Response/Supplemental Comments

The Honorable Andrew Wheeler, Administrator ***VIA E-MAIL AND E-FILING***
US Environmental Protection Agency
1200 Pennsylvania Avenue, N.W. June 17, 2019
Washington, DC 20460

**Re: Environmental Protection Agency's Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration at 83 Federal Register 52056 (October 15, 2018) – Supplemental Comments**

**Docket ID No. EPA-HQ-OAR-2017-0483**

Dear Administrator Wheeler:

The following Supplemental Comments are submitted on the above-referenced proposed Reconsideration Rulemaking ("Reconsideration Rulemaking") on behalf of the following national and state trade associations: the Independent Petroleum Association of America ("IPAA"), American Exploration & Production Council ("AXPC"), Domestic Energy Producers Alliance ("DEPA"), Eastern Kansas Oil & Gas Association ("EKOGA"), Illinois Oil & Gas Association ("IOGA"), Independent Oil and Gas Association of West Virginia, Inc. ("IOGA-WV"), Indiana Oil and Gas Association ("INOGA"), International Association of Drilling Contractors ("IADC"), Kansas Independent Oil & Gas Association ("KIOGA"), Kentucky Oil & Gas Association ("KOGA"), Michigan Oil and Gas Association ("MOGA"), National Stripper Well Association ("NSWA"), North Dakota Petroleum Council ("NDPC"), Ohio Oil and Gas Association ("OOGA"), Oklahoma Independent Petroleum Association ("OIPA"), Pennsylvania Independent Oil & Gas Association ("PIOGA"), Texas Alliance of Energy Producers ("Texas Alliance"), Texas Independent Producers & Royalty Owners Association ("TIPRO"), and West Virginia Oil and Natural Gas Association ("WVONGA") (collectively, "Independent Producers"). The Independent Producers have participated individually or through the Independent Producers in most, if not all, of the rulemakings and associated litigation since the Environmental Protection Agency ("EPA" or "Agency") proposed to revise the New Source Performance Standards ("NSPS") for the Oil and Natural Gas Sector in August 2011. 76 Fed. Reg. 52,738 (Aug. 23, 2011).[1] While many of the Independent Producers represent companies that engage in large volume hydraulic fracturing with horizontal legs, often referred to as unconventional drilling, a significant portion of their membership is also comprised of smaller, family run operations that engage in some form of hydraulic fracturing, involving vertical wells without horizontal legs, referred to as conventional oil or natural gas wells. Many

[1] As EPA has opened a new docket for the Reconsideration Rulemaking, the Independent Producers incorporate by reference their Comments on the previous rulemakings associated with 40 C.F.R. Part 60, Subpart OOOO and Subpart OOOOa, including but not limited to the following documents: EPA-HQ-OAR-2010-0505-4216, EPA-HQ-OAR-2010-0505-4626, EPA-HQ-OAR-2010-0505-4752, EPA-HQ-OAR-2010-0505-4767, EPA-HQ-OAR-2010-0505-7001, EPA-HQ-OAR-2010-0505-7685, and EPA-HQ-OAR-2010-0505-12337

of the individual members constitute small businesses under the Small Business Regulatory Enforcement Fairness Act of 1996.

These supplemental comments are filed by the Independent Producers in response to initial comments and supplemental comments filed by others, including some that directly address the Independent Producers initial comments (filed December 17, 2018).

***Framing the Issues***

The Independent Producers comments addressed several key issues where the proposed Reconsideration Rulemaking adversely affect American oil and natural gas production. These include the following that were directly addressed in comments by others:

1. Alternative Means of Emission Limitation (AMEL) for state equivalency to the required leak detection and repair (LDAR) provisions for fugitive emissions; and,
2. The treatment of low production wells

To put these supplemental comments in context, following are synopses of the initial Independent Producers comments on these issues.

*AMEL for emerging technology and state equivalency to the required leak detection and repair (LDAR) provisions for fugitive emissions*

The Independent Producers support the options in the Proposed Revisions to use modeling, to test technologies in a controlled test environment, and to allow manufactures/vendors to apply for approvals. EPA should allow for basin-wide approvals of emerging technology for use in complying with the LDAR requirements in the rule. EPA can establish clear and consistent parameters under which a technology will be able to detect methane emissions and site specific variables can be addressed in conditions required for the use of the technology. Basin-wide data is necessary to determine equivalency and receive approval per CAA 111(h); basin-wide surveys that can identify potential fat-tail emission sources faster and per the EPA, higher mass emission reductions from large leaks, found earlier, are offset by some degree by smaller leaks which go undetected. Common sense dictates basin-level approval; the 111(h) notice and comment process required to achieve approval is very onerous and not feasible to do for every single well site. CAA Sec. 111(h)(3) does not constrain basin-wide approvals.

Per cooperative federalism, EPA should recognize the approved state programs as wholly equivalent to 40 C.F.R. Part 60, Subpart OOOO's ("Subpart OOOO") LDAR program and fully delegate the implementation of the LDAR monitoring provisions to these respective states. Alternatively, EPA could require the fugitive emissions component definition from Subpart OOOOa to be used when following an alternative approved state program but EPA should not require a duplicative administrative burden; to do so would be an undue burden with no corresponding environmental benefit.

*The treatment of low production wells*

Subpart OOOOa in the context of its application to oil and natural gas production emissions expands on a regulatory network that includes Subpart OOOO. Subpart OOOO applies to the significantly more substantial emissions sources. However, in their entirety, these oil and natural gas production sources currently account for approximately 1.2 percent of the US Greenhouse Gas Inventory (GHGI).

There are approximately one million oil and natural gas wells in the United States. Within this category of sources are low production oil and natural gas wells (wells producing 15 b/d or less or 90 mcfd or less).

There are approximately 770,000 low production oil and natural gas wells in the United States. These wells account for about 10 percent of US oil production and 12.5 percent of US natural gas production. If these wells emit methane comparable to their production volumes, they would account for an amount less than 0.15 percent of the total GHGI.

While Subpart OOOOa addresses new and modified sources, because it applies to a non-criteria, non-hazardous chemical – methane – it will trigger a nationwide existing source regulatory requirement for oil and natural gas production facilities – Section 111(d). Section 111(d) was squeezed into the Clean Air Act to address what can only be understood as a small number of pollutants that would not fall into the larger categories – and correspondingly – to a small number of sources. Section 111(d) was never envisioned as a regulatory framework for a source category with a million facilities.

EPA's creation of an expensive, burdensome and ineffective Optical Gas Imaging (OGI) LDAR fugitive emissions program for low production wells in Subpart OOOOa threatens the economic viability of existing low production wells without a sound basis or reasonable expectations of emissions reductions. While emissions information has been gathered from oil and natural gas production operations, none of these efforts was designed to address low production wells. Rather, low production well data has been culled from the larger data pool. The vast majority of data collected does not distinguish fugitive emissions from permitted emissions. Similarly, when EPA has turned to alternative approaches of using component counts and emissions factors, it has relied on data from an extremely small sample of low production wells and from emissions factors based on a 25-year-old study. Neither that study nor the more recent emissions studies were designed for the purpose of crafting regulations. The Independent Producers believe this information is insufficient to impose requirements that disproportionately affect low production wells.

The Department of Energy (DOE) has initiated a study of low production well emissions that should be finished before low production well regulations are required and could be used to develop a sound low production well regulatory framework if one is necessary.

These supplemental comments will address comments filed by the Joint Environmental Coalition (JEC) on the initial proposed revisions to Subpart OOOOa as well as their supplemental comments submitted by February 21, 2019. The JEC members are advocates for the termination of American fossil energy production. The JEC comments must be viewed in the context that their underlying objective is to produce EPA actions that prevent new American oil and natural gas production and terminate existing American oil and natural gas production. These supplemental comments address comments by the JEC seeking to stop American production that are inaccurate or address issues of particular concern to the Independent Producers.

The organization of these comments will be:

1. A review of the JEC basis for its positions
2. Responses to the JEC Supplemental Filing – February 21, 2019 – Criticisms of Industry Comments with a principal focus on the low production well issues raised

3. Responses to the JEC initial Comments with a principal focus on low production well issues; and,
4. A response to JEC issues related to AMEL for state equivalency.

***Joint Environmental Coalition Basis for Its Positions***

At the center of the comments submitted by the JEC are a series of studies and reports that present its perspectives on methane emissions related to the production of American natural gas and oil. Each of these items present highly inaccurate and questionable assessments and present them with strident evangelical certainty that vastly overstates their accuracy and value. To place the JEC arguments and criticisms in context, it is useful to review documents cited in their comments.

1. *Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries (ICF Study)*

This report funded by EDF created an array of cost effectiveness calculations in $/mcf based on a series of critical assumptions. Since its completion, EDF and other members of the JEC have touted it as demonstrating that methane emissions can be reduced with technologies that only cost cents per day. While aggregating all of the cost effective technologies with the cost ineffective technologies might produce such a result, individual technology options do not. Equally significant are the EDF assumptions of the value of natural gas in calculating the benefits of regulations and the efficiency of the requirements. These are particularly important in the context of the fugitive emissions proposals.

EDF concludes that a quarterly fugitive emissions program for natural gas wells would recover 264 mcf/y using a 60 percent recovery rate on emissions of 440 mcf/y and have a cost burden of $7.60/mcf without recovery benefits and $2.52/mcf with recovery.

Putting this evaluation in some context changes the perspective. First, looking at the emissions and recovery quantities on a daily basis shows them to be 0.72 mcfd and 1.2 mcfd, respectively. These are small volumes for even the average well. EDF does not indicate the average production rate for the wells it assumes for the average emissions, but the average US natural gas well produces about 127 mcfd. Therefore, the approximate emissions rate would be about 1.0 percent. Nor does EDF appear to distinguish sources of emissions in its fugitive discussion. For example, it does not discuss the share of emissions coming from equipment and those coming from storage tanks that have permitted releases. Since an LDAR program would not apply to these allowable emissions, the efficiency/cost estimates must be questioned.

A second key point of the analysis relates to the value of natural gas where EDF assumes a price of $4.00/mcf. Producers have not received such a price for a long time and do not foresee such a price for many years. As the Independent Producers submitted in its original comments, the recent price for natural gas has been nearer $2.22/mcf of which the producer receives approximately $1.67/mcf. If this price replaces the EDF assumptions, the value of the recovered natural gas would drop from $1360 to $440 annually. Correspondingly, the cost effectiveness would change in the net case from $2.52/mcf to $5.48/mcf.

A third point relates to the scope of fugitive leaks of the Leak Detection and Repair (LDAR) program. A study done by Carbon Limits (described below) concluded that fugitive leak emissions at well sites accounted for 17 percent of the total site emissions. Using this assessment of the 440 mcf/y of site emissions, only 75 mcf/y would be addressed by the LDAR program.  And using the generous assumption of a 60 percent recovery, 45 mcf/y (0.12 mcfd) would be recovered.  This would result in $75 in recovered value.  The cost effectiveness would then become $44.58/mcf in the gross case and $42.91/mcf in the net case

More critically, the issue of larger significance here is the application of an LDAR program to low production wells.  These wells average about 24 mcfd rather than 127 mcfd.  Moreover, in some significant natural gas producing states the average low production natural gas well is much less; in Pennsylvania, for example, it is 6.1 mcfd.  Using the same ratio of emissions to production for the average national well would yield low production emissions rates of 0.24 mcfd nationally and 0.06 mcfd for Pennsylvania.  On this basis the potential recovery would be 9 mcf/y for the national average low production well and 2.2 mcf/y for the Pennsylvania well. The gross and net cost effectiveness values would be $222.89/mcf and $221.22/mcf for the national wells and $911.81/mcf and $910.15/mcf for the Pennsylvania wells, respectively. Setting aside that most of the likely emissions would be from permitted storage tank vents, these assessments argue that the Optical Gas Imaging OGI LDAR approach is not cost effective.

2. *Quantifying Cost-effectiveness of Systematic Leak Detection and Repair Programs Using Infrared Cameras (Carbon Limits)*

This report was prepared for the Clean Air Task Force by Carbon Limits.  It is designed to assess LDAR programs using infrared cameras for various components of the natural gas value chain. Environmentalists like to reference it because of its general conclusions that these LDAR programs can be cost effective.  But, a closer look reveals a number of key points that demonstrate a very different result particularly in the context of low production wells.

First, like other analyses this report is based on recovering methane at a natural gas price of $4.00/mcf.  While it does develop an effect case if natural gas were priced at $3.00/mcf, it does not approach an analysis at the $1.67/mcf prices that have characterized the recent prices that producers receive.

Second, as mentioned above, it concludes that natural gas well leaks that would be the subject of an LDAR program represent only 17 percent of the methane emissions from well sites.

Third, the report develops Net Present Value (NPV) determinations for each industry segment that it evaluates — well sites and well batteries, gas processing plants and compressor stations in gas transmission, and gas gathering systems.  For well sites and well batteries, the Carbon Limits study concludes that infrared camera based LDAR programs are not cost effective at 85 percent of these sites — a percentage that exceeds the share of natural gas production facilities that are low production wells.  Moreover, since this assessment is based on $4.00/mcf natural gas, it would thereby mean that such an LDAR program would be not be cost effective for an even greater percentage.

3. *Waste Not:  Common Sense Ways to Reduce Methane Pollution from the Oil and Natural Gas Industry (Waste Not)*

This report was prepared by the Clean Air Task Force, the Natural Resources Defense Council and the Sierra Club.  It essentially presents information from other sources arguing for a methane-based expansion of Subpart OOOO in order to expand regulation to existing sources. Its information is largely restatements of the information from the ICF and Carbon Limits reports described previously and therefore suffers from the same limitations, including the use of a natural gas value of $4/mcf.  Moreover, since it predates Subpart OOOOa, much of its emissions reduction calculations apply to the broad array of possible regulations and are not limited to those addressed in the Subpart OOOOa reconsideration. The only intriguing element of its recommendations in the realization that a fugitive emissions program needs to differentiate its requirements based on the production volumes of the facility.

