions, such as thermal background and wind conditions, which can greatly affect the effectiveness of OGI.[165]

- Information on the components monitored was limited. For 30 of the compressor stations, there was no information whatsoever as to the number of components monitored. For the other 80 stations, the data provided the total number of components per station, but not per monitoring event. This matters greatly to the usefulness of the data, as "there is uncertainty whether the evaluated leak rates are truly representative" of components as defined by Subpart OOOOa.[166]

The memorandum also called into doubt GPA's conclusion that leak rates will sharply decline following an initial leak detection survey, given that the data actually showed the opposite in several cases. As EPA states: "Due to the wide amount of variability in the data, it was difficult for us to make any conclusions regarding leak rates from the provided information."[167] For these reasons, EPA did not make any updates to its model plants using the

[164] *See* Memorandum re: EPA Analysis of Compressor Station Fugitive Emissions Monitoring Data Provided by GPA Midstream 2 (April 17, 2018) [hereafter GPA Memorandum].
[165] *Id.* at 2-3.
[166] *Id.* at 3.
[167] *Id.* at 3-4.

GPA data and did not otherwise alter the conclusions that it had reached. 83 Fed. Reg. at 52,069.[168]

EPA similarly declined to change its analysis in response to the INGAA's submission, which was "an analysis of third party studies and reports as justification for annual monitoring at compressor stations." *Id.* at 52,071. As further described in its memorandum analyzing INGAA's submission, EPA states that it has "several concerns with the analysis and conclusions presented by [INGAA]" and that "EPA is unable at this point to conclude that this information supports annual monitoring for compressor stations." *Id.* EPA's memorandum pointed to a number of specific problems with INGAA's analysis of and conclusions drawn from the third-party studies, including framing data as supporting the efficacy of annual monitoring when the data provided no information as to monitoring frequency; using a study's draft sets of data rather than the final sets; substituting emissions factors; and making inappropriate comparisons.[169] Appendix C includes more detailed critiques of these two studies.

Nonetheless, even though EPA did *not* adopt the conclusions of the two industry submissions that purport to justify a reduction to annual monitoring (and indeed, called into question aspects of these studies), EPA has opted to co-propose semi-annual and annual monitoring at compressor stations. 83 Fed. Reg. at 53,071. In fact, EPA readily admits that "EPA *has not received data that supports* a proposal to change the monitoring frequency to annual monitoring."[170] For EPA to propose such a reduced monitoring frequency with no data in support—from the current monitoring requirements that are supported by data and which EPA admits are cost-effective—is arbitrary and capricious and appears to be based entirely on the fact that this is what industry has requested.

c. EPA's proposal unlawfully disregards evidence that compressor stations are highly prone to fugitive emissions and otherwise should be subject to more frequent monitoring.

Third, EPA's co-proposal of reduced monitoring frequencies on the basis of broad "uncertainties" and industry submissions it did not adopt is particularly arbitrary in light of data—cited by EPA—that specific characteristics of compressor stations make them more prone to fugitive emissions.

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[168] *See also* EPA/OMB, *EO 12866 Interagency Comments on EPA Draft Proposed Rule Titled, "Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration," (RIN 2060-AT54)*, Docket No. EPA-HQ-OAR-2017-0483-0076, at 1-2 (June 2018) [hereafter *Interagency Comments*] ("The EPA has evaluated the data provided by the industry and reaches the same conclusion that quarterly monitoring is cost-effective for compressor stations.").

[169] *See* Memorandum re: EPA Analysis of Fugitive Emissions Data Provided by INGAA 2, 3-4, 6-7 (April 17, 2018) [hereafter INGAA Memorandum].

[170] *Id.* at 8-9 (emphasis added).

As EPA states, "[t]he unique operating characteristics of compressor stations may support more frequent monitoring of compressor stations as compared to well sites. The collection of fugitive emissions components located at compressor stations are subject to vibration and temperature cycling." *Id.* at 52,070. In support of this conclusion, EPA cites a best management practice documents issued by the Canadian Association of Petroleum Producers and EPA's own best practices guide for LDAR. *Id.* (citing Canadian Ass'n of Petroleum Producers, *Best Management Practice: Management of Fugitive Emissions at Upstream Oil and Gas Facilities* (Jan. 2007); EPA, *Leak Detection and Repair: A Best Practices Guide*, EPA-305-D-07-001 (Oct. 2007)). Both documents recommend more frequent monitoring for the components with the most emissions. The Canadian document additionally provides, in EPA's characterization, that "components subject to vibration, high use, or temperature cycling are the most leak-prone." *Id.*

EPA also cites evidence from another commenter indicating that the operating mode of compressors could have important consequences for detected fugitive emissions. 83 Fed. Reg. at 52,070. Specifically, "when compressors were in standby mode, the detected fugitive emissions were lower." *Id.* In other words, monitoring during an operating mode such as standby would result in lower detection of emissions. From this finding, EPA concluded that "[i]f the operating mode of individual compressors has an impact on the occurrence of fugitive emissions, it may provide support for *more frequent monitoring*, or alternatively, a requirement to monitor when compressors are operating reflective of normal operating conditions." *Id.* (emphasis added).

In spite of this evidence that supports maintaining frequent monitoring for compressor stations—or at the very least constitutes "uncertainties" EPA has identified that suggest *more* frequent monitoring is warranted—EPA nonetheless co-proposes semiannual and annual monitoring at compressor stations. In doing so, EPA fails to explain why it is favoring other evidence—presumably the industry submissions and other broad "uncertainties"—over specific evidence to the contrary.

This is not rational analysis, and it does not offer the public adequate information as to EPA's decisionmaking. EPA cannot introduce information, including its own best practices, that, in addition to the agency's own technical analysis, supports retaining the current quarterly monitoring for compressor stations and then take the opposite approach without any explanation. It is all the more egregious that the statements in support of reduced monitoring is only broad (and unsupportive) "uncertainties" and industry submissions that EPA has critiqued and chosen not to incorporate into its analysis.

EPA's proposed reduction in monitoring at compressor stations is arbitrary, capricious, and counter to the evidence.

d. EPA ignored or failed to address evidence that quarterly monitoring is even more cost-effective than EPA estimated.

Finally, EPA appears to have ignored data demonstrating that the monitoring costs for compressor stations are much *lower* and emissions *higher* than what EPA has estimated in the 2018 Proposal. This is particularly significant, given that the primary basis of EPA's co-proposal

is that EPA is "unable to conclude that quarterly monitoring is cost-effective for compressor stations." *Id.* at 52,071. Additionally, Commenters now present EPA with further evidence that the quarterly monitoring is cost-effective based on natural gas savings alone.

In the Proposal, EPA notes a submission by Target Emission Services ("TES") that includes case studies of quarterly leak detection and repair performed at over 100 compressor stations across nine states.[171] Consistent with EPA's finding described above, the TES case study noted the importance of frequent monitoring given that compressors were sometimes monitored in standby mode. In addition, the case study provided information on survey costs and payback period. In particular, the TES case study identified average monitoring times of 3.1 hours per survey, monitoring costs of $1,220, and repair costs of $450, concluding that the program payback period based on recovered gas was approximately 12 months. *Id.* at 13. Importantly, these data were taken from facilities complying with the OOOOa LDAR requirements, and as Table 8 below shows, these facilities experienced far lower costs than EPA projects.

Table 8: Costs and Benefits of Quarterly LDAR (TES Case Study vs. EPA TSD).[172]

	TES Case Study	**2018 TSD**
Average Monitoring Time Per Survey	3.1 hours	10.6 hours
Monitoring Cost Per Survey	$1,122	$2,300
Repair Cost Per Survey	$450	$3,638

As Table 8 shows, the costs of quarterly LDAR monitoring at compressor stations are far lower than EPA projects (and the cost-effectiveness far higher). Indeed, EPA clearly considered the TES case study, 83 Fed. Reg. at 52,069, but arbitrarily made no mention of its important conclusions that EPA has substantially overstated the costs of performing surveys and, as a result, the cost-effectiveness of quarterly monitoring at compressor stations is better (lower) than EPA had estimated.[173]

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[171] Terence Trefiak, Target Emission Services, *NSPS OOOOa Monitoring Case Study* (Mar. 7, 2018), Docket ID No. EPA-HQ-OAR-2017-0483-0031.

[172] 2018 TSD, Spreadsheet Entitled "2 - Proposed Rule OOOOa TSD Section 2 - OGI Compressor Model Plant Costs," available at https://www.regulations.gov/document?D=EPA-HQ-OAR-2017-0483-0040.

[173] EPA's arbitrary and one-sided assessment of the underlying data, along with its adoption of industry suggestions, are consistent with the approach the White House urged as part of the interagency review process. As revealed in communications between EPA and the White House Office of Management and Budget ("OMB"), EPA originally concluded as late as June 2018 that quarterly monitoring for compressor stations was cost-effective, and its preferred option was to retain the frequency in the proposed rule.[173] Furthermore, even though EPA eventually believed that it could justify a reduction to semiannual monitoring, it did not believe it could justify the same for annual monitoring. Interagency Comments, supra, at 1-3 ("We disagree with the commenter that annual monitoring is appropriate for this proposal."); Email from Karen Marsh,

In addition, similar to their analysis for well sites, MJ Bradley evaluated available compliance reports submitted to EPA under OOOOa for compressor stations.[174] This assessment looked at average reported survey times and imputed survey costs. Similar to the TES case study, the MJ Bradley analysis concludes that EPA's LDAR cost estimates for compressor stations are likely significantly overstated. In particular, the analysis found that survey times reported in the available compliance reports averaged 2.8 hours per station (very similar to the TES case study) and cost reductions due only to these time savings suggest EPA's estimated costs are overstated by anywhere from 7 percent to 24 percent. This cost information for facilities subject to OOOOa directly contradicts EPA's suggestion that quarterly monitoring at compressor stations is not cost effective.

In addition to this evidence concerning costs, Commenters present additional analysis related to emissions as compressor stations. In particular, commenter EDF has recently performed its own analysis of LDAR at different frequencies based on the latest scientific data and has concluded that EPA dramatically underestimated fugitive emissions at compressor stations—and therefore the cost-effectiveness of monitoring frequencies.[175]

EPA, to Chad Whiteman, OMB (Aug. 14, 2018), Docket No. EPA-HQ-OAR-2017-0483-0057, at 2 (explaining why EPA "could not use the same justification to move to annual monitoring").

[174] Appendix J, Dana Lowell, MJ Bradley & Associates, *Analysis of OOOOa Annual Air Emission Reports – Compressor Stations* (December 2018) ("MJB Compressor Memo").

