IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CLEAN AIR COUNCIL, EARTHWORKS, ENVIRONMENTAL DEFENSE FUND, ENVIRONMENTAL INTEGRITY PROJECT, NATURAL RESOURCES DEFENSE COUNCIL and SIERRA CLUB, *Petitioners* v. SCOTT PRUITT, Administrator, United States Environmental Protection Agency, and UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *Respondents.*	No. 17-1145

ATTACHMENTS TO EMERGENCY MOTION FOR A STAY OR, IN THE ALTERNATIVE, SUMMARY VACATUR

Volume 2 – Attachments 17 to 34

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TABLE OF CONTENTS

Attach. No.	Title	Page
Volume 1		
1	U.S. EPA, Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources; **Grant of Reconsideration and Partial Stay**, 82 Fed. Reg. 25,730 (June 5, 2017)	1
2	U.S. EPA, Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, **Final Rule**, 81 Fed. Reg. 35,824 (June 3, 2016) (excerpts)	7
3	U.S. EPA, **Regulatory Impact Analysis** of the Final Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources (May 2016) (excerpts)	24
4	Office of Management and Budget, Notice Pending EO 12866 Regulatory Review: Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources: **Extension of Stay for Certain Requirements** (last visited June 3, 2017)	31
5	**Declaration of Dr. David R. Lyon**, Environmental Defense Fund	33
6	**Declaration of Dr. Elena Craft**, Environmental Defense Fund	61
7	**Declaration of Ilissa B. Ocko**, Environmental Defense Fund	76
8	**Press Release**, U.S. EPA, EPA Stays Oil and Gas Standards (May 31, 2017)	83
9	**API, Request for Administrative Reconsideration**: EPA's Final Rule "Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources" (Aug. 2, 2016) (excerpts)	85

10	**GPA Midstream Association, Request for Partial Reconsideration and Stay** of EPA's Final Rule entitled Oil and Natural Gas Sector: Emission Standards for New, Modified, and Reconstructed Sources (Aug. 2, 2016) (excerpts)	116
11	**IPAA et al., Request for Administrative Reconsideration** EPA's Final Rule "Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources" (Aug. 2, 2016) (excerpts)	133
12	**TXOGA, Petition for Reconsideration** (Aug. 2, 2016) (excerpts)	144
13	**Letter from E. Scott Pruitt**, Administrator, U.S. EPA, to Howard J. Feldman, API, et al. (Apr. 18, 2017)	152
14	**Letter from Bakeyah Nelson**, Air Alliance Houston, et al., to E. Scott Pruitt, Administrator, U.S. EPA (May 25, 2017)	155
15	**Letter from David Doniger**, NRDC, et al., to E. Scott Pruitt, Administrator, U.S. EPA (June 1, 2017)	161
16	U.S. EPA, Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, **Proposed Rule**, 80 Fed. Reg. 56,593 (Sept. 18, 2015) (excerpts)	164
Volume 2		
17	**API, Comments on the Proposed Rulemaking** – Standards of Performance for New Stationary Sources: Oil and Natural Gas Production and Natural Gas Transmission and Distribution (Dec. 4, 2015) (excerpts)	175
18	**TXOGA, Comments on U.S. EPA's Proposed Rule** Addressing Oil and Natural Gas Sector: Emission Standards for New and Modified Sources (Dec. 4, 2015) (excerpts)	205
19	**IPAA/AXPC Comments for Three Regulatory Proposals** issued September 18, 2015 (Dec. 4, 2015) (excerpts)	209
20	**Clean Air Task Force et al., Comments**: Oil and Natural Gas Sector: Control Techniques for the Oil and Natural Gas Industry (Dec. 4, 2015) (excerpts)	215