4. *Toward a Functional Definition of Methane Super-Emitters: Application to Natural Gas Production Sites (Super-Emitters)*

This study was commissioned by the EDF and clearly demonstrates the outcome-based purpose of the effort. It represents an effort to carefully cull data from other efforts and recast it as a new analysis to create the impression that low production wells are "super-emitters". It manipulates data to twist reality for the purpose of convincing EPA and others to regulate low production wells. The Independent Producers have addressed the abusive structure of this study in earlier comments. Those statements are restated herein:

> **Manipulating Data to Create the Illusion That Low Producing Wells Are "Super-Emitters"**
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> This document addresses data manipulation issues in the environmentalist study submitted to the rulemaking proposal for Subpart OOOOa to distort the role of low producing wells regarding methane emissions. This study was then characterized as the basis for removing the low producing well exclusion for the Subpart OOOOa fugitive emissions program initially proposed by the Environmental Protection Agency (EPA).
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> **Background**
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> Initially, it is important to understand that this study used data from a number of different studies to create its arguments. All of the underlying studies generated their data by driving vehicles with samplers downwind of production sites, hunting for methane plumes. None of them used samples taken on the production site. This creates two issues. First, it measures everything emitted at the site – fugitive emissions and permitted vents. Second, the data are collected over minutes – maybe over an hour – but not over a day. The data in the study are presented as if they were daily emissions but the studies merely scale up hourly estimates. Consequently, an emission that might occur for several hours, but not the full day, would be overstated.
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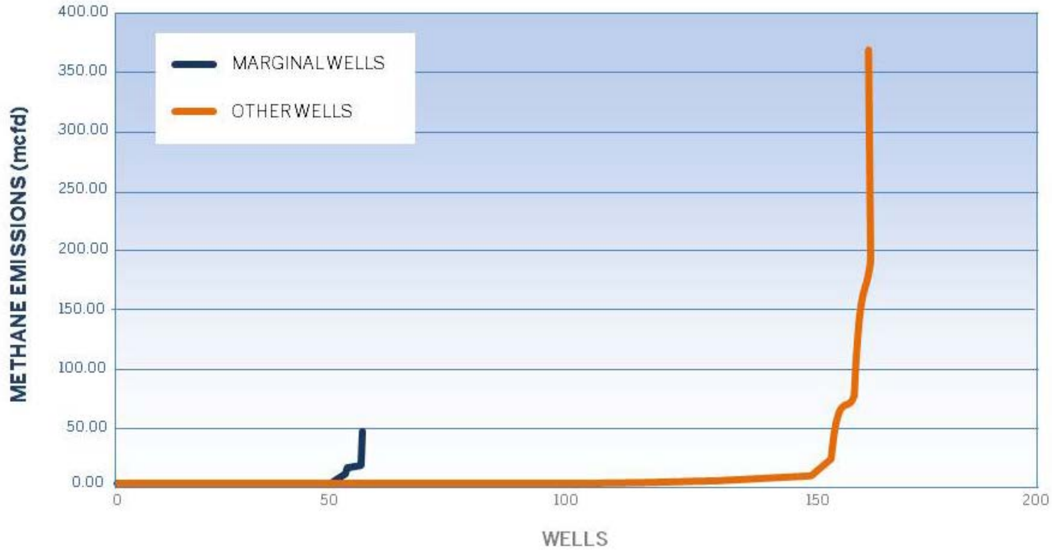
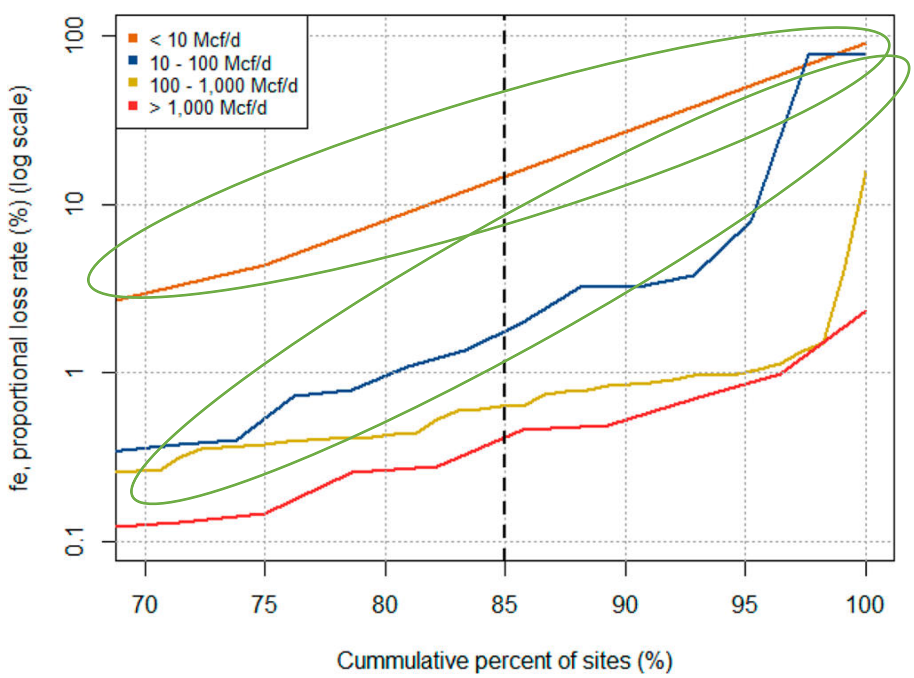
> Before turning further to describe the submitted study, it is useful to look at the same data using a direct graph of emissions. In this graph, marginal wells are those with production volumes of 90 mcfd or less.




This graph is consistent with information from other studies showing that a small portion of wells have an emission profile for some reason with high emissions and most wells have really low emissions.  Importantly, it also clearly shows that marginal wells – low producing wells in the context of the regulation – have far smaller emissions.  But, since this graph is using the same data as the study, it could also be overstating emissions because of scaling short term emissions to a daily amount.

With this background, turning to the presentation of the same material in the study demonstrates how it was manipulated.  Below is the graphic used to present the data.  It would suggest that the worst emitting operations – the "super-emitters" –



are the smallest wells (the orange line and the blue line, circled in green). Having directly plotted this data, the obvious issue is how such a result can occur.

It is a busy and confusing graph – it's intended to be. The study uses data analysis tricks to create the appearance that marginal wells are "super-emitters".

First, it shows emissions as a percentage of production rather than actual emissions. Thus, one mcf emitted out of ten mcf produced is 10 percent, but 50 mcf emitted out of 1000 mcf produced is 5 percent. As a result, it skews the perception of the data to imply that low producing wells are large emitters when they are not.

Second, its production volumes are really sales volumes, not the amount extracted from the wellhead. Consequently, a "proportional loss rate" of 50 percent would be the calculated loss divided by the volume sold. If the percentage of loss were calculated based on extracted volumes, the 50 percent "proportional loss rate" would drop to 33 percent because the loss would be added to the sales volume to obtain the extracted volume.

Third, it only shows data from the 70$^{th}$ percentile of information. This excludes all of the virtually zero emissions that dominate the data.

Fourth, it uses a logarithmic scale to present the data. One of the reasons to use logarithmic scales is to flatten curves to make them look more like straight lines.

5. *Aerial Surveys of Elevated Hydrocarbon Emissions from Oil and Gas Production Sites (Lyon 2016)*

This report was completed for the Environmental Defense Fund and utilizes aerial data collection techniques to develop information. The data for the report were taken from June through October 2014. Consequently, of the 8220 well pads that were sampled, only 1574 would have been subject to the requirements of Subpart OOOO which became effective for new facilities after August 2011.

The study provides some useful insights. For example, it states:

> Tank hatches and tank vents were the most common source type of detected emissions, comprising 92% of observed sources. The remaining 8% of detected emission sources were dehydrators, separators, trucks unloading oil from tanks, and unlit or malfunctioning flares.

Of these, 184 would have been under the Subpart OOOO requirements. The remainder would have been allowed to have vented emissions without federal requirements for vapor recovery. In addition to vented emissions, tanks can have emissions from open hatches or corrupted seals.

The report also observes that its data may not reflect annual emissions information stating:

> Since our observations were limited to summer/fall and daylight hours, we were not able to assess how annual average prevalence may be affected by seasonal or diurnal trends such as higher tank breathing losses during warmer conditions.

This is a plausible issue since temperature can affect breathing losses.

Additionally, the validity of aerial surveys is an issue that has been questioned because – like other forms of data collection that is both based on measurements of sites from offsite and on measurements that are taken for a limited period of time and then extrapolated to daily or annual emissions – the lack of information on site operational conditions can result in inaccurate assessments. This issue has been addressed in a study published in 2018, *Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region*, which makes the following observation:

> This study spatially and temporally aligns top-down and bottom-up methane emission estimates for a natural gas production basin, using multiscale emission measurements and detailed activity data reporting. We show that episodic venting from manual liquid unloadings, which occur at a small fraction of natural gas well pads, drives a factor-of-two temporal variation in the basin-scale emission rate of a US dry shale gas play. The midafternoon peak emission rate aligns with the sampling time of all regional aircraft emission studies, which target well-mixed boundary layer conditions present in the afternoon. A mechanistic understanding of emission estimates derived from various methods is critical for unbiased emission verification and effective greenhouse gas emission mitigation. Our results demonstrate that direct comparison of emission estimates from methods covering widely different timescales can be misleading.

Like other reports, this one was not structured to specifically address low production wells but it includes information that presents some useful insights regarding the low production wells it sampled. Of the 8220 well pads sampled, 4195 were low production wells (15 BOE/day or less), averaging 4.1 BOE/day. Of these 4195 low production wells, 57 had measurable emissions (1.3 percent). Of these, 37 had tank vent emissions, 8 had tank hatch emissions and 2 had both tank vent and hatch emissions. The remaining 10 (0.2 percent) had emissions from dehydrators, separators, trucks unloading oil from tanks, and unlit or malfunctioning flares. These emissions are not clarified regarding whether the emissions would be considered as fugitive or whether they are from allowable vents or normal operations (e.g., truck unloading). However, it does clearly call into question the benefits of an OGI based fugitive emission program to address the small percentage of low production wells that would be dealing with non-tank emissions.

6. *Methane Emissions from Conventional and Unconventional Natural Gas Production Sites in the Marcellus Shale Basin (Omara Marcellus 2016)*

This report includes information on both unconventional natural gas wells and conventional natural gas wells. For both types of wells remote sensing of emissions was undertaken and the facilities were examined using OGI, although most of the site examinations occurred without the participation of the facility operator. Among the report's conclusion is the following:

> Based on our results, the estimated 2014 CH4 leakage from all routinely producing NG well pad sites, as a fraction of statewide CH4 production, was 1.0% in Pennsylvania … and 3.0% in West Virginia …. The combined regional CH4 emissions (1150 Gg, Table 1) represented approximately 1.4% … of total Marcellus CH4 production (i.e., production from all routinely producing UNG and $C_v$NG sites in PA and WV combined) in 2014.

However, as Energy In Depth reports:

> Importantly, Omara et al. is actually part of a larger federally-funded study (Presto et al.) that began in the Marcellus and eventually was expanded to include several basins across the country. That more recent and comprehensive study found that methane emission estimates for Pennsylvania and West Virginia were **actually 40 percent lower than those reported in Omara et al. — the study EDF bases its estimates off of** – due to "improved statistical power in the current study and methodological differences in the treatment of high emitting sites."
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> Specifically, the **more comprehensive 2017 study** found,
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> > "From the 511,000 O&G production sites, we estimated total U.S. onshore CH4 emissions of 700,000 kg/h (or 6.1 million metric tons) in 2015. **These CH4 emissions were equivalent to 1.43% of total CH4 production in 2015**, or 1.6 kg/h/site." (emphasis added)
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> …
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> The more comprehensive 2017 study also determined that 2015 methane emissions leakage rates in both the southwestern and northeastern parts of the state were **less than one percent of production**. This is significant for a variety of reasons, the biggest being that in order for natural gas to maintain its climate benefits methane leakage rates have to **fall below 3.2 percent** – and they are well below that rate in Pennsylvania. Importantly, the leakage rate estimate from the more recent and comprehensive 2017 study includes conventional sites (i.e. generally older equipment) and wells from the southwestern portion of the state where the gas is "wet," meaning there are more natural gas liquids (NGLs) and thus more equipment on site (i.e. more opportunity for leaks). Still, the study found leakage rates **well below one percent of production**.

The report includes information from 19 conventional natural gas wells at 18 well pads, all of which are low production wells. The report suggests that emissions from these wells are proportionally higher than those from unconventional wells. Looking at the data more closely reveals some key facts.

First, it is important to recognize that this report suffers from the same limitations as most others. Its emissions information is taken remotely for limited times and cannot be converted accurately to either daily or annual emissions. Consequently, using the emissions determinations in the report should not be considered as accepting them as accurate. As the information above indicates, subsequent reports show far lower emissions rates.

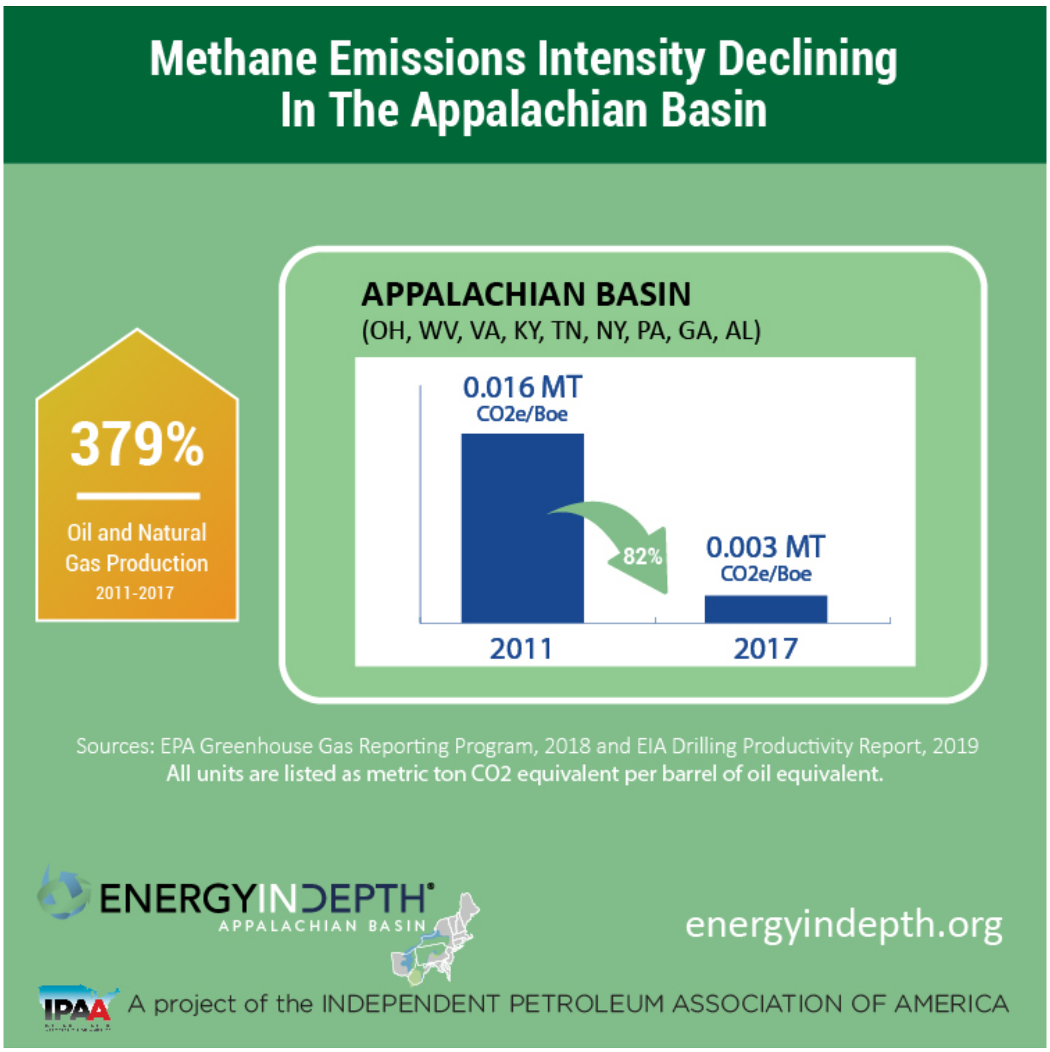
Second, of the 19 conventional wells, onsite information related to an OGI survey is supplied for 18 of them. Of these 18, the average production rate was 13.08 mcfd with calculated emissions of 1.22 mcfd or 0.05 lbs/day. Translating this value to annual emissions, it would be 0.0092 tons/year.