[175] Appendix F, Hillary Hull, EDF, EDF NSPS LDAR Methane Cost-Effectiveness Analysis – Source Counts, Baseline Emissions, and Costs (December 2018). For transmission and storage compressor stations, baseline emissions were derived using the total station emissions estimates and the assumption that 75% of total station emissions are fugitive, both from Zimmerle et al (2015). For gathering and boosting compressor stations, baseline emissions were derived using the total station emissions estimates from Marchese et al (2015), and a conservative assumption that 50% of total station emissions are fugitive (based on past EPA GHGI inventories and engineering judgement). *Id.* Zimmerle et al (2015) used onsite measurements and modelling to assess emissions from the transmission and storage segment, including transmission and storage compressor stations. Marchese et al (2015) used facility-level emissions data to assess emissions from the gathering and processing segment, including compressor stations in that segment. Both studies found that the U.S. Greenhouse Gas Inventory (relied upon by EPA in developing its emissions estimates, *see* 2018 TSD at 17) significantly underestimated methane emissions from those sources.

Table 9: Baseline Emissions From Compressor Stations (Comparison of EDF and EPA Estimates; Source Count per year).

Facility Type	Compressor Stations		
	Baseline (tons/facility)		Source Count
	EPA	EDF	EPA/EDF
G/B	35.1	189.0	212
Transmission	40.4	502.5	36
Storage	142.4	635.3	2

As a result, quarterly monitoring at compressor stations effectively pays for itself through the value of the natural gas that would otherwise be lost as fugitive emissions, a conclusion consistent with the findings in the TES case study (which documented a 12-month payback period). The table below uses a single-pollutant approach to compare the cost-effectiveness of OGI monitoring frequencies between EPA's 2018 TSD and EDF's baseline emissions analysis, including the percentage difference in calculated cost-effectiveness. As the table illustrates, the costs calculated by EDF are consistently lower than the EPA figures (which themselves support quarterly monitoring). This is because EDF's estimates for compressor station fugitive emissions, based on estimates from recent studies showing that compressor station methane emissions are significantly higher than estimated by EPA, are much higher than EPA's emissions estimates for compressor stations, which are based on outdated emissions data.[176]

Table 10: Comparison of EPA's and EDF's Cost-Effectiveness of OGI Monitoring Frequencies at Compressor Stations, Single-Pollutant Approach

Production	Frequency	Without Savings ($/ton)			With Savings ($/ton)		
		EPA	EDF	EDF vs. EPA	EPA	EDF	EDF vs. EPA
Compressor Stations	Annual	$557	$86	-85%	$396	-$62	-116%
	Semi-annual	$652	$101	-85%	$491	-$49	-110%
	Quarterly	$910	$141	-85%	$749	-$15	-102%

Note: Reflects updates to the baseline emissions only.

This cost and emissions information, along with EPA's recognition that several factors at compressor stations "may provide support for more frequent monitoring," all suggest that EPA should, at minimum, retain quarterly monitoring for compressor stations. Indeed, based on these analyses, more frequent monitoring may be warranted. Conversely, EPA's proposal to weaken

[176] *See* 2018 TSD at 17-18 ("Baseline model plant emissions were calculated using the fugitive emissions component counts from the GHG Inventory, derived from the Greenhouse Gas Reporting Program (GHGRP), 1996 EPA/GRI study, and 40 CFR part 98, subpart W tables as described above, the component oil and natural gas production emission factors from the Protocol for Equipment Leak Emission Estimates (1995 Protocol) as incorporated into AP-4213 for non-thief hatch fugitive emissions components.")

compressor station LDAR requirements is unsupported by the record, arbitrary, and unlawful, and we urge EPA to abandon these proposed changes.

4. Other proposed changes to fugitive emissions requirements.

EPA proposes a number of other changes to the standards, and solicits comment on a variety of other aspects of the standards that EPA has not proposed to change.

- *Initial Survey.* EPA has proposed to maintain the 60-day initial monitoring requirement, but solicits comment and information regarding extending it to 180 or 90 days. Commenters support retaining the 60-day initial monitoring requirement. Petitions for reconsideration requested this change, asserting that additional time was needed to prepare for and coordinate monitoring. The agency noted, however, that no petitioners provided information supporting this request. To the extent any petitioners provide information through this comment period that EPA seeks to rely on in lengthening the initial requirement, EPA cannot lawfully finalize changes to its standards without affording commenters an opportunity to evaluate and critique the data on which it purports to rely. In any event, EPA's 60-day initial monitoring requirement is consistent with certain state standards, including those in Colorado and Pennsylvania, and accordingly, we urge the agency to retain it.

- *Repair Provisions.* EPA proposes to change the current requirement that leaks be repaired within 30 days to one where operators would have to attempt an initial repair within 30 days and final repair within 60 days. This change is unnecessary, as data consistently shows that most leaks are quickly repaired. For instance, the MJ Bradley analysis assessing available compliance reports, Appendix E, showed that over a third of leaks were repaired on the same day they were detected and 90 percent had been repaired by the end of the reporting period. Colorado's most recent analysis of state LDAR reports likewise shows that 98.4 percent of leaks were repaired and only 1.8 percent of leaks remained on delay of repair lists.[177] Several states, including Colorado and California, within 30-days or less, demonstrating the feasibility of this requirement, and EPA's proposal to extend these requirements will therefore result in additional, unnecessary harmful pollution.

- *Modifications.* EPA has proposed to retain the agency's definition of when a modification occurs at a well site and add a clarification concerning when separate tank batteries are modified. We support the agency's conclusion that a re-fractured existing well is modified because it involves a physical change to the well that results in an emissions increase. In the proposal, EPA describes a number of different ways that the increased production resulting from a re-fracture increases emissions and so constitute a modification. In addition, EPA proposes to clarify that a modification occurs at a separate

[177] Colorado Department of Public Health and the Environment, *LDAR Annual Report (2017) Summary* (Aug. 22, 2018) https://www.colorado.gov/pacific/cdphe/2017-ldar-annual-reports-regulation-7-section-xvii.

tank battery when a new well sends production to that tank battery or when an existing well removes equipment and sends production to the battery, regardless of whether new equipment is installed at the battery. We concur with EPA's assessment that both of these changes are physical or operational changes that result in emissions increases and so fall comfortably within the definition of modification.[178]

- *Site Map and Monitoring Plan*. EPA is proposing to retain site map and monitoring plan requirements and add alternatives to these requirements allowing operators to describe how they will effectively monitoring equipment. We note that many studies have concluded that the effectiveness of LDAR declines when surveys are conducted poorly, including when components are surveyed from long distance. For instance, the Ravikumar analysis, Appendix D, found "that minimum detectable leak rate can increase by almost two orders of magnitude in moving from 5 ft to 50 ft imaging distance." Accordingly, as EPA is considering these changes, we urge the agency to ensure that facility monitoring is conducted consistent with the latest scientific evidence to ensure that the standards are effectively reducing emissions.

5. Other proposed changes to the standards.

EPA proposes a number of other changes to the standards. We offer comments on those changes below.

a. Alternative Means of Emission Limitation—incorporation of emerging technologies

EPA has also proposed a number of changes to the alternative means of emission limitation provisions, which the agency adopted in 2016 to help incentivize the development and use of advanced monitoring methodologies and technologies that could potentially deliver enhanced environmental benefits at lower costs. In comments on the 2016 Rule, many of the commenters here recognized the potential value of these advanced methodologies and technologies and supported EPA's adoption of a pathway that enabled use of these methodologies and technologies if accompanied by a rigorous, transparent demonstration that they secure equivalent or superior emission reductions.[179] However, baseline standards that are protective and deliver meaningful emission reductions are an essential element of a rigorous pathway to incentivize advanced methodologies and technologies. Accordingly, another consequence of EPA's proposal to dramatically weaken OGI LDAR requirements is to remove incentives for the development of these important advanced methodologies and technologies and to potentially allow for the use of methodologies and technologies that do not deliver reductions consistent with those attributable to regular OGI-based LDAR. The potential ill-effects of this proposal on EPA's commitment to incentivize advanced LDAR methodologies and technologies

[178] Our comments on the 2016 Rule provide additional support for the agency's approach to modifications and we attach and incorporate those comments by reference. CATF et al. Comments at 55.
[179] CATF et al. Comments at 5.

is yet another reason to abandon the agency's proposed weakening of OGI-based LDAR requirements.

b. Pneumatic pumps

The NSPS includes a technical infeasibility provision for pneumatic pumps at non-greenfield[180] sites. 83 Fed. Reg. 52,061. EPA's Proposal purports to address (1) confusion regarding the definition of a greenfield site and (2) concerns about system designs at greenfield sites which are designed in a way so as to make the control of emissions from pneumatic pumps technically infeasible. 83 Fed. Reg. 52,061-62. To those ends, EPA proposes to expand the use of technical infeasibility determinations beyond the current use of the certification at non-greenfield sites by permitting these certifications at greenfield sites as well. 83 Fed. Reg. at 52,061.

To the extent there is confusion about this definition, EPA should clarify it rather than using expanded exemptions to render that definition meaningless. Moreover, this proposal represents an about-face from the reasoning provided in the NSPS. In 2016, EPA declined to extend this exemption to greenfield sites because technical infeasibility concerns "can be addressed in the site's design and construction." 81 Fed. Reg. at 35,849. Essentially, the purpose of not adopting the exemption at greenfield sites was to ensure that newly-constructed oil and gas facilities are designed in a way that ensures effective control of emissions from pneumatic pumps. Furthermore, EPA excluded pumps that "are driven by means other than natural gas" from "any requirements under the final rule." 81 Fed. Reg. at 35,849. EPA has not explained why its reasoning in 2016 was wrong or what new facts it relies upon now to change the standard.

Furthermore, several state programs showcase both the feasibility of the underlying standards and the lack of need for an expansion of the infeasibility exemption. Longstanding requirements in Wyoming, as well as newly adopted provisions in California, demonstrate the lack of need for an expansion of the technical infeasibility exemption. Wyoming has required operators of new and modified single wells and multi-well sites to control discharge streams from natural gas-operated pneumatic pumps since 2010.[181] To control pump emissions, Wyoming provides operators with options including routing the pump discharge streams to

[180] EPA defines a greenfield site as a "site, other than a natural gas processing plant, which is entirely new construction." 83 Fed. Reg. 52,061.