21	U.S. EPA, **EPA's Responses to Public Comments** on the EPA's Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources (May 2016) (excerpts)	230
22	**Declaration of Lois Bower-Bjornson**, Sierra Club and Earthworks Member	246
23	**Declaration of Huda Fashho**, Sierra Club	254
24	**Declaration of John Stith**, Environmental Defense Fund	258
25	**Declaration of Francis Don Schreiber**, Environmental Defense Fund Member	264
26	**Declaration of Hugh Fitzsimons**, Environmental Defense Fund Member	272
27	**Declaration of Gina Trujillo**, Natural Resources Defense Council	279
28	**Declaration of Joseph Luxbacher**, Natural Resources Defense Council Member	283
29	**Declaration of Michael C. Harris,** Sierra Club Member	288
30	**Declaration of Shirley J. McNall**, Sierra Club Member	294
31	**Declaration of Bruce Baizel**, Earthworks	301
32	**Declaration of Eric Schaeffer**, Environmental Integrity Project	307
33	**Declaration of Joseph O. Minott**, Clean Air Council	315
34	**Declaration of Jonathan R. Camuzeaux and Dr. Kristina Mohlin**, Environmental Defense Fund	320

Attachment 17

API, Comments on the Proposed Rulemaking – Standards of Performance for New Stationary Sources: Oil and Natural Gas Production and Natural Gas Transmission and Distribution (Dec. 4, 2015) (excerpts)

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December 4, 2015

The Honorable Gina McCarthy, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Attention: Docket ID Number EPA-OAR-2010-0505
Submitted to the Federal eRulemaking Portal (www.regulations.gov)

Re: Environmental Protection Agency's (EPA's) "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" at 80 FR 56593 (September 18, 2015)

Dear Administrator McCarthy:

American Petroleum Institute (API) respectfully submits the attached comments on the Environmental Protection Agency's (EPA's) "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" at 80 FR 56593 (September 18, 2015).

API represents over 625 oil and natural gas companies, leaders of a technology-driven industry that supplies most of America's energy, supports more than 9.8 million jobs and 8 percent of the U.S. economy, and, since 2000, has invested nearly $2 trillion in U.S. capital projects to advance all forms of energy, including alternatives. Collectively, they provide most of the nation's energy and many will be directly impacted by the proposed regulations.

The proposed rule is part of the President's "Methane Strategy," which includes multiple regulations and programs from several different agencies, intended to further reduce greenhouse gas emissions from oil and natural gas operations. However, it's important to take into account the recent methane emission trends associated with our industry. Even as U.S. oil and natural gas production has surged, methane emissions have declined significantly. For example, EPA's GHG inventory shows methane emissions from hydraulically-fractured natural gas wells have fallen nearly 79 percent since 2005 and total methane emissions from natural gas systems are down 11 percent over the same period. According to the Energy Information Agency, these reductions have occurred during a time when total U.S. gas production has increased 44% and, as a result of the increased use of natural gas, CO2 emissions from the energy sector are now near 20-year lows. These trends are indicative of what our industry, when given the freedom to innovate, can achieve to improve the environment as we bolster our nation's energy security.

Each of the proposals (Control Techniques Guidelines, Source Determination, Minor Source Tribal NSR), including this one, has potentially significant impacts on our industry's operations and, collectively, they have the potential to hinder our ability to continue providing the energy our nation demands. These cumulative impacts must be considered in conjunction with the impacts of the lowered ozone standards and the pending Bureau of Land Management (BLM) methane rule, which has not yet been proposed and will likely require costly methane controls for some of the very same emission sources. Our organizations have collaborated well in the past and API remains committed to working with EPA and the Administration to identify emission control opportunities that are both cost-effective and, when implemented, don't impact safety or hinder our ability to provide the energy our nation will continue to demand for many years to come. Attached are our comments on the "Oil and Natural Gas Sector: Emission Standards for New and Modified Sources" as well as an executive summary.

As we noted in our comment extension request, we again request that EPA officially re-open the docket for all three rulemakings when the proposed BLM methane rule is published in the Federal Register, to allow additional time for public comment once its interrelationship with the EPA proposed regulations can be fully analyzed. Also, given the limited comment period and minimal extension for these complex proposals, API will continue its review and, if warranted, provide supplemental comments to the agency that we request be included in the appropriate docket to protect the record and considered before finalizing the rules.

We look forward to working with you and your staff as these rules are developed. If you have any questions regarding the content of these comments, please contact Matthew Todd (toddm@api.org, 202-682-8319).