Third, of the 18 wells, the OGI information shows that 11 of them were characterized by having storage tank emissions from vents or hatches. Their average production rate was 13.79 mcfd with calculated emissions of 1.63 mcfd or 0.067 lbs/day. Translating this value to annual emissions results in a calculated value of 0.012 tons/year (tpy).

Fourth, the current Volatile Organic Compound (VOC) Control Techniques Guidelines (CTG) document for oil and natural gas production facilities in ozone nonattainment areas recommends its Reasonably Available Control Technology (RACT) for storage vessels apply to storage vessels "…with a potential to emit (PTE) greater than or equal to 6 tpy VOC". The assumption in this report is that the methane content of the emitted vapor is 81 percent. Consequently, the annual emissions from the well sites with tanks would be approximately 0.019 tons/year. This is approximately 0.3 percent of the threshold for regulation in the current CTG.

Fifth, to put a final perspective on the implications of this report with regard to low production wells, according to EPA, "A typical passenger vehicle emits about 4.6 metric tons of carbon dioxide per year…." or 5.07 tons per year. Applying the Greenhouse Gas Inventory Global Warming Potential to the emissions calculations for these tank-based well sites, it would take about ten of them to equal one typical passenger vehicle.

Sixth, as the following graphic shows, oil and natural gas production facilities continue to reduce their methane emissions intensity in the Appalachian basin where this report obtained its information.



7. *Assessment of methane emissions from the U.S. oil and gas supply chain (Assessment of Studies)*

This EDF report was released with great fanfare during the 2018 World Gas Conference to create the appearance of new data showing methane emissions from the oil and natural gas industry value chain. The report purports to show that emissions are far higher than those reported in EPA GHGI. The JEC then refers to this report as a linchpin of its arguments for changes to the Subpart OOOOa proposal, particularly with regard to the fugitive emissions program with a special focus on low production wells. However, probing its details provides a far different perspective.

This report is not new data. Rather, it is a reconstruction of prior data from others' studies. For example, it regurgitates the same information in the Super-Emitters study and adds some additional material from others.

As a consequence, the report suffers from no certainty regarding the quality of its data by possibly exacerbating bias and inaccuracies through incompatible sampling and data collection methodologies. It accepts as accurate everything it receives and these data have glaring deficiencies.

The predominant data that is used for the bottom-up (BU) elements of the report are – as described frequently in these comments – facility measurements that can not distinguish between fugitive emissions and allowable emissions and that are remotely sampled. These failures are demonstrated in a number of statements in the report and its supplementary materials.

For example, one of the key issues in the use of remote sampling relates to interpreting the short-term information in the context of long-term emissions. In its supplementary material, the report states:

> Measurement methods included the mobile flux plane technique …, dual tracer flux approach …, and OTM-33A, an inverse Gaussian method …. All three methods capture a snapshot of site-level emissions, with reported duration of individual plume captures of ~50 s …, 30 s to a few minutes … and 15-20 minutes ….

Consequently, using samples with time spans of 50 seconds, 30 seconds to a few minutes and 15-20 minutes, the report scales this information first to daily emissions and then to annual emissions. The approach generates an inherent and inappropriate characterization of emissions that cannot be considered accurate or valid. Further, the study presents no information regarding background levels inherent to various comingled land use activities and regional sources.

Similarly, the report makes a significant effort to try to discount this obvious emission estimating challenge by discounting the likelihood that short-term activities at the production sites could be the cause of its higher readings. However, since the researchers in their original data development chose not to work with production operations during data collection these assertions are a thinly disguised effort to rationalize the fundamental inability to understand the nature of the data. Consequently, rather than recognized that activity at production sites largely take place during daytime hours – activities such as liquids unloading, maintenance and liquid transfers – that could account for higher than normal emissions, the report attempts to argue the converse. In its supplementary materials it makes this statement:

> In addition, there is no reason to expect daytime bias in the kinds of abnormal operating conditions that are thought to characterize high-emitting production (and gathering) sites, which operate continuously. In fact, it is plausible that abnormal emissions could actually be higher at night because they are less likely to be found and corrected in the absence of operators.

Yet, the very issue that arises in the use of daytime data is highlighted in a recent NOAA study and the point was addressed in the Independent Producers initial comments by inclusion of an EID analysis of this report and are restated later in this submission.

This Assessment of Studies report – faced with trying to justify its rational for its higher emissions estimates – tries to dismiss anything that flies in the face of its biases. As it brings in its Top Down (TD) information the report includes this statement:

> An extensive aerial infrared camera survey of ~8,000 production sites in seven U.S. O/NG basins found that ~4% of surveyed sites had one or more observable high emission-rate plumes … (detection threshold of ~3-10 kg CH4/h was 2-7 times higher than mean production site emissions estimated in this work). Emissions released from liquid storage tank hatches and vents represented 90% of these sightings. It appears that abnormal operating conditions must be largely responsible, because the observation frequency was too high to be attributed to routine operations like condensate flashing or liquid unloadings alone …. All other observations were due to anomalous venting from dehydrators, separators and flares.

The report that this report references in this paragraph is the Omara Marcellus 2016 report which did – as we described earlier – at least for conventional low production wells demonstrate that the primary emissions sources were storage tanks. Here, however, the authors cannot accept the reality that storage tanks, dehydrator vents, separators and flare are the likeliest sources of emissions and must postulate some "abnormal operating conditions" because to do otherwise would undermine their singleminded focus on expensive OGI LDAR requirements.

Another point the report makes and then ignores is:

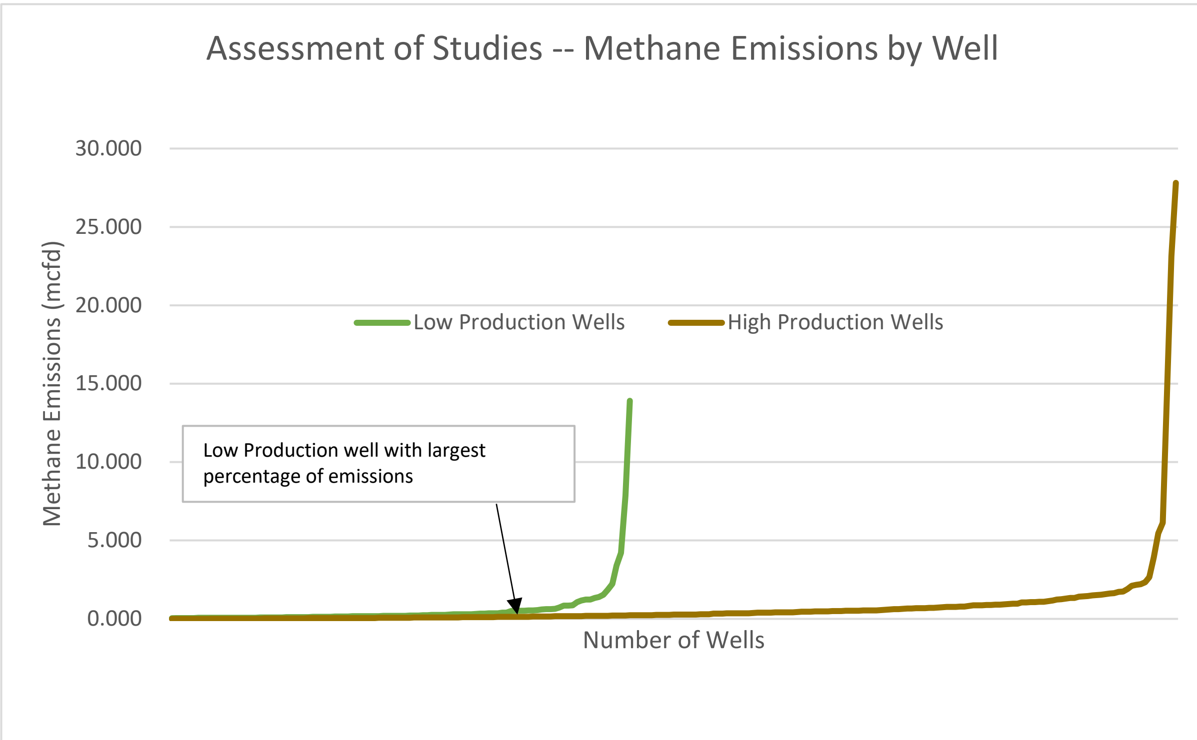
> Notably, the two largest sources of aggregate emissions in the EPA GHGI – pneumatic controllers and equipment leaks – were never observed from these aerial surveys.

This should be telling observation: *the two largest sources in the GHGI – pneumatic controllers and equipment leaks – were never observed in these aerial surveys*. But the report lets it drop while pursuing its skewed emissions estimates based on statistical manipulation of data.

These prior issues present an array of reasons why the Assessment of Studies report should have been extremely cautious about the methods it used to develop its inflated emissions estimates that the JEC has touted so frequently in its comments opposing the Reconsideration Rulemaking. The core of the Assessment of Studies emissions estimates hinges on how EDF takes the limited facility scale emissions information and kites it to national emissions.

Previously, the fundamental issue of taking short-term emissions observations and escalating them to daily and annual amounts was identified and challenged. But the more devious action taken in the report is the use of statistical tools to create emissions. Mark Twain once attributed to Benjamin Disraeli this statement, "There are three kinds of lies: lies, damned lies, and statistics." This report falls in the last category.

The following graph presents the emissions from the well sites used in the Assessment of Studies. It tracks the same type of emissions profile as the Super-Emitter report – large numbers of wells with little or no emissions and a few wells with some emissions. And, since these data are taken for the entire facility remotely, there is no information that defines the actual sources of the emissions. Similarly, since the data is collected from 2 seconds to 20 minutes, the representation of the emissions as daily emissions is speculative at best.




This chart also demonstrates the flaw in the arguments that emissions issues should be analyzed based on the percentage of emissions related to sales. For low production wells, the highest percentage emissions well is almost at the point where it is barely discernible. It emphasizes the lack of analysis of the underlying data. In this instance, using the EDF approach of calculating its percentages based on emissions divided by sales, the result would be 24.45 percent. Any good engineer would look at this result and question losing a quarter of its sales volume. The question then would be whether something unusual was happening that created this loss. But, clearly, an EDF analyst merely sees it a data point corroborating a preconceived notion of emissions.

It also accentuates the management of the data used for the Assessment of Studies report. The authors report some data was excluded from its analysis, stating:

> And second, values reported as zero or below the detection limit (0.08 kg/h, 0.036 kg/h and 0.01 kg/h in Rella et al. (*19*), Robertson et al. (*21*), and Omara et al. (*20*), respectively) were treated as censored data points (see below). Such censoring

> applied to 78 (40%) and 18 (35%) measurements in the Barnett and Fayetteville, respectively.

This statement implies that the authors concluded that low emissions data would reduce the emissions estimates and, therefore, it was inconsistent with the intended result of the study.

All of these pieces point to a consistent conclusion regarding the validity of the Assessment of Studies report. It builds on data that is not consistent and then excludes data it does not want. But, the final aspect of its effort is telling. The key to the development of the Assessment of Studies is its statistical manipulation of its data to develop emissions values where it does not have data. Here are some important statements by the authors:

> We assume our underlying emissions pdfs are lognormal, which is expected in a system where many independent random and multiplicative events can contribute to the occurrence and magnitude of emissions

and

> Results from both tests applied to all of the datasets used directly in this work indicate that one cannot reject the null hypothesis that the site-level sample data arise from a lognormal population distribution

These are extremely weak arguments – "we assume … emissions pdfs are lognormal…."; "…one cannot reject the … hypothesis that the site-level … data arise from a lognormal population distribution."

If they are not lognormal distributions, the entire framework for the Assessment of Studies report becomes suspect. Correspondingly, looking at the nature of the site emissions data – with all of the flaws associated with the assumptions in evaluating that data – there is little to suggest it is a lognormal distribution.

These inadequacies and those described in the EID analysis of the report undermine the validity of the basis for arguing that the Assessment of Studies provides a basis for the fugitive emissions LDAR programs in Subpart OOOOa, particularly in their application to low production wells.

8. *A technical assessment of the forgone methane emissions reductions as a result of EPA's proposed reconsideration of the 2016 NSPS fugitive emissions requirements for oil and gas production sites (Omara Appendix G)*

This technical assessment was prepared by EDF to create a perception that EPA is understating the implications of its reconsideration of the Subpart OOOOa fugitive emissions requirements. Clearly, the first issue here relates to the vastly different views of the effectiveness of the fugitive emissions programs. But others are significant. For example, the assessment relies primarily on that same array of data that is used in other reports. As stated previously, fundamental issues with these data include the remote sampling nature that cannot distinguish between permitted or regulated emissions and fugitive sources and using limited time samples to create daily or annual emissions estimates. The assessment actually recognizes the challenge of distinguishing emissions.

The first issue in the assessment relates to differences between EPA calculations of the number of well sites that will be constructed between 2015 and 2025 for purposes of determining emissions changes between the current and proposed requirements. The assessment concludes that fewer wells will be drilled in the 10-year period. However, both analyses rely on assumptions that are not reflecting changes in the development of American resources. Historic wells were typically one or two wells and low production well sites producing conventional formations are more likely to continue to be. However, the larger unconventional well sites frequently include far more wells because horizontal drilling allows for the well bores to be started close to each other. Consequently, both assessments may overstate the number of well sites needed to meet future production activities.