[181] Wyoming DEQ, Division of Air Quality, Ch. 6, Sec. 2 Oil and Gas Production Facilities Permitting Guidance, 9, 14, 19 (March 2010) ("2010 Permitting Guidance"), Ex. 1; Wyoming Ch. 6, Sec. 2 Oil and Gas Production Facilities Permitting Guidance, 11, 15, 21, 26 (Sept. 2013) ("2013 Permitting Guidance"), Ex. 2; Wyoming Ch. 6, Sec. 2 Oil and Gas Production Facilities Permitting Guidance 10, 16, 21 (May 2016) ("2016 Permitting Guidance") http://deq.wyoming.gov/media/attachments/Air%20Quality/New%20Source%20Review/Guidance%20Documents/5-12-2016%20Oil%20and%20Gas%20Guidance.pdf.

closed loop systems or a control device capable of controlling emissions by 98%, or replacing the natural-gas powered pump with one powered by electricity or instrument air.[182]

Wyoming's Department of Environmental Quality ("DEQ") revised its guidance on these standards in 2013 and again in 2016. During these revisions, DEQ considered the technical feasibility and cost-effectiveness of requiring the control of pneumatic pump emissions by routing them to a control device or closed loop system, or by replacing gas-operated pumps with electric or air-driven pumps. And in each instance, DEQ determined that it was both technically-feasible and cost-effective to maintain these requirements. Specifically, in 2013, DEQ stated that "in communication with Industry over possible control thresholds of pneumatic pumps, Industry made the commitment to control pneumatic pumps at all new and modified well sites. Therefore, the Division will consider the control of pneumatic pump emissions by at least 98% as being representative of [Best Available Control Technology]."[183] In 2016, DEQ once again revised its Permitting Guidance, and along with it, its analysis of what constitutes Best Available Control Technology for sources in this sector. Again, no operator objected to the pneumatic pumps standards.[184]

Wyoming is not the only state to require operators to control emissions from pneumatic pumps at new facilities. California's Air Resources Board ("CARB") recently finalized rules that prohibit venting from new pneumatic pumps as of January 1, 2019, allowing no exceptions.[185] In proposing the requirement, ARB noted the options available to operators in meeting the "no venting" standard: "[T]he control strategies include controlling devices with use of a vapor collection system or modifying devices to use compressed air or electricity to operate. These options are designed to provide a regulated party with flexibility to control emissions of methane from a variety of devices and pumps."[186] As in Wyoming, operators did not oppose the

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[182] 2010 Permitting Guidance at 9, 14, 19; 2013 Permitting Guidance 11, 15, 21, 26; 2015 Permitting Guidance at 10, 16, 21.

[183] Wyoming DEQ, Division of Air Quality, Proposed Revisions to the Ch. 6, Sec. 2 Oil and Gas Production Facilities Permitting Guidance, Technical Support Document, p.8 (Sept. 2013).

[184] *See* Wyoming DEQ, Response to Comments on Revisions to Oil and Gas Production Facilities, Ch. 6, Sec. 2 Permitting Guidance (DEQ did not respond to any comments regarding pneumatic pump emissions in it Response to Comments document) http://deq.wyoming.gov/media/attachments/Air%20Quality/New%20Source%20Review/Guidance%20Documents/5-12-2016%20Oil%20and%20Gas%20Guidance%20-%20Response%20to%20Comments.pdf.

[185] 17 C.C.R. § 95668(e)(4).

[186] California ARB, Staff Report: Initial Statement of Reasons, 52, (May 31, 2016) https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasisor.pdf. *See also id.* at 102 (noting that "[S]taff has provided several options that owners or operators can use to comply with the proposed regulation standard of not venting gas, including replacing gas powered pumps with electric pumps, collecting the vented gas with the use of a vapor collection system, or using compressed air to operate.")

California requirements.[187] Both the Wyoming and California requirements demonstrate the feasibility of controlling pump emissions from new facilities, as EPA currently requires.

As these state examples demonstrate, it is unnecessary to create an exemption for pneumatic pumps at greenfield sites. Pneumatic pumps can be a significant source of fugitive emissions and this exemption unnecessarily allows these components to be designed in a manner that makes their controlling their emissions technically infeasible. Further, EPA has described two limited, hypothetical circumstances where controlling pneumatic pumps may be technically infeasible. But EPA points to no evidence indicating that the lack of a technical infeasibility exemption is a problem in the current implementation of Subpart OOOOa, and indeed the successful implementation of similar state-level requirements in California and Wyoming underscore the feasibility of the current rule. Thus, EPA must retain the limited technical infeasibility exemption to non-greenfield sites only.

c. Professional engineer certification of closed vent systems and pneumatic pump technical infeasibility

The current rule requires that each closed vent system ("CVS") has "sufficient design and capacity to ensure that all emissions are routed to the control device." 83 Fed. Reg. at 52,079. A professional engineer must either certify that the design meets this design requirement and/or certify that the pneumatic pump requirements are "technical[ly] infeasible." *Id.* EPA proposes to additionally allow this certification by an "in-house engineer with knowledge of the design and operation of the CVS . . . , regardless of certification." *Id*. EPA asserts that this change would address concerns about the availability of PEs and willingness to certify a system the PE did not design, despite continued concerns about "the use of undersized or under designed CVS, which can result in pressure relief events from thief hatches and PRVs on the controlled storage vessels or CVS, thus allowing emission to escape to the atmosphere uncontrolled." *Id.* at 52,079.

Environmental Commenters discussed—and rebutted—this argument in our initial submission on the Suspension Proposal. Environmental Comments at 22-23. More recently, Colorado considered and rejected substantially similar claims. In November 2017, the Colorado Air Quality Control Commission adopted a requirement that operators obtain the certification of a professional engineer in order to exempt pneumatic pumps from control requirements.[188] In that rulemaking, industry parties raised essentially the same argument about a supposed lack of availability of professional engineers.[189] The state rejected these claims, finding that there was "no information to suggest that a requirement to obtain a PE assessment would impact the cost

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[187] *See* California ARB, Final Statement of Reasons (May 2017) (summarizing comments and agency response on proposed provisions and not identifying any comments in opposition to the pump requirements) file:///Users/Bessie/Library/Mobile%20Documents/com~apple~CloudDocs/EDF/state%20policy/CA/final%20statement%20of%20reasons%20.pdf.

[188] 5 CCR 1001-9, Section XII.K.2.c.

[189] Joint Prehearing Statement of Colorado Oil & Gas Association, Colorado Petroleum Council, and Colorado Petroleum Association 13.

effectiveness of the Division's proposal."[190] The fact that neither the opponents of Colorado's proposal nor EPA in this instance have offered any actual evidence indicating an insufficient number of professional engineers strongly indicates that such a shortfall does not, in fact, exist.

In addition, the National Society for Professional Engineers (NSPE) submitted comments to this docket opposing any EPA efforts to further suspend the standards on the alleged basis of a lack of certified professional engineers. The NSPE comments note that there are over 400,000 resident and an additional 400,000 non-resident professional engineers in the United States. MJ Bradley's Analysis in the attached *Memorandum: Estimate of Professional Engineers in O&G Industry* (Dec. 6, 2017) builds from this information and other available data on the number of professional engineers. The analysis focuses on five large oil and gas producing states and specifically (and conservatively) identifies the number of professional engineers that work for oil and gas firms or very likely have the requisite knowledge, skills, and training to certify compliance with the EPA requirements. MJ Bradley's analysis concludes that there are likely anywhere between 3,340 and 5,486 professional engineers operating in these states classified as petroleum, mechanical or structural engineers. Using the same methodologies, MJ Bradley projected between 8,000-13,000 such professional engineers operating nationally.[191]

Indeed, EPA solicited comment on the ability to obtain these certifications and received seven comments. 83 Fed. Reg. at 52,079. Three comments supported maintaining the current PE certification requirement and four claimed difficulty obtaining this certification, *id.*, though those concerns did not relate to the availability of engineers, but instead to questions surrounding the certification statement. *See* Docket ID Nos. EPA–HQ–OAR–2010–0505–12422, EPA–HQ–OAR–2010–0505–12424, EPA–HQ–OAR–2010–0505–12437, and EPA–HQ–OAR–2010–0505–12446.

The data EPA already has received does not merit amending the PE certification for OOOOa. The fact that EPA received only one comment regarding availability of PEs, coupled with the determination in Colorado, demonstrate that PE availability is not a widespread problem. And, given that the NSPS has been in effect for over two and one-half years, if there were a significant problem, evidence of that problem would be available.

Moreover, though the agency does not identify any emission changes associated with its Proposal, EPA's proposed change to the PE certification requirements could actually result in more emissions. By permitting the same person who designed the system to certify to its compliance with OOOOa requirements, EPA fails to consider that a second review of the CVS's

[190] Rebuttal Statement of the Colorado Department of Public Health and Environment, Air Pollution Control Division, In the Matter of Proposed Revisions to Regulation Number 7 at 16 (Oct. 4, 2017).

[191] The supply of professional engineers is also augmented by those that work in-house for oil and gas companies, as API has recognized in comments. API Comments on EPA's NSPS for the Oil and Natural Gas Sector, EPA-HQ-OAR-2010-0505-6884, 49 (Dec. 4, 2015) ("Oil and natural gas company engineering staff, with experience in the oil and natural gas industry and emissions control systems, and many with PE registration, are able to design systems effectively.").

compliance can help catch errors by the designer. Also, independent, third-party certification helps to ensure certifications are rigorous and free from any undue influence.

VI. EPA's Cost-Benefit Analysis Is Arbitrary, Capricious, and Contrary to Law.

EPA's analysis of the costs and benefits of its Proposal is arbitrary and capricious in several critical respects. First, the agency fails to fully weigh the costs of climate harms caused by additional methane emissions permitted by the Proposal. Second, in its analysis, EPA fails to account at all for the costs of the health harms caused by the additional VOC and HAP emissions permitted by the Proposal. Furthermore, as discussed in detail *supra* § V, EPA's calculations of the costs saved by industry under the Proposal (i.e. the so-called "benefits" of the Proposal) are very likely overestimated, as substantial evidence indicates EPA overestimated its estimates of the costs associated with fugitives monitoring.

Because methodologies exist for evaluating the harms posed by VOC and HAP, EPA cannot avoid weighing these harms on the basis of "data limitations" as it has sought to do here. 2018 RIA at 3-14; s*ee Pub. Citizen,* 374 F.3d at 1221 ("[T]he agency…apparently had no problem making estimates based on imperfect empirical assumptions when it estimated the costs [as opposed to the benefits]."); *Center for Biological Diversity*, 538 F.3d at 1198–1204 (holding that the failure to consider the social cost of carbon was arbitrary and capricious, in part because the agency monetized other uncertain benefits while attempting to dismiss the social cost of carbon based on uncertainty); *Bus. Roundtable v. SEC*, 647 F.3d 1144, 1151 (D.C. Cir. 2011) (holding an agency's cost-benefit analysis insufficient because it "relied exclusively and heavily upon two relatively unpersuasive studies" while ignoring other studies that would have changed the ultimate cost-benefit balance).

A. EPA must consider the costs of climate pollution and the Interagency Working Group's social cost of methane remains the best available estimate of the full costs of methane pollution.