The second issue involves the approach the assessment uses to develop emissions factors for the different well types. As it states, the assessment uses information taken from existing well sites remotely to develop its factors. This raise a number of issues.

A. Almost all of the data taken at these sites is based on existing operations that pre-date the Subpart OOOO requirements. Consequently, much of the fugitive emission arise from equipment that differ from the sites developed under those requirements (and those required under Subpart OOOOa) such as pneumatic controllers. This inevitably skews the perception of the presence of fugitive emissions.

B. The assessment concludes that EPA's use of emissions factors from the 1995 AP42 materials underestimates emissions. However, this is a highly disputable assumption since the American Petroleum Institute developed substantial new material showing that the factors overstate emissions and the failure rate of repaired equipment is longer than EPA's assumptions.

C. The assessment attempts to use information from 300 wells in the Barnett Shale to develop a reduction in total emissions to represent fugitive emissions. However, there is no basis to suggest that this approach is appropriate for all categories of wells. For example, a number of reports on low production wells suggest that the primary emissions sources at those sites are storage vessels. Storage vessel emissions are comprised of essential vents and open hatches that should be closed. A massive OGI fugitive emissions program is not necessary to address either emission.

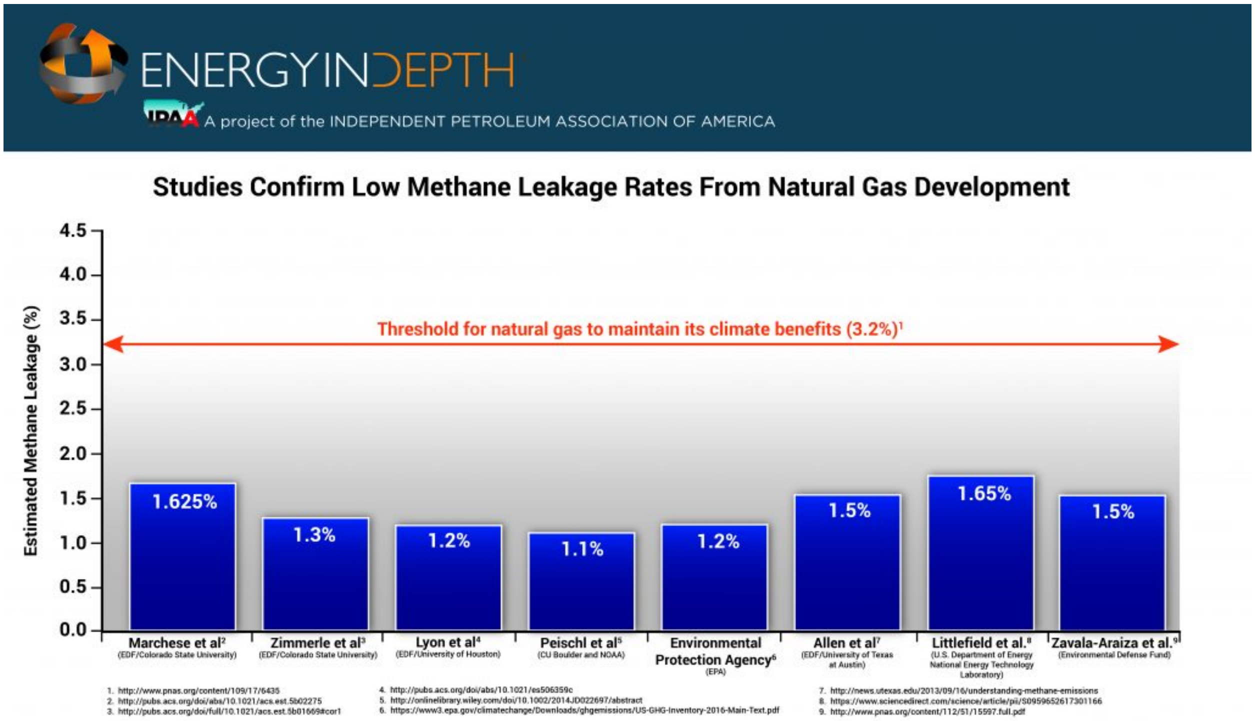
D. The assessment even states that "…fugitive emissions from storage vessels dominate site-level emissions…." But, it uses this statement to argue that EPA's emissions factor for storage tanks "…is likely a significant underestimate for these sources." However, for the new sources being considered in this assessment, storage vessels would be regulated under Subpart OOOO requiring either a vapor recovery/control system or management to keep the emissions below 4.0 tons/year. And, as described previously, storage vessels at existing low production facilities would likely be far lower than that.

Ultimately, this assessment has to be recognized for what it is – a collection of manufactured emissions estimates for the sole purpose of arguing that EPA is understating the implications of the Subpart OOOOa reconsideration when there is ample evidence that EPA has overstated both emissions and the effectiveness of its current program.

9. *Response to methane synthesis critiques (Hamburg)*

This document is a response rebutting analyses of the EDF report addressed previously. It essentially argues that those analysts are too stupid to understand the EDF report. The report responds to statements in an Energy In Depth assessment of the EDF report. The EDF analysis is provided here:

The Environmental Defense Fund (EDF) has **released a myriad of studies** on natural gas system methane emissions over the past six years that have found low leakage rates between 1.2 and 1.5 percent of production. Five such studies are featured in the following EID graphic.




So the fact that a new EDF **study** released today finds methane leakage rates of 2.3 percent — well above what EDF-led research has previously found and "60 percent higher than the U.S. EPA inventory estimate," according to the report — begs the question: What changed with regard to EDF's methodology for this study that yielded a much higher leakage estimate than its past research has shown?

Turns out, quite a lot changed, and most of the changes raise red flags regarding the study's conclusions. Not only did the authors of the new EDF study — which includes no new measurements and instead calculates national methane emissions based on past studies — opt not to use past EDF research as a basis for their emissions calculations, it relies exclusively on five far less comprehensive facility-level studies that lacked industry participation to arrive at its conclusion of higher U.S. emissions than previously reported. In contrast, an "alternative" calculation, based partially on EDF's past studies, that finds emissions in line with current EPA estimates is buried in the study's supplemental data and is not even mentioned in the report.

These are just two of several key issues regarding the manner in which EDF conducted this study that appear aimed at producing the most extreme emissions estimate possible ahead of the 27th annual **World Gas Conference** (WGC), which begins Monday in Washington, DC. Here is a deeper look at each issue.

### #1. Exclusive Use of Facility-Scale Study Data Goes Against National Academy of Sciences' Recommendations and Likely Exaggerates Emissions

This study's national methane emissions estimate is based entirely on downwind, facility-based studies. From the report:

> "In this work we integrate the results of recent facility-scale BU studies to estimate CH4 emissions from the U.S. O/NG supply chain, and then we validate the results using the TD [top-down] studies."

However, a recent National Academy of Sciences (NAS) **report** aimed at improving national methane emissions inventories recommends a more comprehensive approach combining "bottom-up" measurements — both of the component- and facility-level variety — along with "top-down" measurements:

> "Coordinated, contemporaneous top-down and bottom-up measurement campaigns, conducted in a variety of source regions for anthropogenic methane emissions, **are crucial for identifying knowledge gaps and prioritizing emission inventory improvements**. Careful evaluation of such data for use in national methane inventories is necessary to ensure representativeness of annual average assessments."

EDF has conducted studies combining the comprehensive top-down/bottom-up methods recommended by NAS before. **Zavala-Araiza et al.** is the most notable example, and that study found a methane leakage rate of just 1.5 percent. Just as notably, a recent National Energy Technology Laboratory **study** based on Zavala-Araiza et al. data estimates national methane emissions at 1.65 percent. That report involved several of the co-authors of this most recent EDF study that reached much different conclusions.

The new EDF report argues that using facility-level measurements exclusively is appropriate because component-based studies can "under-sample abnormal operating conditions" such as malfunctions and large leaks. But this rationale ignores flaws with facility-level measurements that can lead to overestimation of emissions. For instance, facility-level measurements can capture episodic emissions, such as liquids unloading, and inaccurately characterize them as normal emissions that would be occurring 24 hours a day, seven days a week. The latter issue can be exacerbated when researchers lack a fundamental understanding of the facilities where they are taking measurements, which brings us to the next major issue with the study.

### #2. Lack of Industry Collaboration Goes Against National Academy of Sciences' Recommendations

With regard to the ground-based, facility-level studies used as the basis for estimating national emissions in this report, the report's supplementary information document notes:

> "Sites were reported to be sampled on a quasi-random basis **without advance operator knowledge**."

Not only does EDF admit that some of the studies used did not conduct truly random sampling, it admits that industry wasn't involved in these studies on any level. This again flies in the face of recommendations made in the **NAS** report, which states:

> "[V]erifiability is the bedrock upon which inventories should be built if they are to be widely applicable to policy needs."

The lack of industry participation is surprising, considering EDF's past methane research is well known to have been a collaborative effort between EDF, academia and industry, a fact EDF has frequently **touted**. But even more surprising is EDF's justification for excluding industry from participating in this particular study. From the report:

> "Operator cooperation is required to obtain site access for emission measurements. Operators with lower-emitting sites are plausibly more likely to cooperate in such studies, and workers are likely to be more careful to avoid errors or fix problems when measurement teams are on site or about to arrive. The **potential bias** due to this 'opt-in' study design is very challenging to determine. We therefore rely primarily on site-level, downwind measurement methods with **limited or no operator forewarning** to construct our BU estimate."

Not only does EDF fail to provide a single reference to back up this claim of "potential bias" that it claims necessitated it to use the methodology highlighted above, but none of the five co-authors of this report, who were also the lead authors of past EDF methane research that was conducted in close concert with industry ,have ever publicly claimed any "bias" whatsoever. Not once.

EDF's assertion appears to be purely speculative in nature and also appears to be an excuse to use these studies as a basis for exaggerated national emission estimates.

**#3. "Alternative" Emissions Estimate That Is In Line With EPA Greenhouse Gas Inventory (And Past EDF Research) Is Not Included In Report**

In the supplemental materials document for this report, EDF includes the following "alternative" national emissions estimates based on source-based reports, several of which are past EDF studies.

| Source: Table S3 | GHGI | Source-based EDF estimate (Gg CH4/yr) – Alternative EDF estimate | Site-based estimate (Gg CH4/yr) – Primary Method |
|---|---|---|---|
| **Total U.S. Oil and Gas Supply Chain** | 8,100 (6,800 – 10,000) | 8,800 (8,400 - 9,700) | 13,000 (12,000 - 15,000) |

Source: Alvarez et al. supplementary materials

This “alternative” estimate finds the national methane leakage rate is 1.4 percent, which (not surprisingly) not only aligns with past EDF studies, but also the **EPA Greenhouse Gas Inventory**.

Remarkably, the data from this “alternative” estimate isn’t mentioned at all in the actual report, even though EDF notes that an extensive list of source-based studies featured in the supplemental data of the report has “dramatically improved understanding of the sources and magnitude of CH4 emissions from the industry’s operations.”

EDF also argues that its “primary” estimate — which, again, is based solely on facility-level studies — is in line with aggregate average emissions found in the following nine “top-down” studies based on emission measurements largely collected via aircraft measurements.

> “When the BU estimate is developed in this manner, direct comparison of BU and TD estimates of CH4 emissions in the nine basins for which TD measurements have been reported indicates agreement between methods…”

**Table S2.** Reported estimates of O/NG $CH_4$ emissions from aircraft-based top-down (TD) studies, listed in decreasing order of natural gas production. Italicized values were calculated in this work; shaded rows indicate a second independent, statistically consistent set of reported measurements in two basins (not used directly in this work in favor of the more recent results based on more intensive sampling). Uncertainties are 2-sigma values calculated from reported uncertainties.

| TD survey area | Reference | Date Sampled (Month/yr) | Days/flights/ downwind transects | NG production (bcf/d) | % $CH_4$ in NG | Upwind Background Method* | Total $CH_4$ Flux (Mg/h) | O/G apportionment method† | O/NG $CH_4$ flux (Mg/h)† | Production normalized emission rate$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Haynesville | Peischl (*51*) | 6/2013 | 1/1/3 | 7.7 | 86% | UTA | 80 ± 54 | SE | *73 ± 54* | *1.3%* |
| Barnett | Karion (*71*) | 3 & 10/2013 | 8/8/17 | 5.9 | 89% | DL | 76 ± 13 | E | 60 ± 11 | *1.4%* |
| NE PA | Barkley (*67*) | 5/2015 | 4/4/7 | 5.8 | 95% | MUT | 20 ± 17 | SE | 18 ± 14 | *0.40%* |
| NE PA | Peischl (*51*) | 7/2013 | 1/2 | N/A | 95% | UTA | 15 ± 12 | SE | 13 ± 12 | *0.30%* |
| San Juan | Smith (*52*) | 4/2015 | 5/5/5 | 2.8 | 83% | DL | 62 ± 46 | N | *57 ± 54* | *3.0%* |
| Fayetteville | Schwietzke (*47*) | 10/2015 | 2/2/4 | 2.5 | 97% | UTSV | 31 ± 8 | SE | 27 ± 8 | *1.4%* |
| Fayetteville | Peischl (*51*) | 7/2013 | 1/1/2 | N/A | 97% | UT | 39 ± 36 | SE | 35 ± 32 | *1.9%* |
| Bakken | Peischl (*49*) | 5/2014 | 3/3/5 | 1.9 | 47% | DL | 28 ± 10 | SE | 27 ± 13 | *3.7%* |
| Uinta | Karion (*69*) | 2/2012 | 1/1/1 | 1.2 | 89% | UT | 56 ± 30 | S | 55 ± 31 | *6.6%* |
| Weld | Petron (*70*) | 5/2012 | 2/2/3 | 1.0 | 79% | UT | 26 ± 14 | S | 19 ± 14 | *3.1%* |
| W Arkoma | Peischl (*51*) | 7/2013 | 1/1/1 | 0.37 | 96% | UT | 33 ± 30 | S | 26 ± 30 | *9.1%* |
| 9-basin total | | | | 29 | | | 410 ± 87 | | 360 ± 92 | 1.8 ± 0.5%¶ |

* Upwind background methods: UT=upwind transect; UTSV = spatially variable upwind transect; UTA=upwind transect with adjustments to account for methane above background that flows into a region; DL = downwind lateral plume edges; MUT = model-assisted upwind transect

† Apportionment methods: S= subtraction of inventory-based estimates of non-O/NG sources; E = ethane; SE = subtraction with ethane as qualitative check; N = none

$ Methane emitted normalized by methane produced

¶ Production weighted

Source: Alvarez et al. supplementary materials

### #4. Attempts to Discredit Study That Finds Misrepresentation of Episodic Events Can Lead to Inflated Emissions Estimates Via Daytime Bias

Another factor that can lead to facility-scale measurements overestimating actual normal emissions is the fact that such methods are conducted in the daytime and, thus, can capture emissions from episodic events — such as liquids unloading — that are conducted during the day and inaccurately extrapolate them as if they are constant. This fact was further confirmed by a recent peer-reviewed NOAA study of the Fayetteville Shale **covered** by EID last year.

Perhaps anticipating that 2017 study would be used to call this new EDF report's conclusions into question, EDF attempts to discredit the NOAA study in the paper:

> "[W]e consider unlikely an alternative hypothesis that systemically higher emissions during day-time sampling cause a high bias in TD methods."
>
> "[T]here is no reason to expect daytime bias in the kinds of abnormal operating conditions that are thought to characterize high-emitting production (and gathering) sites, which operate continuously. In fact, it is plausible that abnormal emissions could actually be higher at night because they are less likely to be found and corrected in the absence of operators."

The above claim is directly contradicted by the following, which acknowledges the validity of the NOAA Fayetteville study, but claims it isn't relevant to other basins.

> "O/NG emissions are systematically higher during daytime hours when TD and BU measurements have been made, and lower at night. This situation was reported for the Fayetteville Shale but appears to be unique because the effect is caused by manual liquids unloadings, which represent a much higher fraction of total production emissions than in any other basin."

The fact is, events such as liquid unloadings *are* common in other basins and downwind measurements, such as the ones used as the basis for this EDF analysis, do tend to be higher because they are conducted during the day.

**#5. Despite EDF's Alarmist Characterizations, Natural Gas' Climate Benefits Remain Clear**

The report claims the oil and natural gas development emissions level estimated in this report combined with carbon emissions from current natural gas combustion is having the same climate impact as coal in the short term (20-year timespan):

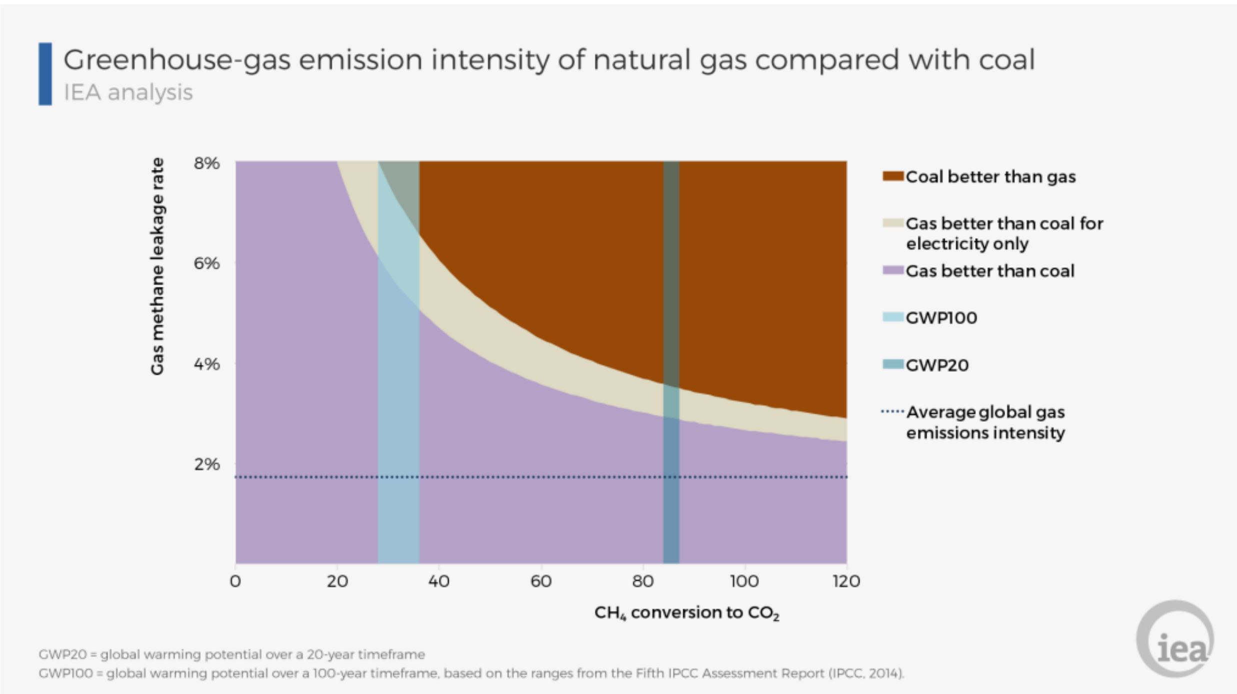
> "Indeed, our estimate of $CH_4$ emissions across the supply chain, per unit of gas consumed, results in roughly the same radiative forcing as does the $CO_2$ from combustion of natural gas over a 20-year time horizon (31% over 100 years). Moreover, **the climate impact of 13 Tg $CH_4$/y over a 20-year time horizon roughly equals that from the annual $CO_2$ emissions from all U.S. coal-fired power plants operating in 2016 (31% of the impact over a 100-year time horizon)."**

But as alarming as that claim might be, it is essential to note that natural gas maintains clear climate benefits over other traditional sources even at much higher leakage rates than purported by this study.

A recent hydraulic fracturing issues brief published by Washington D.C.-based environmental think tank Resources for the Future (RFF) **notes**:

> "If more than about 4% of the natural gas produced in the United States is emitted as methane (rather than being burned), the climate benefits of gas's displacement of coal disappears over a 20-year time frame. If the time frame is 100 years, the leakage rate would have to be more than 8% for natural gas to be a climate loser relative to coal."

The following International Energy Agency (IEA) graphic illustrates RFF's point, showing natural gas maintains its climate benefits even at high leakage rates and regardless of time-frame considered.




## Conclusion

This EDF study spends an inordinate amount of time explaining *why* its conclusions are plausible rather than explaining *how* it reached its conclusions. And it's clear why — once one digs into the report's supplemental information, it's clear that the conclusions are based on some pretty shaky assumptions and speculation that runs counter to established and/or recommended best practices for such research.

But at the end of the day, the EDF study is not only an outlier in terms of the overall body of current methane research — it's also an outlier with regard to EDF's collective methane research, which has consistently found leakage rates between 1.2 and 1.5 percent. In the meantime, EPA **data** show oil and gas methane emissions have declined 14 percent since 1990 even as oil and natural gas production have skyrocketed. Combined with the fact that increased natural gas use has helped contribute to the best air quality of the modern era and the

> lowest carbon emissions in 25 years, it is clear that the shale revolution has been a win-win for the economy and environment.

As addressed in specific comments on the EDF report, despite EDF's characterization of the report as "…the culmination of an extensive amount of research…examining methane emissions from the U.S. oil and gas supply chain", the material is an aggregation of various reports that fail to change the reality that the data suffers from the limitations that it is dependent on remote sampling that cannot distinguish sources and that it estimates daily or annual emissions from short term data collection.

In addition to relying on the studies above, the JEC attempts to further justify its positions by identifying new information that it believes points to support. These three items are, in reality, as flawed as support documents as the studies the JEC relies on.

1. *Very Strong Atmospheric Methane Growth in the Four Years 2014 – 2017: Implications for the Paris Agreement*

The environmental activists argue that:

> A new paper approved for publication by the American Geophysical Union indicates that there has been rapid growth in atmospheric methane since 2007, including "remarkable growth" in methane concentration between 2014 and 2017. One reason that the paper finds for this increase in atmospheric methane is from "very large" emissions of methane from the oil and natural gas sector. The paper concluded that "[r]educing methane emissions is feasible, *especially from fossil fuel sources*, and would have rapid impact on the global methane burden."

New research on rising global methane levels is much more complex than the environmental activists suggest in their comments. While, the report details that oil and natural gas is still a source of methane, it also explains that "fossil fuel emissions are falling as a proportion of the total methane emission." Further, the study notes,

> "However, there is evidence (Schwietzke et al., 2016) that natural gas emissions per unit of production have declined significantly in recent years, and rapid improvements and investment in leak detection and reduction have likely cut the percentage of gas leaked from gas industry production facilities."

More importantly, and as media reported, biogenic sources of methane are thought to be a more likely cause of the increases. Lead author of the study, Professor Euan Nisbet of Royal Holloway, University of London, told the *Guardian*, "We have only just started analysing our data but have already found evidence that a great plume of methane now rises above the wetland swamps of Lake Bangweul in Zambia." Notably, Zambia is not a country with significant – if any – oil and gas production. The *Guardian*, which has vocally supported a "Keep It In the Ground" agenda with regard to fossil fuels in recent years, had a much different take on the study's findings than the activists:

> "**Studies suggest these increases are more likely to be mainly biological in origin**. **However, the exact cause remains unclear**. Some researchers believe the spread of intense farming in Africa may be involved, in particular in tropical regions where conditions are becoming warmer and wetter because of climate change. Rising numbers of cattle – as well as wetter and warmer swamps – are producing more and more methane, it is argued."

The activists' typical approach of pulling statements out of context here is clear.

More recently, a report by National Oceanic and Atmospheric Administration (NOAA) and University of Colorado scientists entitled, "Long-Term Measurements Show Little Evidence for Large Increases in Total U.S. Methane Emissions Over the Past Decade", calls into question some of the fundamental approaches to assessing methane emissions that have led to excessive emissions estimates. That report summarizes the issues as follows:

> In the past decade, natural gas production in the United States has increased by ~46%. Methane emissions associated with oil and natural gas productions have raised concerns since methane is a potent greenhouse gas with the second largest influence on global warming. Recent studies show conflicting results regarding whether methane emissions from oil and gas operations have been increased in the United States. Based on long-term and well-calibrated measurements, we find that (i) there is no large increase of total methane emissions in the United States in the past decade; (ii) there is a modest increase in oil and gas methane emissions, but this increase is much lower than some previous studies suggest; and (iii) the assumption of a time-constant relationship between methane and ethane emissions has resulted in major overestimation of an oil and gas emissions trend in some previous studies.

Moreover, to supplement the point that industrial actions are reducing methane emissions, as described previously, in the U.S. new information demonstrates that methane emissions intensity is declining.

2. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017*

With regard to the Green House Gas Inventory, the activists state:

> Furthermore, EPA's latest draft greenhouse gas inventory, released February 12, 2019, shows that methane emissions increased slightly for the oil and gas sector between 2016 and 2017. While EPA's inventory significantly underestimates methane emissions from the oil and gas sector, as discussed *supra* Section II, the latest draft inventory continues a pattern showing that overall methane emissions remain unacceptably high.

The activists carefully address emissions changes only from 2016 to 2017. Energy In Depth addressed the Inventory more fully in the following assessment:

> U.S. greenhouse gas emissions fell significantly from 2005 to 2017, even while oil and natural gas production **skyrocketed**, according to the Environmental Protection Agency's **draft 2019 greenhouse gas inventory (GHGI)**.
>
> The draft GHGI data show total U.S. CO2 decreased nearly 14 percent, while methane emissions were reduced by more than 4 percent since 2005. Meanwhile, U.S. oil and natural gas production increased more than **80 percent** and **51 percent**, respectively, according to the Energy Information Administration.

| CO2 | 1990 | 2005 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|
| Natural gas systems | 30.0 | 22.6 | 25.1 | 25.5 | 25.1 | 25.5 | 26.3 |
| Petroleum systems | 8.9 | 11.6 | 25.2 | 29.7 | 31.7 | 22.2 | 23.3 |
| *Combined* | 38.9 | 34.2 | 50.3 | 55.2 | 56.8 | 47.7 | 49.6 |
| **Methane** | | | | | | | |
| Natural gas systems | 193.9 | 171.9 | 166.3 | 165.8 | 167.8 | 164.7 | 166.2 |
| Petroleum systems | 42.1 | 36.7 | 41.6 | 42.1 | 39.5 | 38.2 | 37.7 |
| *Combined* | 236.0 | 208.6 | 207.9 | 207.9 | 207.3 | 202.9 | 203.9 |
| **Total U.S. CO2** | **5,122.0** | **6,131.5** | **5,524.0** | **5,574.9** | **5,427.0** | **5,310.5** | **5,279.7** |
| **Total U.S. Methane** | **780.8** | **692.1** | **664.0** | **663.1** | **661.8** | **653.4** | **663.3** |

Source: Table ES-2, EPA draft "Inventory of U.S. Greenhouse Gas Emissions and Sinks," February 2019; Data: million metric ton CO2 equivalent

The activists also dismiss the information that they report by referring to their recurring analyses that the Inventory underestimates emissions. However, as described above, the basis for alleging higher emissions is based on limited and flimsy analyses. Moreover, while the total methane emissions that are reported in the Inventory amount to about 3.86 percent of the total inventory, the contribution from the oil and natural gas production would be 1.2 percent.

3. *Plugging the Leaks: Why Existing Financial Incentives Aren't Enough to Reduce Methane*

The activists pull from this report the following assessment:

> Finally, a new policy brief from the University of Pennsylvania highlights the need for standards to reduce fugitive methane emissions from the oil and gas sector because the value of recovered product alone may be lower than the cost to control the emissions. In other words, often industry is not economically incentivized to control the emissions based on its own cost-benefit analysis. Capturing these emissions is important because of the social damage from climate change and health and safety harms from emissions, which operators do not factor into their own cost-benefit analysis. Because industry does not take these societal costs into account, the need for strong federal action is clear as "global damages reflect real economic risks to the United States, as climate change will impact the global economy."

There are two fundamental issues here that arise on a recurring basis. The first relates to the assessment of cost-benefit analysis in the regulatory arena, particularly with regard to low production wells. Most cost-benefit analyses develop assessments based on valuing the cost of the regulatory requirement and the amount of the recovered emissions. It produces a value in dollars per unit of emissions, e.g., $/ton or $/mcf. What these cost-benefit analyses fail to address are the economic implications for a facility including their operating costs. The Independent Producers comments have submitted assessments regarding how the failure to look at the full implications of regulations can distort conclusions about their "benefits" when in fact they will cause operations to cease.

The second issue relates to the development of social benefits from regulations in the context of global implications. The issue of "social cost" calculations is a complicated one. Developing social cost values relies on a wide variety of assumptions that can be sound or speculative. If these values are not well founded and reliable, social cost calculations can be manipulated to produce whatever value is needed to generate a "cost effective" regulations. Essentially, the process becomes a "black box" that produces a supportive result.