In its proposed reconsideration of the 2016 NSPS, EPA uses a new, hastily-developed "domestic" "interim" social cost of methane ("'interim' SCM"), developed in response to Executive Order 13,783, issued on March 28, 2017. 83 Fed. Reg. at 52,088. EPA admits that the "interim" SCM provides only a "partial accounting" of the harms of climate change. *Id.* This change in methodology results in a dramatically lower estimate of the social cost of methane than the Interagency Working Group's estimate ("IWG SCM") because it attempts to exclude all climate change impacts taking place outside the United States. The IWG SCM (and the IWG's social cost of GHGs more broadly) is based on the most comprehensive modeling platforms available and reflects years careful development, peer-reviewed research, and numerous revisions by the collection of federal agencies that constitutes the IWG. Although this metric should be understood as a conservative floor for the true social cost of methane—which is almost certainly much higher than the IWG SCM indicates—this tool is nevertheless the best and most representative set of estimates for the social cost of methane that the federal government has thus far produced.

In eschewing the IWG SCM in favor of the "interim" SCM, EPA not only has selected a tool that improperly segments out purportedly domestic-only impacts from a phenomenon—climate change—that is inherently global in every way. The "interim" SCM also steeply discounts the future harms of climate change at annual rates of 7 percent and 3 percent, instead of using the four values included in the IWG SCM: 5 percent, 3 percent, 2.5, percent, and the 95th percentile at 3 percent. As a result, EPA's 2025 social cost of methane estimate drops from approximately $735-$4,200 per metric ton of methane (reflecting the full range of the IWG's discount rates[192]) to just $68-$200 per metric ton of methane (using the interim SCM's 7 and 3 percent discount rates, respectively).[193, 194] If the global 2016 RIA social cost estimates are applied to the 2018 RIA estimates of direct methane emissions increases,[195] we find that at a 3 percent discount rate, the forgone benefits for 2019-2025 are $413 million compared to EPA's estimate of $54 million, also using a 3 percent discount rate. Thus, when applying a 3 percent discount rate, EPA's hastily developed methodology reduces the foregone climate benefits of the proposed action by 87 percent. The reduction could be as high as 97 percent, as is the case when comparing the 2018 RIA estimate of domestic forgone benefits discounted at 7% with an estimate of global forgone benefits discounted at 2.5 percent. *See* Table 11 for a breakdown of the cost of globally forgone climate benefits.

[192] The full range of the IWG's discount rates has a 5% discount rate at the lower end. The extreme high cost is the 95th percentile of the SC-CH4 distribution at the 3% discount. It is modeled to show the cost in a world in which GHG impacts are higher than expected.

[193] *Compare* 2018 RIA Table 3-4 (reporting interim domestic social cost of CH4, 2019-2025 (in 2016$ per metric ton CH4)) *with* EPA, Regulatory Impact Analysis of the Final Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources ("2016 RIA") Table 4-3, Dkt. No. EPA-HQ-OAR-2010-0505-7630 (Social Cost of Methane (SC-CH4), 2012 – 2050a [in 2012$ per metric ton] (Source: Marten et al., 2014b)). Note that these values are adjusted to 2016 dollars for direct comparison.

[194] The values used in the 2016 RIA are from the following study: Marten, A., Kopits, E. A., Griffiths, C.W., Newbold, S.C., and Ann Wolverton (2014). Incremental CH4 and N2O mitigation benefits consistent with the US Government's SC-CO2 estimates. Climate Policy, DOI: 10.1080/14693062.2014.912981. Note that the methods used in the the Marten et al. 2014 study are consistent with the 2010 IWG SC-CO_2 estimates. Also note that the SC-CH4 costs estimated in this study rely on methane radiative forcing values estimated in the IPCC Fourth Assessment Report (AR4) from 2007. The social cost of methane reported in the study would be even higher if updated with the significantly larger radiative forcing estimates from the IPCC Fifth Assessment Report (AR5).

[195] *See* 2018 RIA Table 3-3 (reporting annual direct increases in methane, VOC and HAP emissions compared to the 2018 baseline, options 2 and 3, 2019 through 2025).

Table 11: REVISED Table 3-6 from 2016 RIA: Discounted Forgone Global Climate Benefits of the Co-Proposed Option 3, PV and EAV (millions, 2016$).[196]

YEAR	DISOUNT RATES 7%	3%	2.5%
2019	--	$35.11	$46.94
2020	--	$42.45	$56.60
2021	--	$50.98	$67.82
2022	--	$59.46	$78.97
2023	--	$66.68	$88.42
2024	--	$75.03	$99.38
2025	--	$83.29	$110.22
PV	--	**$412.99**	**$548.36**
EQUIVALVENT ANNUAL VALUE	--	$66.29	$86.36

This "interim" estimate is arbitrary and capricious because it departs from the best available science and EPA's prior practice without a well-reasoned explanation.[197] Although EPA provides its own similar estimate of the IWG SCM in the 2018 RIA appendix A3,[198] these estimates are not accounted for in any way in EPA's calculation of the net benefits of the proposal. As discussed below, EPA's approach ignores important rationales that underpinned the use of the IWG SCM in the 2016 Rule. EPA recognized in the 2016 Rule that methane is a global pollutant whose economic impacts can only be fully accounted for by considering its impacts both within the United States and abroad. The 2016 Rule also recognized that the United States has a national interest in encouraging other jurisdictions to fully account for the costs of climate pollution, which would be put at risk if EPA were to focus solely on domestic costs. Even if it were rational (and permissible) to limit EPA's consideration to "domestic" impacts (which it is not), the "interim" SCM arbitrarily excludes many of effects of climate change that,

[196] To reach these cost estimates, we replicated EPA's methods in the 2018 RIA. However, instead of relying on the domestic cost of methane reported in Table 3-4, "Interim Domestic Social Cost of CH4, 2019-2025," we used estimates of the social cost of methane based on the 2016 RIA Table 4-3, "Social Cost of Methane (SC-CH4), 2012 – 2050a (Source: Marten et al., 2014b)." Table 4-3 reports social costs 5-year increments between 2015 and 2025. In order to estimate the annual social cost of methane for the years 2019 through 2025, we assumed linear growth in the cost for this period. All estimates are adjusted to 2016 dollars using the Bureau of Labor Statistics' CPI Inflation calculator.

[197] Several of the organizations signing these comments join a separate comment letter filed in this docket by the New York University School of Law's Institute for Policy Integrity in response to EPA's Proposal, which provides a more comprehensive critique of EPA's interim social cost of methane.

[198] *See* 2018 RIA Tables 3-3;A.3 Forgone Global Climate Benefits, Dkt. No. EPA-HQ-OAR-2010-0505-7630 for similar estimates of global forgone benefits.

while global in nature, will necessarily have a significant domestic impact. These include impacts on U.S. trade and investment patterns, efforts necessary to accommodate climate refugees, spillover effects and national security implications of political destabilization, and other repercussions on the United States resulting from the global impacts of climate change.

Furthermore, as we discuss below, EPA's use of a 7 percent discount rate is wholly arbitrary in that it is dramatically higher than the expert consensus recommends for analyzing the impacts of a high-risk, long-term, multi-generational crisis such as global climate change. Additionally, as EPA notes in its 2018 RIA, the "interim" SCM "represent only a partial accounting of domestic climate impacts from methane emissions." 2018 RIA at 1-12 n.1. This admission underscores the inappropriateness of EPA's attempt to dramatically reduce the social cost of methane (and the social cost of GHGs more broadly) so as to obscure the harmful effects not only of the Proposal, but of a number of environmental rollbacks undertaken by the current administration.

EPA's principal justification for its approach is that Executive Order 13,783 mandates compliance with OMB Circular A-4, which, in turn, calls for agencies to evaluate the costs and benefits of its regulatory proposals based on domestic impacts and using discount rates of 3 and 7 percent. EPA plans to use this "domestic" value for the SCM "until an improved estimate of the impacts of climate change to the U.S. can be developed based on the best available science and economics." 83 Fed. Reg. 52,088.[199] This is incorrect: as explained below, the IWG approach was fully consistent with Circular A-4, and EPA's "interim" approach fails to adhere to Circular A-4 in key respects. Moreover, OMB guidance does not relieve EPA of its obligation under the Clean Air Act and the Administrative Procedure Act to consider all relevant factors, to articulate a "rational connection between the facts found and the choice made," *State Farm*, 463 U.S. at 43, and to provide "good reasons" for departing from prior policies and practices, *Fox Television*, 556 U.S. at 515. EPA's reliance on Circular A-4 as a talismanic explanation for its interim social cost of methane falls far short of this standard.

1. EPA's estimate of the domestic costs of methane pollution is fatally flawed.

EPA's "domestic" "interim" social cost of methane drastically undervalues the true costs of methane pollution by attempting to focus only on climate impacts that physically occur within the United States. In so doing, EPA fails to address either the methodological flaws in its approach or the central rationales that EPA cited in support of its use of a global cost estimate in

[199] It is notable that EPA provides no information about when an "improved" estimate will be available or any steps it (or any other federal agency) is taking to develop an "improved" estimate. Indeed, to our knowledge, EPA has not taken *any* steps to update its "interim" metric. This may be because any evidence-based process to improve a social cost of methane estimate based upon "best available science and economics" would strongly cut against the Administration's (and, in particular EPA's) efforts to dismantle climate protections. Indeed, EPA does have an "improved" estimate available—the IWG SCM—and it is arbitrary and capricious not to use it in the absence of a better estimate.

the 2016 Rule. In the RIA for the 2016 Rule, EPA explained that its analysis incorporates the global costs of methane pollution for three separate reasons:

> First, emissions of most GHGs contribute to damages around the world independent of the country in which they are emitted. The SC-CO_2[200] must therefore incorporate the full (global) damages caused by GHG emissions to address the global nature of the problem. Second, the U.S. operates in a global and highly interconnected economy, such that impacts on the other side of the world can affect our economy. This means that the true costs of climate change to the U.S. are larger than the direct impacts that simply occur within the U.S. Third, climate change represents a classic public goods problem because each country's reductions benefit everyone else and no country can be excluded from enjoying the benefits of other countries' reductions, even if it provides no reductions itself. In this situation, the only way to achieve an economically efficient level of emissions reductions is for countries to cooperate in providing mutually beneficial reductions beyond the level that would be justified only by their own domestic benefits.

EPA, Regulatory Impact Analysis of the Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources 4-8 (May 2016) ("2016 RIA"). The RIA went on to note that the IWG concluded there "is no bright line between domestic and global damages," and that "[a]dverse impacts on other countries can have spillover effects on the United States, particularly in the areas of national security, international trade, public health, and humanitarian concerns." *Id.* at 4-8. The Seventh Circuit upheld this same logic when it rejected an industry challenge to the Department of Energy's use of the IWG's global social cost of carbon metric. *Zero Zone Inc. v. Dep't of Energy*, 832 F.3d 654, 677 (7th Cir. 2016) (holding that Department had reasonably identified carbon pollution as "a global externality" and appropriately concluded that, because "national energy conservation has global effects, . . . those global effects are an appropriate consideration when looking at a national policy").