In 2015, NERA Economic Consultants addressed the implications that differing assumptions can have on social cost benefit determinations as a part of comments on the original proposal of Subpart OOOOa regulations. It stated in part:

> The U.S. Environmental Protection Agency (EPA) proposed emission standards for methane (CH4) and volatile organic compounds from new and modified sources in the oil and natural gas sector (referred to as "the Proposed Rule" in this report) on August 18, 2015. Accompanying this Proposed Rule is a Regulatory Impact Analysis (RIA) that is required under Executive Orders 12866 and 13563 for all major rulemakings from Executive Branch agencies. The RIA contains estimates of the net benefits of each of several options that the Proposed Rule is considering, which are equal to each option's estimated benefits minus its estimated compliance costs.
>
> Our comments address technical issues with the RIA's monetized benefits estimates, which are entirely based on potential reductions in future climate change due to CH4 reductions, using a concept called the social cost of methane (SC-CH4). We demonstrate that EPA's estimates of the benefits are: 1) highly uncertain and very likely overstated; and 2) lack the appropriate peer review that is necessary for use in supporting regulatory policy. We also explore the implications of these issues with the Proposed Rule's net benefits estimates, and find they are far more likely to be negative than positive.
>
> More specifically:
>
> - We conclude that the RIA's estimates of benefits from CH4 reductions using its SC-CH4 estimates are highly uncertain and likely overstated for multiple reasons:
>     - The EPA's SC-CH4 estimates are based upon a single study (Marten *et al.*, 2014) whose estimates are significantly greater than, and inconsistent with, available estimates in other published papers (see Section II for a summary of the rest of the literature).
>     - EPA relies on SC-CH4 estimates that reflect global benefits rather than domestic benefits, a practice that is contrary to the Office of Management and Budget's (OMB's) *Circular A-4* (OMB, 2003) and inconsistent with the theoretical underpinnings of benefit-cost analysis that endow the method with its ability to guide a society towards policies that will improve its citizens' well-being. *Circular A-4* calls for use of domestic benefits, and notes that any estimates of non-domestic benefits should be presented separately. EPA's use of global SC-CH4 benefits estimates (and failure to

even present domestic benefits, which are readily obtained The RIA includes a 2.5% discount rate in its range of benefits, which is inconsistent with the short atmospheric lifespan of CH4. Its inclusion overstates the upper end of EPA's SC-CH4 estimates, and hence its net benefits.

    - Marten *et al.* (2014) have used assumptions regarding indirect effects on radiative forcing from changes in tropospheric ozone and stratospheric water vapor levels that lack clear support from the scientific literature. This assumption, which is uncertain and not validated, could be a substantial source of overstatement in EPA's SC-CH4 estimates. For example, compared to a zero indirect effects assumption, it increases EPA's SC-CH4 estimate by about 36% (when using a 3% discount rate).
    - EPA's SC-CH4 estimates are based on an average of five socioeconomic scenarios, four of which assume no incremental policies to reduce emissions in the future (also known as "business as usual" scenarios). Use of scenarios that assume no future emissions control policies to estimate the benefit of reducing a ton of emissions in the near-term overstates the SC-CH4 estimates.

- The absence of a full scientific peer review of the methodology behind EPA's SC-CH4 estimates calls into question the reliability of all of the RIA's estimated benefits and net benefits. We conclude more extensive peer review is especially warranted in this particular case for several reasons:
    - The integrated assessment models (IAMs) that were used to compute EPA's SC-CH4 estimates were modified in a significant manner that has not been reviewed by the original model developers. Other researchers working in this field have not had a chance to concur or disagree with the methodological changes and alternative input assumptions that EPA believes cause its SC-CH4 estimates to be so much greater than other published estimates.
    - The development of new SC-CH4 estimates by modifying pre-existing IAMs to make "standardized" calculations is inconsistent with the concept of using multiple existing models to identify the range of uncertainty in the best-available science-based estimates.
    - EPA conducted an internal peer review process and the paper upon which it has relied (Marten *et al*. 2014) has been published in a peer-reviewed journal. However, those two types of reviews do not replace the need for a more rigorous independent scientific review in light of the types of changes described above. Additionally, EPA's internal reviewers lacked consensus on the use of the paper's SC-CH4 estimates for evaluation of major regulations.

To provide a quantitative assessment of the sensitivity of the RIA's estimates of benefits and net benefits to the technical issues that we have identified, we have re-estimated the SC-CH4 values under several alternative assumptions that we consider more reasonable. These alternative calculations include 1) eliminating from consideration the 2.5% discount rate, 2) limiting benefits to a domestic geographic scope, 3) using alternative assumptions regarding the indirect effects on radiative forcing, and 4) eliminating "business as usual" emissions projections as the reference point for computing future damages from a ton of incremental emission that would occur today. EPA's assumptions on these matters are discussed in Section III, along with our explanations for why our alternative assumptions are more reasonable for estimating SC-CH4 for use in a Federal RIA. All of our alternative SC-CH4 calculations have been made using the same IAMs that Marten *et al.* (2014) used to make their SC-CH4 estimates.

Figure 1 provides a summary of how the EPA's SC-CH4 estimates would change based on assumptions we consider either more reasonable or subject to too much uncertainty for EPA to rely on a single point estimate. The first row shows the range of SC-CH4 included in the RIA based on mean values using 2.5%, 3.0%, and 5.0% discount rates.9 Each subsequent row includes a revised range based on different cases we constructed to address some of the technical issues we identified in EPA's SC-CH4 estimates. Case A removes from consideration the 2.5% discount rate because it is not appropriate given that the shorter atmospheric lifespan of CH4 implies that the resulting climate benefits are not intergenerational. Cases B, C, and D then use a range of discount rates from 3% to 5%, while layering on additional alternative assumptions. Case B shows the range of SC-CH4 estimates when limited to a domestic geographic scope. Case C removes the assumption EPA made on a 40% enhancement of radiative forcing due to indirect atmospheric effects (in addition to the change for Case B). Case D incorporates the same changes as in Case C, but also ensures the baseline emissions projection provides consistency between future emissions control policies and the current emissions reduction effort that is implied if the SC-CH4 is to be used to make near-term emissions reduction decisions.

As Figure 1 shows, using all the alternative assumptions produces SC-CH4 estimates that are as much as 90% and 94% lower than EPA's SC-CH4 estimates for 2020 and 2025, respectively.

**Figure 1. Alternative Estimates of SC-CH4 Reflecting Key Methodological Uncertainties**

| Case | Description | SC-CH4, $ per tonne of CH4 (2012$) *(% Change Relative to RIA Range)* 2020 Min | 2020 Max | 2025 Min | 2025 Max |
|---|---|---|---|---|---|
| RIA | RIA Option 2 (2.5%, 3.0%, and 5% discount rates) | 587 | 1,721 | 702 | 1,900 |
| A | RIA Option 2 (3.0%, and 5% discount rates) | 587<br>0% | 1,309<br>-24% | 702<br>0% | 1,508<br>-21% |
| B | Domestic (U.S.) specific SC-CH4 values averaged across all socioeconomic scenarios from PAGE and FUND models. | 106<br>-82% | 210<br>-88% | 130<br>-81% | 248<br>-87% |
| C | Domestic (U.S.) specific SC-CH4 values averaged across all socioeconomic scenarios from PAGE and FUND model without the indirect effects. | 69<br>-88% | 141<br>-92% | 84<br>-88% | 158<br>-92% |
| D | Domestic (U.S.) specific SC-CH4 values for the 5th Scenario from PAGE and FUND model without the indirect effects. | 58<br>-90% | 99<br>-94% | 69<br>-90% | 115<br>-94% |

Note: The Min and Max values span different discount rates, EPA's Low and High total costs, and climate benefits. For Cases B, C, and D, we do not report U.S-specific SC-CH4 estimates from the DICE model because it is a global model and does not include regional details (see Section III.2 for discussion).

The percentage changes in the SC-CH4 estimates would directly translate to percentage changes in the overall estimated benefits since there is not any change associated with the assumed tons of CH4 reductions. Thus, we find that the Proposed Rule is likely to result in net costs, rather than net benefits….

These comments demonstrate the substantial challenge of decision making utilizing a social cost framework for climate related regulations. Analysts who assess policies like the allegations in the activist referenced report produce conclusions that cannot be validated since they rely on determinations that are as speculative as social cost calculations.

***Joint Environmental Coalition Supplemental Filing – February 21, 2019 – Criticisms of Industry Comments***

The JEC submitted a supplemental filing on February 21, 2019, that asserted a number of criticisms of industry comments, many of which attack statements or information submitted by the Independent Producers. A number of these allegations are addressed below.

1. *Demand for EPA to make all new data submitted during comment period available to public and reopen comment period*

The JEC demands in its Supplemental Filing that EPA make all new data submitted in the comment period available to the public and reopen the comment period to address this additional data. The purpose of this demand is clearly to delay EPA's action to address the proposed reconsideration of Subpart OOOOa. Ironically, when comments submitted by EDF on the "super-emitters" study during the comment period on the Subpart OOOOa resulted in the removal of the proposed low production well exclusion, the environmentalist were not crying foul. Not only should the concept of "what is good for the goose is good for the gander" apply, nothing prohibits EPA from relying on information submitted in response to an issue/topic raised in the proposed rule. The Independent Producers believe EPA needs to move forward on its proposed changes to Subpart OOOOa expeditiously.

2. *Reduction in Monitoring Frequency at Well Sites remarks rely on flawed reports*

The JEC criticizes comments addressing the validity of EPA's proposal to extend the monitoring frequency for both large wells and low production wells. Significantly, the basis for these criticisms is reliance on both the Assessment of Studies and Omara Appendix G reports. Both of these reports are essentially reassessments of the same information and reflect the same problems of remote, short-term data. Consequently, while they manipulate the data to create illusions of high emissions, these conclusions are no more valid than the estimates the JEC criticizes. Moreover, these data are based on facilities that largely preceded the requirements of Subpart OOOO and therefore do not reflect the technologies required by those regulations and their emissions reductions.

3. *IPAA comments on super-emitter study – Zavala, Omara 2016, Appendix A*

The JEC challenges the Independent Producers criticisms of the Super-Emitters report, offended by the characterization of the report as "specious". Specious can be defined as "having a false look of truth or genuineness". Recognizing that a key purpose of the JEC is the ultimate use of Subpart OOOOa to terminate the 770,000 low production wells in the United States using the nationwide existing source requirements of Section 111(d) through the application of costly OGI based fugitive emissions regulations casts all of the analytical efforts funded by or conducted by the JEC members into a clear light. Their efforts are targeted to this end result and their reports are tools to get there. In this context they must *appear* to be genuine, but their efforts are biased. They are at their core, specious.

The Independent Producers look to the key ingredients of the Super-Emitter report for corroboration. First, to prevent a discussion on the actual volumes of emissions, the report generates its percentage of production basis. Second, in creating this approach, it distorts the calculation by using a false basis to increase the percentage number. Third, it chooses to present only a portion of the data to elevate the appearance of higher percentage emissions. Fourth, it chooses to use a mathematical presentation that "flattens" data to make it look more a straight line. These are choices made to create a result to target low production operations.

The JEC argues that the Independent Producers criticize the Super-Emitter report for aggregating data from different studies. The criticism, if fact, is that these studies were not designed to evaluate low production wells, that those wells are merely components of a larger study, and that the short-term collection of general data does not present a picture of low production wells to use as a basis for their regulation. The JEC obliquely acknowledges this reality in stating:

> We agree that site-level measurements include intentional, vented emissions in addition to fugitive emissions.

However, it then argues that its solution is a costly LDAR program. Conversely, the Independent Producers believe that such a costly LDAR program would be a death blow for these small business facilities and that more analysis is needed before sentencing them to that fate.

The JEC also directs attention to the Omara Marcellus 2016 report touting another of its percentage of production emissions conclusions. However, as described above, a closer look at this report and its information on low production wells finds that storage tanks were the dominant emissions sources at the 60 percent these facilities but their emissions would fall well below the threshold for regulation under the current CTG. Equally important, an OGI LDAR program is not needed to find open thief hatches on tanks.

4. *Reference to 1000 well study – Appendix G*

The JEC further turns to its Assessment of Studies document for another attack on low production wells, emphasizing its 1000 wells analysis and its calculation of higher emissions values based on this report.

As described previously in evaluating the Assessment of Studies document, these conclusions are wholly flawed. First, while the Assessment of Studies document considers 1000 wells, not all of these are low production wells. Second, a substantial share of the 1000 wells are the same wells that were in the Super-Emitters report. Third, the Assessment of Studies document does nothing to quality control this old data to determine what it sampled or how accurately. Fourth, contrary to the JEC statement, these data do not distinguish between fugitive and permitted emissions and suffer from all of the limitations of taking short term data and extrapolating it to daily and annual values. Fifth, the Assessment of Studies appears to have eliminated all of the zero and low emissions sites from its analysis thereby skewing the emissions estimates high. Sixth, the entire report is an exercise in generating emissions values where data does not exist.

Using this faulty, conclusion driven Assessment of Studies report as a basis to judge the regulation of low production wells is wholly inappropriate.

5. *Carbon Limits*

The JEC alleges that the Independent Producers misinterpret the Carbon Limits report countering that the report shows that OGI LDAR programs are cost effective in the aggregate. The Independent Producers were not concerned about the aggregate conclusions; the focus was on low production wells. Here, there were several differences. First, as noted previously, like most other analyses and EPA's calculations, the value of recovered methane is too high – \$4.00/mcf versus \$1.67. Second, the JEC fails to mention that the Carbon Limits report found that fugitive emissions at well sites represented only 17 percent of their methane emissions. These emissions are presumably the target of an OGI LDAR program. Third, this reality likely leads to the Carbon Limits report's assessment that an infrared camera based LDAR program is not cost effective for 85 percent of well sites based on the \$4.00/mcf methane value and a larger percentage if a more realistic value (e.g., \$1.67/mcf) were used.

*6. Fort Worth comments*

The JEC criticizes the Independent Producers assertions that the use of the Fort Worth dataset to characterize low production wells. The JEC then goes on to state:

> Environmental Commenters agree that it would be arbitrary and capricious for EPA to rely on this evidence as a sole basis for subcategorizing low production wells and developing a separate low-production well model facility. *See* Joint Environmental Comments at 94-100. However, uncertainties regarding the representativeness of the Fort Worth dataset for low-production wells indicates that EPA lacks sufficient data to regulate low-production wells as a separate category, *not* that EPA may exempt these wells from regulation, as IPAA argues. These concerns instead underscore that EPA lacks meaningful evidence to contravene its conclusion in the 2016 Rule 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. at 35,856. Indeed, the Fort Worth dataset shows that these low producing wells have high absolute emissions and component counts similar to those in EPA's non-low production model facility. *See* Joint Environmental Comments at 97-99.