EPA has failed to explain why it is has rejected these rationales in its proposed reconsideration, nor could it provide a well-reasoned explanation for doing so. First, there is no question that EPA's "domestic" "interim" SCM does not account for important ways in which global climate impacts affect U.S. interests—through physical damage to U.S. citizens and assets overseas, effects on global economic growth and demand for U.S. products, humanitarian crises resulting in broad displacement of peoples, political destabilization, and other harmful repercussions. For this reason, leading economists in the field of climate economics (including a Nobel laureate) have described "domestic" social cost figures as "deeply misleading" estimates

[200] "SC-CO_2" refers to the social cost of carbon, a metric closely related to the social cost of methane. As the 2016 RIA explains, the social cost of methane used in the 2016 Rule relies on the same rationales and methodologies for assessing global impacts that underlie the SC-CO2. See 2016 RIA, at 4-14.

that "wrongly assume that the United States is an island unaffected by migration, national security, global economic disruptions and other cross-border externalities."[201]

Notably, a 2017 report by the National Academies that is cited in an attachment to the 2018 RIA specifically calls out these limitations, concluding that "[c]limate damages to the United States *cannot be accurately characterized without accounting for consequences outside U.S. borders.*"[202] As the report explains:

> Correctly calculating the portion of the SC-CO_2 that directly affects the United States involves more than examining the direct impacts of climate that occur within the country's physical borders …. As the IWG noted (Interagency Working Group on the Social Cost of Carbon, 2010), climate change in other regions of the world could affect the United States through such pathways as global migration, economic destabilization, and political destabilization. In addition, the United States could be affected by changes in economic conditions of its trading partners: lower economic growth in other regions could reduce demand for U.S. exports, and lower productivity could increase the prices of U.S. imports. *The current SC-IAMs do not fully account for these types of interactions among the United States and other nations or world regions in a manner that allows for the estimation of comprehensive impacts for the United States.*[203]

OMB and the federal agencies in the IWG concluded in 2015 that "good methodologies for estimating domestic damages do not currently exist."[204] Similarly, William Nordhaus, the developer of the DICE model (one of the three integrated assessment models underlying the social cost of methane), has cautioned that "regional damage estimates are both incomplete and poorly understood," and "there is little agreement on the distribution of the SCC by region."[205]

The most recent National Climate Assessment likewise highlights how the international effects of climate change will impact U.S. interests:

> The global impacts of climate (climate change, variability, and extreme events) are already having important implications for societies and ecosystems around the world and are projected to continue to do so into the future. There are specific U.S.

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[201] Richard L. Revesz et al., *The Social Cost of Carbon: A Global Imperative,* 11 Rev. of Envt'l Econ. and Policy 172, 173 (2017) http://policyintegrity.org/files/publications/REEP_SCC_2017.pdf.

[202] National Academies of Sciences, Engineering, and Medicine, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* 53 (2017) (emphasis added) ("National Academies 2017").

[203] National Academies 2017, at 52-53.

[204] Interagency Working Group on the Social Cost of Carbon, *Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12,866* at 36 (July 2015) ("IWG Response to Comments").

[205] William Nordhaus, *Revisiting the Social Cost of Carbon*, 114 PNAS 1518, 1522 (2017).

> interests that can be affected by climate-related impacts outside of U.S. borders, such as climate variability (for example, El Niño/La Niña events), climate extremes (for example, floods resulting from extreme precipitation), and long-term changes (for example, sea level rise). These interests include economics and trade (Key Message 1), international development and humanitarian assistance (Key Message 2), national security (Key Message 3), and transboundary resources (Key Message 4)…. [T]hese four topics…can also affect each other. For example, climate-related disasters in developing countries not only have significant local and regional socioeconomic impacts, but they can also set back U.S. development investments, increase the need for U.S. humanitarian assistance, and affect U.S. trade and national security. U.S. citizens have long been concerned about the welfare of those living beyond U.S. borders and their vulnerability to the global impacts of climate.[206]

Although the 2018 RIA briefly acknowledges the deep flaws in EPA's approach, 2018 RIA at 3-11 to 3-13 (noting that "current IAMs do not model all relevant regional interactions . . . through pathways such as global migration, economic destabilization, and political destabilization"), EPA does nothing to provide sound reasoning for why it chose to ignore them and use a new cost estimate—a cost estimate which accentuates many of the shortcomings identified in calculating the social cost of methane.

EPA also utterly fails to consider the repercussions that a "domestic-only" social cost of methane might have for global actions to reduce methane and other GHG pollution, which was another rationale cited in the 2016 NSPS for using the global SCM. As EPA notes in that final rule, methane and other climate pollutants have global impacts—meaning that actions taken by other countries to reduce greenhouse gas pollution inevitably have benefits for the United States and vice-versa. Because all countries are affected by greenhouse gas pollution emitted anywhere, optimal reductions of these pollutants can only be achieved if every country takes into account the full, global costs of its emissions of these pollutants. In other words, climate change is a tragedy of the commons in which the individual actors are the world's nations, and the crisis can only be resolved if each entity calibrates its actions based on not just some small swath of the commons, but the commons as a whole—in this case, the entire globe.

Many other countries are, in fact, following the United States' initial lead in accounting for the global impacts of methane and other climate pollutants[207]—a practice that generates

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[206] National Climate Assessment, Chapter 16: Climate Effects on U.S. International Interests (November 2018), https://nca2018.globalchange.gov/chapter/16/.

[207] *See* Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 COLUMBIA J. ENVTL. L. 203, 223 (2017) (noting that Canada, Mexico, Sweden, Germany, the United Kingdom, Norway, and the European Union have all adopted global social cost metrics, and that many other jurisdictions have adopted policies that put a price on climate pollution consistent with global social cost metrics).

significant economic benefits for the United States.[208] By contrast, the "domestic-only" approach in the supplemental notices would severely underestimate the true costs of methane pollution—and lead to inadequate limits on that pollution, to the detriment of the United States and all countries—if it were widely adopted. Citing extensive academic literature, the National Academies recognized that these reciprocity effects are one reason to use a global measure of the social cost of climate pollution.[209]

EPA's only attempt to respond to this problem appears in a footnote at the end of the 2018 RIA, in which it states that "the basic argument for adopting a domestic only perspective for the central benefit-cost analysis of domestic policies is … that the authority to regulate only extends to a nation's own residents who have consented to adhere to the same set of rules and values for collective decisionmaking, as well as the assumption that most domestic policies will have negligible effects on the welfare of other countries' residents." 2018 RIA at A-8 n.87. Neither of these justifications is applicable in the context of this rulemaking and neither is responsive to the core rationales for the IWG SCM that were presented in the RIA for the 2016 NSPS. In particular, nothing about using the IWG SCM to assess the benefits of the oil and gas NSPS would imply EPA has "authority to regulate" outside of U.S. borders. To the contrary, the argument for using a global social cost of methane is based on the United States' *own national interest* in fully accounting for the costs of methane pollution. Furthermore, as EPA itself concedes in the 2018 RIA, the assumption that foreign impacts of domestic policies are "negligible" does not apply to climate policy, an arena "for which domestic policies may result in impacts outside of U.S. borders due to the global nature of the pollutants." 2018 RIA at A-8 n.87.

In short, EPA's proposed use of a "domestic" social cost of methane is akin to a homeowner who dumps trash in his neighbor's yard without considering whether that might attract pests or generate noxious odors, affect his property value, or prompt his neighbor to respond in kind—leaving both neighbors' yards full of garbage. EPA should abandon this inherently arbitrary and flawed approach, and fully account for the costs of methane pollution in the same way that it did it did in the 2016 Rule.

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[208] *See* Peter Howard & Jason Schwartz, *Foreign Action, Domestic Windfall: the U.S. Economy Stands to Gain Trillions from Foreign Climate Action* 11 Inst. for Policy Integrity (Nov. 2015) http://policyintegrity.org/files/publications/ForeignActionDomesticWindfall.pdf (estimating that direct U.S. benefits from global climate policies already in effect are over $2 trillion through 2030).

[209] National Academies 2017 at 53 ("In addition, the United States may choose to use a global SC-CO2 in order to leverage reciprocal measures by other countries (Kopp and Mignone, 2013; Howard and Schwartz, 2016). The National Academies further notes that such reciprocity impacts should be accounted for in evaluating the impacts of climate pollution on the United States. *Id.* at 9.

2. EPA's use of a seven percent discount rate arbitrarily understates the cost of methane pollution.

The proposed reconsideration also steeply discounts the future costs of methane pollution by presenting foregone climate benefits using a 7 percent discount rate, alongside an estimate of benefits using a 3 percent discount rate. This is a wildly inappropriate assumption for a long-term, intergenerational problem like climate change. As OMB Circular A-4 notes, "[p]rivate market rates provide a reliable reference for determining how society values time within a generation, but for extremely long time periods no comparable private rates exist." Circular A-4 at 36. Under these circumstances, Circular A-4 suggests that uncertainty about the appropriate discount rate supports using "the *minimum discount rate having any substantial positive probability*." *Id.* As EPA notes in the 2018 RIA, Circular A-4 also suggests that where policies have intergenerational effects, agencies should consider conducting sensitivity analyses "using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent." *Id.* at 35-36.

Moreover, a 7 percent discount rate is inconsistent with the integrated assessment models that underlie the social cost of methane and which EPA has attempted to rely on in developing its own interim metric. As OMB and the National Academies have both observed, the models underlying the social cost of carbon (and the social cost of methane) measure the impacts of climate change on *private consumption,*[210] in contrast to its impacts on capital investment. In those circumstances, both economic theory and Circular A-4 recommend the use of a *consumption rate of interest* much lower than 7 percent.[211] Indeed, the National Academies refers to the consumption rate of interest as the "theoretically correct discount rate" where benefits and costs are measured in consumption equivalents, as they are in the models underlying the social cost of methane.[212] Although OMB's suggested discount rate of 3 percent (which was also used for the central estimates in the 2016 Rule) is intended to reflect consumption rates of interest,[213] recent analyses have pointed out that this default is outdated and that discount rates of 2 percent (if not lower) would more accurately reflect consumption rate of interest in light of persistent declines in long-term interest rates.[214]

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[210] IWG Response to Comments at 22; National Academies at 162 (Whether the descriptive approach calls for using the pretax return on capital or the consumption rate of interest depends on whether benefits and costs are measured in consumption equivalents. *If they are, then the theoretically correct discount rate is the rate at which consumers would trade consumption today for consumption in the future*. In many cases, the benefits of avoiding climate change, such as health benefits, accrue directly to consumers or affect the prices consumers pay for goods and services. Even when climate damages do not directly affect consumers, *damage estimates from the SC-IAMs are reported in consumption-equivalent units.*") (emphasis added).

[211] IWG Response to Comments at 22 (citing Circular A-4).

[212] National Academies 2017 at 162.

[213] National Academies 2017 at 160; Circular A-4 at 11.

[214] The Council of Economic Advisers recommended this year that a discount rate based on the consumption rate of interest "should be at most 2 percent." Council of Econ. Advisers, Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the

EPA's 7 percent discount rate is also inconsistent with expert opinion in the field of climate economics. According to a recent expert elicitation of over 1,100 economists in the field of climate economics, there is a growing consensus in favor of an initial discount rate of no greater than 2 to 3 percent and/or one that declines as time progresses. Ninety percent of the economists surveyed supported a discount rate of 5 percent or less.[215] Similarly, the 2017 National Academies report observes that the IWG discount rates of 2.5, 3, and 5 percent were carefully selected to reflect economic theory and peer-reviewed literature, and that the majority of climate change impact studies cited in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change "use an implied social discount rate of no more than 5 percent."[216]

The 2016 Rule and Regulatory Impact Analysis make clear that EPA was making conservative estimates that, if anything, undervalued the economic benefits associated with the 2016 Rule.[217] In the event that EPA seeks to revisit the SCM, the 2016 Rule and available science could only support approaches that would lead to far *greater* economic benefits from the NSPS—including, for example, relying on a very small, or even negative, discount rate,[218] and updating the global warming potential for methane to reflect the latest science.[219] For these reasons as well, EPA's rationale for a 7 percent discount rate are arbitrary and capricious.

Discount Rate at 1 (CEA Issue Brief, 2017), *available at* https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.

[215] Peter Howard & Derek Sylvan, *The Economic Climate: Establishing Expert Consensus on the Economics of Climate Change* 21, Inst. Policy Integrity (Dec. 2015).

[216] National Academies 2017 at 168. The social cost of methane used in the 2016 Rule reflected the same discount rates of 2.5, 3, and 5 percent that were approved by the IWG for the social cost of carbon. *See* 2016 RIA, at 1-8 n.1.

[217] *See* 2018 RIA at 4-9 to 4-19.

[218] *See, e.g.*, CEA Issue Brief, 2017; *see also* Frank Ackerman & Elizabeth A. Stanton, *the Social Cost of Carbon,* 2 (Apr. 2010); Marc Fleurbaey & Stephane Zuber, *Climate Policies Deserve a Negative Discount Rate*, 13 CHI. J. INT'L LAW 565 (2013); Kenneth J. Arrow *et al.*, *Should Governments Use a Declining Discount Rate in Policy Analysis*, REVIEW OF ENVTL. ECON. & POL'Y (2014); Martin L. Weitzman, *Why the Far-Distant Future Should Be Discounted at the Lowest Possible Rate*, J. ENVTL. ECON & MGMT. 36:201-08 (1998).

[219] *Compare* 2016 Rule at 35,827 (relying on methane 100-year GWP of 25) *with* IPCC, *Working Group I, Fifth Assessment Report, Climate Change 2013: The Physical Science Basis, Chapter 8: Anthropogenic and Natural Radiative Forcing* (2014) at 633, 711-712, 714 (Table 8.7)at https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_ Chapter08_FINAL.pdf (providing adjustments in note B for fossil methane; 85-87 times greater than carbon over a 20 year period, and 30-36 times greater during a 100 year period).

3. EPA cannot hide behind circular A-4 to avoid providing a reasoned explanation for its "interim" social cost of methane.

EPA's principal justification for its deeply flawed and arbitrary approach to the social cost of methane is that Circular A-4 calls for a focus on domestic impacts and the use of 3 and 7 percent discount of rates. 2018 RIA at A-8. Neither of these assertions is true. In any event, Circular A-4 does not relieve EPA of its obligation under the Clean Air Act and the Administrative Procedure Act to provide a well-reasoned explanation for its methodological choices and its departure from the 2016 Rule.

First, it is plain that Circular A-4 does not require that EPA ignore the global costs of methane pollution. Circular A-4 only sets forth guidelines for analysis, and it admonishes agencies to tailor their cost-benefit analyses to the unique circumstances of each rule rather than adhere to a rigid and wooden "formula." Circular A-4 at 3. As Circular A-4 explains, "[c]onducting high-quality analysis requires competent professional judgment. Different regulations may call for different emphases in the analysis, depending on the nature and complexity of the regulatory issues and the sensitivity of the benefit and cost estimates to the key assumptions." *Id.* Although Circular A-4 recommends that agencies "focus" on benefits and costs that "accrue to citizens and residents of the United States," it also calls for separate reporting of impacts "beyond the borders of the United States." *Id.* at 15. It by no means *precludes* agencies from considering global impacts in an appropriate regulatory setting. Indeed, the text of Circular A-4 implicitly acknowledges that some cost-benefit analyses may be conducted using a global perspective.[220]

EPA is not saved by including a brief recitation of the IWG social cost of methane and a sensitivity analysis in its 2018 RIA. EPA still has an obligation to explain why it chose an arbitrary "interim" method of calculating a domestic-only SCM, rather than using the IWG SCM calculations, which EPA itself helped develop. Further, EPA acknowledges that this method of calculation is only temporary "until an improved estimate" is available. EPA has an improved estimate available to it—the IWG SCM—but has failed to explain why it elected to use a less accurate calculation for the proposed rule.

Moreover, as explained in detail above, EPA's proposed approach is inconsistent with Circular A-4 in key respects. A fundamental weakness in EPA's so-called "domestic" social cost of methane is that it *omits* key climate impacts that "accrue to citizens and residents of the United States" —including international spillovers, the risk of retaliatory action from other nations, the possibility of national security and humanitarian crises that will affect U.S. citizens and residents, and impacts on United States citizens and assets overseas. It is also out of step with the findings of the National Academies and experts in climate economics, which all underscore the deeply flawed nature of the approach in the supplemental notices. As such, EPA's

[220] Circular A-4 at 38 (explaining that "transfers from the United States to other nations should be included as costs, and transfers from other nations to the United States as benefits, *as long as the analysis is conducted from the United States perspectiv*e.").

interim social cost of methane is inconsistent with Circular A-4's guidance that agencies use the "best reasonably obtainable scientific, technical, and economic information available." *Id.* at 17.

Neither does Circular A-4 require EPA to blindly use an inappropriately high 7 percent discount rate. As explained above, Circular A-4 recognizes that policies with long time horizons and intergenerational effects should be evaluated with lower discount rates—and suggests that agencies evaluate sensitivities using discount rates even lower than 3 percent. Circular A-4 also recognizes that a 7 percent discount rate is appropriate only for analyses of policies that primarily displace capital investments. As OMB and the other agencies in the IWG concluded in responding to public comments on the social cost of carbon, the (much lower) consumption rate of interest "is the correct concept to use" and "consistent with OMB guidance in Circular A-4" when evaluating impacts of climate pollution.[221]

Lastly, regardless of the guidance in Circular A-4, EPA is still obligated under the Clean Air Act and the Administrative Procedure Act to provide a well-reasoned explanation for its interim social cost of methane after consideration of all relevant factors. OMB guidance does not – and cannot – displace these fundamental statutory requirements and basic principles of administrative law.[222] Furthermore, that Circular A-4 may counsel a particular approach does *not,* by itself, constitute a talismanic explanation that is sufficient to meet standards of reasoned decisionmaking. To be sure, OMB guidance may be indicative of the reasonableness of an agency's approach to cost-benefit analysis. But if OMB were to recommend that agencies deem that two plus two equals five, or ignore all environmental benefits in a cost-benefit analysis, it would be just as arbitrary and unlawful for EPA to rely on that guidance as it would be for EPA to reach such determinations on its own.

Here, EPA's sole justification for its focus on domestic costs and its use of a 7 percent discount rate is its assertion that Circular A-4 requires these methodological choices. This "explanation" is incorrect, insufficient, and patently arbitrary in light of its manifest inconsistencies and failure to grapple with the well-established rationales in the 2016 Rule and the underlying IWG reports, the National Academies report cited in EPA's own Memorandum, and the other expert literature discussed here. EPA has an obligation to provide "good reasons" for its departure from the 2016 Rule and to explain why it is "disregarding facts and circumstances that underlay or were engendered by the prior policy." *Fox*, 556 U.S. at 515-16. It has failed to do so in the proposed reconsideration.

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[221] IWG Response to Comments at 22.

[222] *Cf. In re United Mine Workers of Am. Int'l Union*, 190 F. 3d 545 (D.C. Cir. 1999) ("[T]he President is without authority to set aside congressional legislation by executive order…"); *Chamber of Commerce of the United States v. Reich,* 74 F.3d 1322, 1339 (D.C. Cir. 1995) (striking down Executive Order that conflicted with the National Labor Relations Act).

B. The forgone benefits related to increased VOC and HAP emissions caused by the Proposal can, and must, be considered, quantified and monetized.

VOCs emitted from the oil and gas sector form ozone, which can cause a number of harmful effects on the respiratory system, including difficulty breathing and inflammation of the airways. Short-term exposure to ozone can cause chest pain, coughing, and throat irritation, while long-term exposure can cause decreased lung function and cause chronic obstructive pulmonary disease ("COPD").[223] For those with existing respiratory illnesses such as asthma and COPD, these effects can aggravate those conditions, resulting in the increase of medication use, emergency room visits, and hospitalizations. Human Health Effects of Ozone 2018 at 9-10; 80 Fed. Reg. at 65,306. Ozone is also linked to premature death, contributing to 5,000 premature deaths per year.[224] More recent studies suggest that ozone exposure may be linked to increased rates of strokes, heart problems, and neurological effects. Human Health Effects of Ozone 2018 at 16-19, 22, 24-25; 80 Fed. Reg. at 65,308-09.

Additionally, EPA's Children's Health Protection Advisory Committee has found that "[c]hildren suffer a disproportionate burden of ozone-related health impacts due to critical developmental periods of lung growth in childhood and adolescence that can result in permanent disability."[225] Children who are at risk from increased ozone pollution exposure also miss more days of school.[226]

VOCs also contribute to ozone formation impacting sensitive ecosystems and species in national parks. Recent models of VOC markers show the primary pollution sources impacting park air quality. Such modeling focusses on national parks including Rocky Mountain, Joshua Tree and Carlsbad that are approaching or exceeding the ozone standard. In modeling examining

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[223] Stephanie M. Holm MD, MPH et al., EDF, *Human Health Effects of Ozone: The State of Evidence Since EPA's Last Integrated Science Assessment* 8-13 (2018) https://www.edf.org/sites/default/files/content/Ozone_Summary_Report.pdf ("Human Health Effects of Ozone 2018"); National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65,292, 65,301-08 (Oct. 26, 2015).

[224] EPA, Fact Sheet, Overview of EPA's Updates to the Air Quality Standard for Ground-Level Ozone http://www3.epa.gov/ozonepollution/pdfs/20151001overviewfs.pdf (hereinafter "Ozone Standard Fact Sheet"); see also U.S. Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants, Final Report (Feb. 2013) http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492#Download.); Human Health Effects of Ozone 2018 at 7.