This analysis turns the entire concept of regulation on its head. Under its reasoning, the most appropriate basis for regulating would be when EPA knows nothing about the emissions from a potential regulated source. Returning to the 2016 Subpart OOOOa rule, EPA initially chose to exclude low production wells from regulation. It then relied on the specious Super-Emitter study to argue that regulation was necessary based not on emissions information but on purported equivalency of component counts. Now, when EPA attempts to recognize that distinctions exist between large and low production wells, the JEC argues that it should not and then tries to cover its argument by alleging that the component counts really are not that different.

The points that the Independent Producers raise relate to the challenge facing EPA in trying to characterize low production wells using the 25 Fort Worth wells. The Independent Producers do not believe that component counts are a valid basis for developing emissions analyses for low production wells. However, if EPA chooses to go that route, it must have a more substantive basis than 25 wells in one basin. This is particularly significant with regard to the implications of Section 111(d) that would affect 770,000 wells nationwide. In the Independent Producers comments, the flaws in the use of the Fort Worth wells are laid out relating to questions about their representativeness, whether they are in fact low production wells and the validity of the emissions factors that drove the emissions estimates. These flaws generate the need for EPA to develop a more thorough and accurate understanding of low production wells.

In that context, the JEC argument that low production well regulation should go forth and expand perhaps 400 times the annual rate of affected facilities that EPA projects in Subpart OOOOa demonstrates its true intent to cripple and destroy America's low production wells.

*7. IPAA low production well statements*

The JEC further challenges the Independent Producers submission of information on component counts for low production wells across a broad spectrum of states. As the JEC states:

> IPAA itself admits this data is "not intended to be presented as statistically accurate or fully representative of the population of low production wells."

The purpose of submitting this information must be considered in the context that it was intended. As the Independent Producers have stated in submitted comments:

> The EPA should defer any fugitive emissions regulations of low production wells until it obtains information on emissions from low production wells. Specifically, the EPA should first determine whether a low production well program is appropriate and cost-effective, and the design a program based on accurate emissions information from low production wells. The Department of Energy ("DOE") is initiating a research effort to provide specific low production well emissions information that can inform these decisions and actions.

The information submitted in the Independent Producers comments on component counts at low production wells across the nation was generated to emphasize to EPA that creating a model facility for the purpose of making a regulatory assessment required a far broader framework than the 25 Fort Worth wells. Necessarily, the information had to be voluntarily provided by small business operators in the limited time frame of the public comment period. The Independent Producers do not and would not expect EPA to assume it has the kind of quality assurance that EPA would apply to data for regulatory development. However, it does demonstrate that there are substantial differences in the component counts of low production wells – and substantially different counts than the 25 Fort Worth wells. The burden is on EPA to support its regulations of low production wells. The previous Administration relied on information supplied on limited data that has since been proven not representative, if not misleading or unreliable.

8. *Low production well – initial versus ongoing production*

The JEC challenges the concept of classifying low production wells on the basis of current production rather than initial production. The JEC argues:

> Such a classification would create an unworkable standard for both EPA and operators, as monitoring frequencies for individual wells would continually be in flux.

In fact, this type of classification decision on low production wells is made annually by hundreds of thousands of wells as a part of their determination as marginal wells for federal income tax purposes. The Independent Producers recommend in their initial comments an approach to address the definition of a low production well using the federal income tax code as a basis that would be far fairer and more workable than the approach in the proposed Subpart OOOOa reconsideration.

***Joint Environmental Coalition Comments***

The JEC also filed initial comments dated December 17, 2018. These comments raise a number of issues that distort the nature of methane emissions, the effectiveness of regulations and industry positions.

1. *Methane Emissions Understated (Page 9)*

The JEC submits its information on methane emissions but it does so without any context. For example, it reports the GHGI inventory values for natural gas and petroleum systems. Yet, without understanding these values in context they are meaningless. The JEC wants to suggest that a regulatory system would eliminate these emissions but that cannot happen.

First, these emissions estimates are developed for the full value chain – production through distribution to end users. Subpart OOOOa does not regulate all of these elements.

Second, these emissions need to be considered in the context of the entire GHGI. The Independent Producers address the exploration and production components of the GHGI. These amount to about 1.2 percent of the total GHGI.

Third, even if the revised hypothetical emissions values created by the JEC, were remotely accurate, the exploration and production components would still be less that 2.5 percent of the GHGI. However, the revised hypothetical emission values come from the Assessment of Studies document that these Keep It In the Ground organizations created. As described previously, the data supporting that analysis is fundamentally unsound for use in such a report, has not been quality controlled for accuracy, based on extrapolating short term data to annual emissions, and mathematically manipulated to generate emissions estimates to meet their Keep It In the Ground objectives.

2. *Cost of Regulations (Pages 11-12)*

The JEC regurgitates the ICF Study and the Waste Not study to allege that all methane regulations are cost effective. As shown above, while the aggregation of all regulations in the ICF study might be cost effective, individually, they are not. In particular, the OGI LDAR program described in the ICF Study raises significant cost effectiveness issues when realistic natural gas values are used and when the percentage of fugitive emissions at well sites are considered instead of all emissions that included permitted vents. These issues are more striking when they are viewed in the context of low production wells.

Similarly, the cost information in the Waste Not study is developed for a variety of requirements, most of which are separately addressed in Subpart OOOOa and are not a part of this reconsideration.

3. *New scientific evidence (Pages 85-88)*

The JEC castigates EPA for failing to use new information in its regulatory analysis. However, this new information is really analyses of existing information in a different format. At the heart of JEC Assessment of Studies that is referenced are data that suffer from a lack of onsite information, is taken for a short period of time, and is escalated to daily or annual emissions rate. These issues are repeatedly raised here because they pervade all of the JEC efforts to discredit the emissions factors used in the GHGI and to bolster the JEC arguments that far larger emissions are released.

A telling statement in the JEC submission demonstrates the nature of this report. It states:

> 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 events at a subset of sites—precisely the abnormal operating conditions identified and remedied by frequent fugitive emissions monitoring.

The report "postulates" that its estimates are accurate. And, of course, its solution is the implementation of a costly OGI LDAR program. The Independent Producers could postulate that the higher emissions incidents are related to a short-term maintenance activity or a tank being filled, neither of which would be affected by an LDAR program. Since the Assessment of Studies chose not to work with producers during its data collection process, these issues cannot be confirmed.

4. *Low Production Wells (Pages 94-104)*

It is important to reiterate here what drives the JEC targeting of low production wells. These activists are committed to terminating production of American oil and natural gas. Their interest in low production wells reflects their commitment. They are not concerned with the new and modified sources of production that would be covered by Subpart OOOOa. These low production wells are largely small conventional wells drilled in reservoirs that have been producing for decades and have the potential to do so with low production wells. The JEC really wants to eliminate existing wells – the one million wells that would be captured through the implementation of Section 111(d) – particularly the 770,000 low production wells that cannot sustain the costs of the expensive OGI LDAR requirements of Subpart OOOOa.

The JEC present a number of claims regarding low production well decisions by EPA that demonstrate both creativity and duplicity.

The beginning part of this component of the JEC comments challenges EPA action to alter regulation of low production wells by referencing part of EPA's statement in 2016 removing its initial proposal to fully exclude low production wells. The full statement by EPA is included below with the JEC reference shown in italics:

> Based on the data from DrillingInfo, 30 percent of natural gas wells are low production wells, and 43 percent of all oil wells are low production wells. The EPA believes that *low production well sites have the same type of equipment (e.g., separators, storage vessels) and components (e.g., valves, flanges) as production 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.* This would indicate that the emissions from low production well sites could be similar to that of non-low production well sites. We also believe that this type of well may be developed for leasing purposes but is typically unmanned and not visited as often as other well sites that would allow fugitive emissions to go undetected. We did not receive data showing that low production well sites have lower GHG (principally as methane) or VOC emissions other than non-low production well sites. In fact, the data that were provided indicated that the potential emissions from these well sites could be as significant as the emissions from non-low production well sites because the type of equipment and the well pressures are more than likely the same. In discussions with us, stakeholders indicated that well site fugitive emissions are not correlated with levels of production, but rather based on the number of pieces of equipment and components. Therefore, we believe that the fugitive emissions from low production and non-low production well sites are comparable.
>
> Based on these considerations and, in particular, the large number of low production wells and the similarities between well sites with production greater than 15 boe per day and low production well sites in terms of the components that

> could leak and the associated emissions, we are not exempting low production well sites from the fugitive emissions monitoring program.

What the selected quotation does not describe is that the referenced “stakeholders” were members of the JEC demanding that the Obama Administration regulate low production wells despite the absence of sound emissions data. These efforts were wrapped around the specious Super-Emitters study to give EPA some thread of a basis to cover low production wells. Now that EPA recognizes that low production wells are different, the JEC vents its outrage that the basis is inadequate.

The Independent Producers also recognize that EPA’s effort to create a model low production well, while appropriate and appreciated, is a flawed effort but for different reasons. The Independent Producers believe that low production wells will emit less because of lower production, but in the current proposal the basis relies on component counts and that approach must be addressed. As stated previously, there is no simple way to create a model low production well facility and relying solely or primarily on the Fort Worth wells is not an adequate basis to base regulations. EPA recognizes that the Fort Worth wells do show differences but those differences are actually much larger than the Fort Worth wells suggest. The Fort Worth data includes too many facilities that are not likely low production wells and this creates a component count that is too high.

The Independent Producers have presented information addressing these issues in initial comments and elsewhere in this submission. Consequently, this portion of these comments will focus on the JEC statements in their comments.

The JEC jabbers about component count differences between the low and high production Fort Worth wells but misses the key points. As presented previously, the Independent Producers also question the EPA component count analysis from the Fort Worth low production wells because the wells appear to be far larger than most true low production wells. But, the critical aspect of EPA’s analysis involves the components that drive the emissions estimates. Only two are significant.

The first is storage tanks. No one disputes that storage tanks can be sources of emissions. Tanks have vents to protect their integrity/safety. Tanks can also release emissions from open hatches or poor seals. The vent emissions are allowed; the hatch and seal emissions do not need an expensive OGI LDAR program to manage. Moreover, as shown in the Omara Marcellus 2016 data, these tank emissions are below the thresholds of regulation in the CTG.

The second key source is valve emissions. Here the emission factor used by EPA is questionable. The API reports on fugitive emissions programs established that the valve emissions factor was about 25 percent of the emissions factor used by EPA. Additionally, emissions from valves likely occur when the valve moves. For low production wells, valve movement is limited or nonexistent because the valves were designed for higher flows and as the well production declined, they essentially move to their maximum throughput position and stay there.

The JEC then complains that EPA’s new assessment of information on low production wells is inadequate and concludes that it should not make a proposed change because its recent studies purport to show the low production well emissions are higher than EPA believes.

The JEC complaint raises a broader question. If the information currently available to EPA to define emissions from low production wells is inadequate, then the information EPA used to regulate low production well was also inadequate. Consequently, EPA's initial decision to regulate creates potentially severe economic and energy production results without a valid environmental justification – results that could become catastrophic for existing low production wells if regulated under Section 111(d).

The JEC attempts to paper over these realities by dragging out its array of reports. As described previously, these reports were not low production focused efforts, rely on data that is inadequate to make regulatory decisions and – when studied – show that they provide little useful information on the fugitive emissions from low production wells. If anything comes from them, it would be that tank emissions are sources – equipment that does not need an expensive OGI LDAR program to address if they even emit at a regulated amount.

5. *Fugitive Emissions Cost Analysis (pages 104-108)*

The JEC introduces a new fugitive emissions cost analysis to support its position that a semi-annual OGI LDAR program is sustainable for low production wells. There are numerous issues with the basis for this analysis. At the outset the analysis is based on the emissions estimations from the JEC that are speculative at best. Secondly, the analysis creates its own LDAR cost estimate. Interestingly, these costs appear to be about twice the annual costs of the ICF Study. Third, the analysis addresses only new wells that were subsequently shut-in. Fourth, the analysis is based on gross revenues rather than net revenue. In the material supporting the analysis, M.J. Bradley states:

> Newly drilled and modified wells get shut in when revenue falls below about $150,000/year, regardless of what level of production is required to achieve this revenue target.

What is most compelling about this analysis is its inconsistency with other approaches.

For example, as described previously, the average price of natural gas has been $2.22/mcf. Using this gross revenue number, the daily production number for a natural gas well to reach $150,000 annually would be 185 mcfd. This would be about twice the threshold for a low production well of 90 mcfd and almost 8 times the average low production well nationally and 31 times the average Pennsylvania low production well. If the M.J. Bradley analysis was correct, no small well in Pennsylvania would be in operation.

Significantly, as the Independent Producers have discussed previously, gross revenues are not an appropriate approach to assess the validity of the cost effectiveness of regulations.

6. *EPA Estimate of Domestic Costs Fatally Flawed (Pages 126-130)*

The JEC challenges the EPA approach to its benefits analysis by criticizing its shift away from the social cost calculations EPA used in justifying its 2016 Subpart OOOOa regulations. This argument is bolstered in the JEC Supplemental Comments. However, as previously presented, analyses by organizations like NERA Economic Consultants have shown that social cost of methane determinations are highly questionable and can be manipulated to produce specific outcomes. For example, NERA concluded that a different look at the 2016 social cost of methane calculation would conclude that the regulation imposed net costs rather than benefits.

***Response to AMEL State Equivalency Issues***

1. *EPA's State Equivalency Determinations are Lawful and Meet the Requirements of Clean Air Act 111(h)*

In both the initial and supplemental comments submitted to the EPA by the JEC on December 17, 2018 and February 21, 2019 respectively, the JEC challenges the lawfulness of the state LDAR program equivalency determinations that EPA proposed in the Subpart OOOOa Reconsideration Rulemaking.[2] The Independent Producers disagree with these challenges and have outlined below support for the equivalency determinations and inclusion of the specific state LDAR programs as an alternative to compliance with the Subpart OOOOa LDAR program.