[225] Letter from Sheela Sathyanarayana MD MPH, Chair, Children's Health Protection Advisory Committee to Christopher Frey PhD, CASAC Review of the Health Risk and Exposure Assessment for Ozone and Policy Assessment for the Review of the Ozone NAAQS: Second External Review Drafts, (May 19, 2014) http://yosemite.epa.gov/sab/sabproduct.nsf/7F79D27B503CB28385257CDE00546CB3/$File/CHPAC+May+2014+Letter+&+Attached+2007+Letters.pdf.

[226] EPA, *By the Numbers Fact Sheet* (Oct. 2015) http://www3.epa.gov/airquality/ozonepollution/pdfs/20151001numbersfs.pdf.

the signature VOCs emitted from oil and gas development—light alkanes C2-C6, i-butane/nbutane, and i-pentane/n-pentane—the models demonstrate that oil and gas emissions are the most significant source of VOCs and therefore contributors to ozone pollution at national parks, especially Carlsbad.[227]

EPA acknowledges in the proposal that "the forgone VOC emission reductions may degrade air quality and adversely affect health and welfare effects associated with exposure to ozone, PM2.5, and HAP. . . ." 83 Fed. Reg. at 52,088. *See also* 2018 RIA at 1-12, 3-2. However, EPA declined to monetize or otherwise quantify the forgone VOC-related health benefits due to "data limitations." *Id*. Specifically, EPA claims an inability to "estimate forgone health benefits estimates for this rule due to the differences in the locations of oil and natural gas emissions points relative to existing information and the highly localized nature of air quality responses associated with HAP and VOC reductions."2018 RIA at 2-3.

However, EPA's proposal arbitrarily disregards a methodology developed by its own scientists to quantify and monetize the benefits of VOC reductions from the oil and gas sector.[228] This study credibly and specifically quantifies the health impacts from oil and gas air pollution. EPA may not dismiss these studies out of hand due to uncertainty or lack of consensus, as it has sought to do. *See* 83 Fed. Reg. at 52,088 ("[D]ata limitations prevent us from quantifying forgone VOC-related health benefits. This omission should not imply that these forgone benefits may not exist; rather, it reflects the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this industrial sector with the data currently available."). Paradoxically, in support of its decision to reopen the rule for reconsideration, EPA has relied on studies that, by its own assertions, give rise to "uncertainty" or "concerns." For EPA to rely on data uncertainties as a basis for revising the rule's substantive requirements while, at the same time, citing uncertainty as a reason for *declining* to quantify the health impacts of those revisions is plainly arbitrary and capricious. *See Pub. Citizen,* 374 F.3d at 1221 ("[T]he agency…apparently had no problem making estimates based on imperfect empirical assumptions when it estimated the costs [as opposed to the benefits]."); *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1198–1204 (9th Cir. 2008) (holding that the failure to consider the social cost of carbon was arbitrary and capricious, in part because NHTSA monetized other uncertain benefits while dismissing the social cost of carbon based on uncertainty).

In Fann et al., a 2018 peer-reviewed publication in the Journal Environmental Science and Technology, EPA researchers drew upon the emission estimates from EPA's own National Emissions Inventory, which incorporates national activity, emission factors, and oil and gas basin-specific information that was submitted by State and local agencies and reflects the year

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[227] Barkley C. Sive, National Park Service, *Source Attribution Using Volatile Organic Compound Measurements to Assess Air Quality Impacts at Five National Parks in the Western US* http://apps.nelac-institute.org/nemc/2018/docs/pdf/Wednesday-Air%20Methods%20and%20Monitoring%20Part%201-16.4-Sive.pdf

[228] Fann et al., Assessing Human Health PM2.5 and Ozone Impacts from U.S. Oil and Natural Gas Sector Emissions in 2025, *ENVT'L SCI. & TECH.* 2018, 52, 8095-8103 ("Fann et al.").

2011.[229] The oil and gas sector emissions assessed in Fann et al. included those from sources covered by Subpart OOOOa, including fugitive emissions.[230] Using EPA's Nonpoint Oil and Gas Emission Estimation Tool to produce county-level emission for calendar year 2011 for pollutants like VOC and fine particulate, Fann et al. then used economic growth factors based on product and consumption indicators derived from the Annual Energy Outlook (AEO) 2014 to project the 2011 emissions to the year 2025.[231] AEO 2014 also projected growth rates for U.S. Census Divisions, which were then projected by the researchers to the specific basins.

The study then relied on these emissions estimates to model air quality impacts using the Comprehensive Air-Quality Model with extensions (CAMx) version 6.20 for the entire year for 2011, using a 12 km by 12 km grid across the nation, with 25 layers top to bottom.[232] Fann et al. applied CAMx with source apportionment to differentiate the oil and gas air emissions from other emissions. Additionally, they incorporated biogenic (using the Biogenic Emission Inventory System) and anthropogenic (using the NEI, which also accounts for fires) emissions.[233]

Finally, to quantify the premature deaths and the illnesses attributed to oil and gas air pollution, the study calculated a health impact function consistent with the methodologies employed by EPA in the regulatory impact analyses for the PM2.5 and ozone national ambient air quality standards (NAAQS).[234] Fann et al. concluded that in the year 2025, there would be 970 premature deaths, as well as over 770,000 lost school days, caused ozone formed by oil and gas air pollution.[235] Fann et al. then estimated the overall economic value of the health impacts caused by the oil and gas sector's air pollution by using analyses in the PM2.5 and Ozone NAAQS RIAs the applied BenMAP-CE.[236] This included a suite of willingness-to-pay and cost-of-illness valued that produce an estimated dollar value.[237] The study found that the range of economic value per ton of ozone-related VOC from the oil and natural gas sector was $300−$500.[238] We use these values from Fann et al. to monetize the foregone benefits from oil and gas sector VOC pollution reductions due to the Proposal. Table 12 shows these monetized VOC emissions costs for the 2019-2025 period for EPA's preferred option of reducing monitoring frequencies, while Table 13 illustrates monetized VOC emissions costs for each of the options considered by EPA for the years 2020 and 2025.

[229] *Id.* at 8095.
[230] *Id.* at 8096.
[231] *Id.* at 8096. They used 2025 because it "was most relevant for U.S. EPA air quality planning purposes.
[232] *Id.* at 8097.
[233] *Id.* at 8097.
[234] *Id.* at 8097.
[235] *Id.* at 8099.
[236] *Id.* at 8097.
[237] *Id.* at 8097.
[238] *Id.*

Table 12: Monetized Costs of Additional VOC Emissions in 2019-2025 Due to the Proposal using Fann et al. Estimates.

VOC EMISSIONS REDUCTIONS BENEFITS THAT WOULD NOT OCCUR UNDER EPA'S RECONSIDERATION PROPOSAL		
NSPS OOOOa	ADDITIONAL VOC EMISSIONS THAT WOULD OCCUR UNDER EPA'S RECONSIDERATION PROPOSAL [1] [TONS]	FORGONE BENEFITS BASED ON VOC BENEFIT PER-TON (BPT) RANGE OF $300-$500 [2]
	2019-2025	2019-2025
Option 3 (Co-Proposed)	100,000	$30,000,000 - $50,000,000
Option 3 (Co-Proposed) with further decrease in fugitive emissions monitoring frequency at compressor stations from semi-annual to annual	124,000	$37,200,000 - $62,000,000

[1] 9/11/18 EPA Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration at pp. 14-15 and RIA Table 3-3. Note, this compares EPA's Option 3 (Co-Proposed) changes to the revised 2018 baseline:

Option 3 (Co-Proposed): annual monitoring at well sites, biennial monitoring at low production well sites, semiannual monitoring at compressor stations, annual monitoring at Alaska North Slope well sites and compressor stations; In-house engineer certification requirements

2018 Baseline: includes amendment package updates (e.g., annual monitoring at Alaska North Slope well sites) and estimate updates (e.g., projections, state and local regulations and model plants); PE certification requirements

[2] The range of economic value per ton of ozone-related VOC from the oil and natural gas sector is $300–$500 (Fann et al. 2018); this range reflects the sum of the value of morbidity impacts and the Smith et al. 2009 ozone mortality risk coefficient at the low end and the Zanobetti & Schwartz 2008 risk coefficient at the high end.

Table 13: Monetized Costs of Additional VOC Emissions in 2020 and 2025 Due to the Proposal using Fann et al. Estimates.

VOC EMISSIONS REDUCTIONS BENEFITS THAT WOULD NOT OCCUR UNDER EPA'S RECONSIDERATION PROPOSAL										
NSPS OOOOa	2016 NSPS [1] 2018 RIA TABLE 1-1		2018 BASELINE [2] 2018 RIA TABLE 1-1		OPTION 1 [3] 2018 RIA TABLE 1-3		OPTION 2 [4] 2018 RIA TABLE 1-3		OPTION 3 (CO-PROPOSED) [5] 2018 RIA TABLE 1-3	
	2020	2025	2020	2025	2020	2025	2020	2025	2020	2025
VOC EMISSIONS REDUCTIONS [TONS]	46,300	94,500	32,000	62,000	32,000	62,000	26,000	51,000	22,000	42,000
FORGONE EMISSIONS REDUCTIONS [TONS] FROM NOT IMPLEMENTING EPA'S 2016 NSPS			14,300	32,500	14,300	32,500	20,300	43,500	24,300	52,500
FORGONE BENEFITS BASED ON MIN VOC BENEFIT PER-TON OF $300 [6]			$4,290,000	$9,750,000	$4,290,000	$9,750,000	$6,090,000	$13,050,000	$7,290,000	$15,750,000
FORGONE BENEFITS BASED ON MAX VOC BENEFIT PER-TON OF $500 [6]			$7,150,000	$16,250,000	$7,150,000	$16,250,000	$10,150,000	$21,750,000	$12,150,000	$26,250,000

[1] Semiannual monitoring at well sites and quarterly monitoring at compressor stations; PE certification requirements
[2] Includes amendment package updates (e.g., annual monitoring at Alaska North Slope well sites) and estimate updates (e.g., projections, state and local regulations and model plants); PE certification requirements
[3] Semiannual monitoring at well sites, annual monitoring at Alaska North Slope well sites, quarterly monitoring at compressor stations; In-house engineer certification requirements
[4] 2 years semiannual then annual monitoring at well sites, annual monitoring at low production well sites, quarterly monitoring at compressor stations, annual monitoring at Alaska North Slope well sites and compressor stations; In-house engineer certification requirements
[5] Annual monitoring at well sites, biennial monitoring at low production well sites, semiannual monitoring at compressor stations, annual monitoring at Alaska North Slope well sites and compressor stations; In-house engineer certification requirements
[6] The range of economic value per ton of ozone-related VOC from the oil and natural gas sector is $300–$500 (Fann et al. 2018); this range reflects the sum of the value of morbidity impacts and the Smith et al. 2009 ozone mortality risk coefficient at the low end and the Zanobetti & Schwartz 2008 risk coefficient at the high end.