In the Reconsideration Rulemaking, EPA stated that "the 2016 NSPS Quad Oa allowed owners and operators to use the AMEL process to allow use of existing state or local programs" but EPA quickly realized the impracticality of this approach and further stated "it is possible that EPA would have over 300 identical applications from various owners and operators wanting to use the same state program at their affected facilities."[3] As the JEC points out in the summary table[4] of the 111(h)(3) approvals issued by EPA in their initial comments, dated December 17, 2018, these AMEL approvals were for an alternative work practice at a single large facility, such as an ethylene plant, a stark difference to the lengthy and onerous process that would be involved in approving individual AMELs for use at hundreds of upstream oil and gas well and tank battery facilities. As common sense would dictate, EPA sought "to streamline the process, ensure compliance, and reduce regulatory burdens, and continued its evaluation of state fugitive emission programs after promulgating the 2016 NSPS OOOOa". [5]

There are examples of EPA adopting state or local control requirements as alternative standards in other NSPS rules. For example, EPA incorporated, as an alternative standard into the Subpart Ja NSPS for petroleum refineries, the local requirements for flare minimization that were adopted by the Bay Area Air Quality Management District and the South Coast Air Quality Management District. In both of these cases, the Subpart Ja regulations establish the local flare minimization requirements "as an alternative to complying with the requirements" applicable to flares under Subpart Ja. [6] Following this general approach, EPA was reasonable in identifying the current state and local standards that achieve emission reductions that are equivalent to, or greater than, the reduction obligations imposed by EPA under the Subpart OOOOa regulations, and incorporate those equivalent standards as alternative standards to meeting federal performance standards.

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[2] Reconsideration Rulemaking, 83 Fed. Reg. at 52080 (October 15, 2018)
[3] *Id.*
[4] JEC comments to Reconsideration Rulemaking December 17, 2018, page 46
[5] Reconsideration Rulemaking, 83 Fed. Reg. at 52080 (October 15, 2018)
[6] 40 C.F.R. § 60.103a(g). Specifically, section 60.103a(g) provides: An affected flare subject to this subpart located in the Bay Area Air Quality Management District (BAAQMD) may elect to comply with both BAAQMD Regulation 12, Rule 11 and BAAQMD Regulation 12, Rule 12 as an alternative to complying with the requirements of paragraphs (a) through (e) of this section. An affected flare subject to this subpart located in the South Coast Air Quality Management District (SCAQMD) may elect to comply with SCAQMD Rule 1118 as an alternative to complying with the requirements of paragraphs (a) through (e) of this section. The owner or operator of an affected flare must notify the Administrator that the flare is in compliance with BAAQMD Regulation 12, Rule 11 and BAAQMD Regulation 12, Rule 12 or SCAQMD Rule 1118. The owner or operator of an affected flare shall also submit the existing flare management plan to [EPA]." *Id.*

*A. The fugitive emissions equivalency determinations do not have to be quantitative; rather, qualitative factors can be included in determining equivalency*

In the Reconsideration Rulemaking, EPA conducted its evaluation by "compar[ing] the fugitive emission components covered by the state programs, monitoring instruments, leak or fugitive emissions definitions, monitoring frequencies, repair requirements and recordkeeping to the fugitive emission requirements proposed in this action." [7]

JEC's first attacked this evaluation process by stating that "EPA must conduct a quantitative analysis to approve an AMEL and may not average qualitative factors", and further stated, "equivalency determinations must be quantitative." [8] Clean Air Act 111(h)(3) does require that the AMEL will "achieve a reduction in emissions of any air pollutant at least equivalent to" the reduction under the NSPS.[9] However, the term "equivalent" is not defined in statute, nor is there a formula for calculating equivalence, especially for fugitive emissions at issue here where the leaks are not required to be quantified and the federal requirement is not to reduce a certain volume of fugitive emissions but rather, to simply find and fix the leaks.

Equivalence is however explained at length in the 2008 rulemaking where EPA deemed OGI technology equivalent to Method 21 for leak detection ("OGI AWP"). In the OGI AWP, EPA states, "The emission control effectiveness of any work practice is a function of both 1) <u>its ability to detect leakage and</u> 2) <u>the frequency of monitoring</u>. An equivalent work practice may require more frequent monitoring, depending on its mass rate threshold for detecting leaks."[10]

EPA further stated, "A more frequent monitoring requirement becomes necessary because higher mass emission reductions from large leaks, found earlier, are offset by some degree by smaller leaks which go undetected."[11] Based on this standard in the statute, larger leaks found earlier and more frequently should reasonably be able to offset smaller leaks that may not be found as timely.

This 2008 equivalency analysis clearly assessed qualitative factors (i.e. frequency) and determined that if a technology is less sensitive at detecting leaks then it could be deployed more frequently and this can be analogous to a different technology that may be more sensitive but is deployed less frequently.

In the Reconsideration Rulemaking, not only does EPA compare various qualitative factors in proposing to approve these state programs, EPA's evaluation process in the Reconsideration Rulemaking is almost identical to the evaluation EPA conducted previously in the OGI AWP as follows: "EPA believes that more frequent monitoring warrants allowance of a higher fugitive definition because larger fugitive emission will be found faster and repaired sooner, this reducing the overall length of the emission event." [12]

Therefore, qualitative factors should be assessed because the state programs are not identical to the federal programs but that does not mean they are less stringent in their ability to find and reduce fugitive emissions. There are many different combinations of monitoring instruments,

[7] Reconsideration Rulemaking, 83 Fed. Reg. at 52080 (October 15, 2018)
[8] JEC comments to Reconsideration Rulemaking, December 17, 2018, page 47
[9] 42 U.S.C. §7411(h)(3) (Clean Air Act Sec. 111(h)(3))
[10] Alternative Work Practice to Detect Leaks from Equipment Proposed Rule, 71 Fed. Reg. at 17404 (October 18, 2008)
[11] *Id.*
[12] Reconsideration Rulemaking, 83 Fed. Reg. at 52081 (October 15, 2018)

leak or fugitive emissions definitions, monitoring frequencies, repair requirements, etc… and these factors were all taken into consideration in crafting the state programs, many of which were included in a SIP for the air permit or program in which they have been incorporated, and SIPs must be approved by EPA. And again, fugitive emissions are not required to be quantified in Subpart OOOOa. Therefore, contrary to the JEC argument, these various program components *should be* compared "side by side" to determine the stringency or equivalence of the state program; this is the only feasible approach and is precedent based on the 2008 OGI AWP rulemaking. [13]

Last, in EDF's recent paper entitled *Pathways for Alternative Compliance, A Framework for Advance Innovation, Environmental Protection, and Prosperity,* referring to the approval process of emerging technologies as an AMEL to Subpart OOOOa's OGI requirement, EDF clearly states that non-quantifiable factors (i,e. frequency) must be taken into consideration to determine emissions reduction and therefore equivalency, as follows: "technologies with higher detection limits may yield greater or equivalent emission reductions than low detection limit technologies if used in a fashion that leads to quicker detection and mitigation of high emitting sources." [14] This is concurrent with EPA's point in the Reconsideration Rulemaking and directly contrary to the Environmental Commenter's statements on page 48 of their comments challenging EPA's inclusion of frequency as a factor to weigh in the equivalency determination.[15]

*B. Taken as a whole, some state programs are more stringent than federal programs (e.g. Texas)*

The JEC claims that "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."[16] Then the JEC does some type of analysis for four states and compare the percentage of emissions reduced under the state program to the emissions reduced under the federal program. For Texas specifically, this graph doesn't make sense and the footnote attempting to explain this data manipulation is nonsensical and confusing. [17]

Texas' LDAR program in the oil and gas Standard Permit is more stringent across the board, for each variable examined, as opposed to the Subpart OOOOa program. This Texas LDAR program requires the use of Method 21, with a leak detection of 500 ppm, as opposed to OGI allowed under Subpart OOOOa, the monitoring frequency is quarterly, and repairs must be made within 15 days.[18] And as the JEC point out, the frequency can eventually be reduced if less than 2% of leaks are found; therefore, it is impossible to calculate the emissions reductions this program will achieve in the future since that change in the frequency variable is unknown.

The state LDAR program AMEL option in Subpart OOOOa is relevant and useful where an operator is performing two concurrent LDAR programs at a site, and chooses to perform only the state program at the site in lieu of the federal program. This would only be done for the sites that

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[13] [13] Alternative Work Practice to Detect Leaks from Equipment Proposed Rule, 71 Fed. Reg. at 17404 (October 18, 2008)

[14] *Pathways for Alternative Compliance, A Framework for Advance Innovation, Environmental Protection, and Prosperity;* EDF and Environmental Council of the States Shale Gas Caucus (April 2019)

[15] JEC comments to Reconsideration Rulemaking, December 17, 2018, page 48

[16] *Id.* at 50

[17] *Id.* at 51

[18] 30 TAC 116.620

are required to conduct both a state LDAR program required for the TX Standard Permit for example, and the Subpart OOOOa LDAR program. In Texas this would be for sites that have either a Standard Permit or Non-Rule Standard Permit. If the Texas program only covers a small percentage of sites (according to the JEC, it is only 5.5% of sites, and 12% of emissions)[19] then so be it. The point is that for those specific sites, the operator would not have a duplicative LDAR burden, with overlapping timeframes and two different onerous administrative requirements that would result in no added environmental benefit.

*C. State LDAR programs are included in state enforceable regulations and if promulgated through a State Implementation Plan (SIP), EPA retains oversight and enforcement authority over them*

The JEC also attacks the lawfulness of the inclusion of these certain state programs by stating that the programs were not deemed equivalent through the requisite notice and comment process of 111(h)(3).

State LDAR programs have already been subject to the notice and comment process for the state regulation and/or air permitting program they are included in. These LDAR programs may also be included in a SIP and therefore, were subject to comment during the SIP promulgation process *(the Texas LDAR program, for example, is included in the Standard Permit and Non-Rule Standard Permit and is included in the Texas SIP).* These are valid state regulatory programs and should be recognize as such. This approach is similar to EPA's handling of storage tanks in Subpart OOOO where EPA allowed tanks, if shown to be below 6 tpy in a state or local enforceable permit, to be exempted from Subpart OOOO's storage tank provisions. [20] Similar to tanks that are permitted below federal threshold limits, these state LDAR programs are enforceable by the requisite state agencies and should recognized as adequate, alternative programs under the premise of cooperative federalism.

Further, if these state LDAR programs were promulgated under a SIP, EPA has, and will continue to have, oversight and enforcement authority over these programs.

*D. Cooperative federalism should be recognized*

Under the well-established premise of cooperative federalism, EPA should recognize these programs in full, including the states' recordkeeping and reporting requirements. The states have recordkeeping and reporting to ensure compliance with their programs and EPA should give proper deference to states for compliance assurance for their state program. If the state program is not adequate in EPA's opinion, then EPA needs to address this issue with the states.

Complying with two different recordkeeping and reporting schemes on the same site(s) is an enormous administrative burden with no added environmental benefit. And requiring the federal reporting (which would require some Subpart OOOOa recordkeeping requirements to be met in order to comply with the federal reporting), and monitoring plan defeats the purpose and any benefit from EPA approving these state programs in the first place.

Cooperative federalism is a central tenet of the Clean Air Act. Over the course of its fifty year history, the Act has evolved first from a set of general principles intended to guide States as they undertook regulation of air pollution sources, to an extensive number of more targeted standards

[19] JEC comments to Reconsideration Rulemaking, December 17, 2018, page 51
[20] 40 CFR 60.5365

often prescribed by the federal government in the first instance and then implemented by the states. The principle that the States and the federal government will work in tandem to protect the nation's air resources is embodied throughout the Act. Congress, in section 101(a)(3) of the Act, declared air pollution control to be "the primary responsibility of States and local governments," 42 U.S.C. § 7401(a)(3), with the federal government providing "financial assistance and leadership," *id*. § 7401(a)(4).

For example, pursuant to section 110 of the CAA, while EPA develops the national ambient air quality standards, *see* 42 U.S.C. §§ 7408, 7409, states develop plans, called state implementation plans, to meet those standards. In that context, the U.S. Supreme Court has made clear that "[t]he Act gives the Agency no authority to question the wisdom of a State's choices of emission limitations if they are part of a plan which satisfies the standards." *Train v. Natural Res. Def. Council, Inc.*, 421 U.S. 60, 79 (1975). Similarly, under the CAA's visibility provisions, states have broad leeway to develop plans to combat regional haze that EPA cannot second-guess if the states have considered the statutory factors. *Am. Corn Growers Ass'n v. EPA*, 291 F.3d 1, 8 (D.C. Cir. 2002).

Section 111, the provision at issue here, fits squarely within the cooperative federalism tradition, with section 111(c) expressly calling on states to develop "a procedure for implementing and enforcing standards of performance for new sources" and calling on the Administrator to delegate "any authority he has … to implement and enforce such standards." 42 U.S.C. § 7411(c)(1). The Supreme Court has affirmed that these cooperative principles are the heart of the CAA again and again. *See, e.g.*, *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 470 (2001) ("It is to the States that the CAA assigns initial and primary responsibility for deciding what emissions reductions will be required from which sources."); *Union Elec. Co. v. EPA*, 427 U.S. 246, 269 (1976) ("Congress plainly left with the States, so long as the [NAAQS] were met, the power to determine which sources would be burdened by regulation and to what extent.").

State LDAR programs are precisely the sort of regulation over which states have special expertise, and they are proper subjects of state control.

***Conclusion***

The Independent Producers believe that these supplemental comments can better inform EPA as it makes the critical decisions related to the Reconsideration Rulemaking and would appreciate EPA's consideration of them.

The pending reconsideration gives EPA the opportunity to address regulatory actions that were rushed to a conclusion in 2016 without a full understanding of their consequences. Set forth herein, the Independent Producers reiterate and expand on key aspects of these actions – the treatment of low production wells, the importance of an LDAR program that can embrace new, cost effective technologies as they arise and the necessity of a coordinated federal and state regulatory structure to prevent unnecessary burdens on the regulated industry.

More explicitly, methane emissions from the natural gas and oil production sectors of the industry amount to about 1.2 percent of the GHGI and, as EPA is well aware, the Subpart OOOO regulations in place for facilities constructed after August 2011 are managing the major emissions from these operations. At issue here is the impact of some of the Subpart OOOOa regulations. These comments expand the Independent Producers concerns regarding the fugitive emissions requirements.

Specifically, the current Reconsideration Rulemaking proposal does not have a cost effective approach to the regulation of fugitive emissions from low production wells. Significantly, this issue is dramatically expanded because Subpart OOOOa is a methane based regulation that would result in the expansion of its scope from new sources to existing sources. As a result, instead of addressing 25,000 to 45,000 facilities per year, it would affect one million wells, 770,000 of which are low production wells. The regulations are not based on an adequate understanding of low production well emissions. They should not be applied as written. The Department of Energy (DOE) has initiated a study of low production well emissions that should be finished before low production well regulations are required and used to develop a sound low production well regulatory framework if one is necessary.

Similarly, the provisions regarding AMEL for emerging technology and state equivalency should be addressed to improve the ability of the regulated community to use better emerging technologies and to coordinate between federal and state requirements to avoid overregulation.

The Independent Producers appreciate the opportunity to submit these additional comments. If there are questions, please contact Lee Fuller (lfuller@ipaa.org or 202-857-4731) or James Elliott (jelliott@spilmanlaw.com or 202-361-8215).

Sincerely,

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