Prior to the Fann et al. paper, Clean Air Task Force used similar methodology to characterize the VOC-only impacts of oil and gas sector emissions on a state-by-state basis. The resulting report, *Gasping for Breath*, outlined the health consequences associated with ozone changes due to oil and gas activity.[239] The analysis concludes that, in 2025, the oil and gas sector would contribute to more than 750,000 summertime asthma attack in children under the age of 18 and contributing to 500,000 missed school days each year. *Gasping for Breath* was based on an impact analysis that quantified health impacts in the U.S. from ozone smog produced by the

[239] Clean Air Task Force, *Gasping for Breath* (Aug. 2016) https://www.catf.us/wp-content/uploads/2018/10/CATF_Pub_GaspingForBreath.pdf ("*Gasping for Breath*").

pollution from the oil and gas industry. The study quantified the health impacts in three separate steps, each with its own methodology: (1) emissions characterization, (2) air quality modeling, and (3) health effects estimation.

To characterize the emissions, 2025 Emissions were determined for two cases. For the baseline case, *Gasping for Breath* used projected emissions, including the total amount of VOCs emitted by oil and gas sources. The emissions estimates are based on a U.S. EPA 2025 projection of the National Emissions Inventory (NEI) for 2011. Using the 2011 NEI v6.2 as a baseline, EPA developed the 2025 inventory by projecting population, other trends affecting air quality, oil and gas production growth, and the impact of federal emissions regulations promulgated by December 2014.[240] This includes the impact of EPA's 2012 NSPS for oil and gas VOCs, [Subpart OOOO] but not EPA's 2016 Final Rule. Additionally, this future inventory was modified to include expected future oil and gas sector emission reductions due to state rules for existing sources in Colorado (2014) and Wyoming (2015). The second case used a Zero Oil and Gas scenario, which included all of the emissions of the baseline 2025 inventory except for emissions of air pollutants identified as originating from the oil and gas sector. Therefore, by comparing the modeled ozone concentrations of the 2025 Baseline case to the 2025 Zero Oil and Gas scenario, the estimated air quality and human health impacts of the entire oil and gas sector can be separated and calculated.

Gasping for Breath then used an atmospheric model, which uses these emissions levels as inputs to estimate ozone levels in the atmosphere (in parts per billion). The study relied on Environ's Comprehensive Air Quality Model with Extensions (CAMx)[241] to calculate air pollution levels associated with the two emissions cases. CAMx simulates the spatial and temporal changes in air pollution through mathematical representation of the emissions, chemistry, dispersion, and removal of pollution on a predefined grid system. CAMx version 6.2 was used for with chemistry as described by the Carbon Bond 6 (cb6) chemical mechanism[242] and meteorology developed by EPA for 2011 with National Center for Atmospheric Research's (NCAR) Weather Research and Forecasting modeling system Advance Research WRF (WRF-ARW).[243]

Finally, *Gasping for Breath* assessed the impacts from ozone attributed to oil and gas has on a variety of public health endpoints, including asthma attacks, lost school days, and asthma

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[240] EPA, Technical Support Document ("TSD"): Preparation of Emissions Inventories for the Version 6.2, 2011 Emissions Modeling Platform (Aug. 2015), https://www.epa.gov/sites/production/files/2015-10/documents/2011v6_2_2017_2025_emismod_tsd_aug2015.pdf.

[241] Comprehensive Air Quality Model with Extensions (CAMx), http://www.camx.com/about/default.aspx.

[242] Greg Yarwood, et al. *Updates To The Carbon Bond Mechanism For Version 6 (CB6)*, Presented at the 9th Annual CMAS Conference, Chapel Hill, NC, October 11-13, 2010,https://www.cmascenter.org/conference//2010/abstracts/emery_updates_carbon_2010.pdf.

[243] EPA, *Meteorological Model Performance for Annual 2011 WRF v3.4 Simulation* (2014) https://www3.epa.gov/scram001/reports/MET_TSD_2011_final_11-26-14.pdf.

related emergency room visits. The human health impacts associated with changes in ozone concentrations were estimated using EPA's Benefits Mapping and Analysis Program Community Edition 1.0 (BenMAP).[244] The approach used to calculate benefits in this study follows the methodology of the US EPA's Regulatory Impact Analysis (RIA) developed in support of the most recent update to the NAAQS for ozone.[245] Calculated changes to the modeled ozone concentrations are overlaid with forecast U.S. census data representing 2025 and projected county-level 2025 baseline incidence data, and applied to the concentration-response functions (CRFs) corresponding to the specific pollutant. CRFs are statistical relationships between small changes in ambient concentrations of pollution and human health endpoints. The CRFs used in this study are all from published, peer-reviewed literature. BenMAP has built in population projections (including 2025) that incorporate economic predictions of changing population spatial distributions, which could be important given that pollution is often not spatially homogeneous. Thus, the incidence rates represent ozone season health impacts in the year 2025, with and without oil and gas emissions.

Gasping for Breath found that there are more than 750,000 summertime asthma attacks in children under the age of 18 due to ozone resulting from oil and gas pollution, resulting in more than 2,000 asthma-related emergency room visits and over 600 respiratory related hospital admissions.[246] *Gasping for Breath* also found that children miss 500,000 days of school each year and adults experience 1.5 million person-days when they are forced to rest or reduce activity due to ozone resulting from oil and gas pollution.[247]

The agency cannot arbitrarily ignore these studies, nor can EPA fail to give them any weight based on the agency's "uncertainty" with regard "to the development and application of a benefit-per-ton estimate," 2018 RIA at 3-14. *See Ctr. For Biological Diversity v. Nat'l Highway Traffic Safety Administration*, 538 F.3d 1172, 1181, 1202 (9th Cir. 2008) ("*CBD*"). In *CBD*, the agency failed to assign a cost to carbon emissions in its rule pertaining to fuel economy standards. 538 F.3d at 1200. The Court concluded that the agency's failure to assign a value was arbitrary and capricious "for several reasons," including that the agency had failed to successfully argue that the "extremely wide" range of values for the cost of carbon emissions reasonably prevented it from assigning a value as "substantial evidence of the value of carbon emissions reductions" was not "a high statutory threshold." *Id.* at 1201-02. Further, the agency had "monetized other uncertain benefits, such as the reduction of criteria pollutants, crash, noise, and congestion costs" such that it was unreasonable to not assign a value to other considerations with uncertain values. *Id.* at 1202.

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[244] EPA, *Environmental Benefits Mapping and Analysis Program - Community Edition (BenMAP-CE)*, https://www.epa.gov/benmap.
[245] EPA, *Regulatory Impact Analysis of the Final Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone*, Office of Air and Radiation (2015) https://www3.epa.gov/ttn/ecas/ria.html.
[246] *Gasping for Breath* at 4.
[247] *Id.*

Here, EPA's failure to quantify the forgone health benefits of increased VOC emissions (combined with the fact that it did not invoke these foregone benefits in any way in proposing weakened standards) likewise implies that the agency is not valuing these lost benefits *at all*.[248] This is impermissible because, as discussed *supra*, EPA developed a methodology, which has undergone rigorous peer-review, to quantify these health benefits in Fann et al., and has likewise quantified ozone-related benefits from VOC emissions reductions in other rulemakings, including for the industrial boiler sector and ozone NAAQS. *See* 2018 RIA at 3-15. EPA's explanation for why it did not attempt to quantify the ozone impacts of its Proposal—that because of "data limitations regarding potential locations of new and modified sources affected by this rulemaking, we did not perform air quality modeling for this rule needed to quantify the forgone ozone benefits associated with forgone VOC emission reductions," 2018 RIA at 3-14—is unpersuasive. Even if EPA is not able to model potential locations of *future* affected sources, there is detailed geographic information available (via the Drillinginfo database and state databases) on the tens of thousands of facilities already subject to the current standards.[249]

Notably, EPA quantified the costs and benefits of other aspects of the proposal, where the agency recognized some uncertainties, including utilizing its uncertain "interim" SCM, and so, as in *CBD*, it would be unreasonable for EPA to decline to quantity and monetize VOC benefits because of uncertainties in those estimates.[250] EPA must include these values in its analysis of the costs of the proposal because it has evidence of a widely-accepted methodology to calculate these values. To do otherwise is arbitrary and capricious.[251] And even more fundamentally, EPA cannot entirely ignore these critical health benefits—the type of "endangerment" that triggers the requirement to regulate in the first place—in proposing to significantly weaken the standards.

* * *

For these reasons, EPA's analysis of the costs and benefits of its Proposal is arbitrary and capricious. The agency fails to fully weigh the costs of climate harms caused by additional methane emissions permitted by the Proposal and fails to account at all for the costs of the health harms caused by the additional VOC and HAP emissions permitted by the Proposal. Likewise, as

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[248] Despite EPA's attempt to avoid this implication by claiming it "expects that the foregone VOC emission reductions may degrade air quality and adversely affect health and welfare effects associated with exposure to ozone, PM2.5, and HAP," 83 Fed. Reg. at 52,088, the fact remains that EPA, just as NHTSA did in *CBD*, failed to set a value for the forgone health benefits from increased VOC emissions, despite available information that would enable the agency to do so.

[249] *See, e.g.* Appendix A, Renee McVay and Kate Roberts, *Assessment of State-Level Fugitive Emissions Programs in Comparison to EPA NSPS Reconsideration Proposal* (December 2018).

[250] *See e.g.* 2018 RIA at 4-41 (using estimates from the 2016 RIA to calculate LDAR survey time when, as discussed *supra*, EPA has had LDAR survey time from reports submitted in 2017 and 2018).

[251] Furthermore, D.C. Circuit case law makes clear EPA's ability to regulate in the face of uncertainty, *e.g.*, *National Lime Assoc. v. Environmental Protection Agency*, 627 F.2d 416, 455 n. 143 (D.C. Cir. 1980), which provides further support for EPA's duty to assess and quantify any uncertain benefits of these regulations.

discussed in detail *supra* § V, substantial evidence indicates that EPA's calculations of the costs saved by industry under the Proposal (i.e. the so-called "benefits" of the Proposal) are overestimated. In short, EPA's cost benefit analysis *underestimates* the costs of the Proposal while *overestimating* its benefits, providing an arbitrary analysis.

Conclusion

The Proposal is deeply flawed and clearly unlawful for all of the reasons stated in these comments. EPA should abandon this rulemaking. Instead, EPA should follow the record evidence documenting both the urgency of the problem and the availability of cost-effective solution and the text of the Clean Air Act, and strengthen the NSPS, and issue strong standards for existing sources.

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