Sincerely,

Howard J. Feldman

Howard J. Feldman

Cc: Janet McCabe, EPA
Joe Goffman, EPA
Peter Tsirigotis, EPA
David Cozzie, EPA
Bruce Moore, EPA
Cheryl Vetter, EPA
Chris Stoneman, EPA
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Attachment

API Comments on the Proposed Rulemaking – Standards of Performance for New Stationary Sources: Oil and Natural Gas Production and Natural Gas Transmission and Distribution

December 4, 2015

Docket ID No. EPA-HQ-OAR-2010-0505

EXECUTIVE SUMMARY

As detailed in our comments, API has numerous concerns with EPA's proposed New Source Performance Standard (NSPS) rulemaking for the oil and natural gas sector (40 CFR Part 60, Subpart OOOOa). EPA has indicated the desire to finalize the proposed rule in June of 2016. We are concerned that this artificial deadline will hinder the agency's ability to adequately address stakeholder comments and develop a final rule that protects the environment and does not hinder America's energy renaissance. This is an unrealistic schedule for issuing a complex rule with the concerns identified that cover oil and natural gas industry segments as large and diverse as the onshore production, processing, and transmission and storage segments. EPA has only a few months to review and analyze all the submitted comments, make appropriate revisions, and complete the necessary internal and interagency reviews. As such, EPA should take sufficient time between the close of the comment period and promulgation of the final rule to adequately consider and address public comments.

Many of API's concerns stem from the broad applicability of the proposed rule and the one-size-fits-all approach to regulating an industry that varies greatly in the type, size and complexity of operations. EPA has justified the proposed regulation using economic studies on "average model facilities" without determining whether the resulting proposed control requirements are appropriate for the entire range of sources included in the source category. The proposed rule applies NSPS in unique and unprecedented ways to categories and equipment not previously listed, while relying on unsound legal justification. The notification, monitoring, recordkeeping, performance testing and reporting requirements are significantly more burdensome than justified for the small and/or temporarily affected facilities.

Listed below are API's primary concerns with the proposed rule. To facilitate review of our comments, API has summarized the concern and provided a recommendation with a reference to the detailed comments where additional supporting discussion has been included.

Direct Regulation of Methane is Unlawful

Issue – Section 111 of the Clean Air Act (CAA) requires the Agency to list a category of stationary sources if, in the Administrator's judgment, the category "causes, or contributes significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare." CAA §111(b)(1)(A). It is unlawful for EPA to regulate only methane from oil and natural gas sources based on an endangerment finding that is largely attributable to other GHG pollutants from non-stationary sources. In the 2009 endangerment finding for motor vehicles, EPA found that "carbon dioxide is expected to remain the dominant anthropogenic greenhouse gas, and thus driver of climate change." See, e.g., 74 Fed. Reg. at 66519. Given that EPA concluded that carbon dioxide from motor vehicles—not methane— is the "driver of climate change," EPA cannot rely on that past finding in a rule that regulates only methane. EPA has not shown that there is a rational basis for concluding that methane, a single element of the aggregate pollutant GHGs, meets the endangerment standard called for in the CAA, or that upstream oil and natural gas sources are a significant contributor of methane. Both showings are legal prerequisites before EPA may propose Subpart OOOOa.

Recommendation – EPA must make both an endangerment and significant contribution finding for each pollutant that it seeks to regulate for a given source category. In this case, an endangerment finding must be made for methane specifically, and a significant contribution finding must be made for the proposed covered sources.

Refer to Comments 3.0 and 4.0 for detailed comments on this matter.

Direct Regulation of Methane is Unnecessary

Issue – In the proposed rule, EPA states that, for some of the regulated affected facilities, direct regulation of methane accomplishes no further reduction in methane emissions than would occur through regulation of VOC alone. EPA recognizes that under its proposal, the same controls would be required for VOC and methane as are currently required for VOC under Subpart OOOO. EPA's decision to directly regulate methane from those same sources covered by OOOO, despite this admission - which means that no significant additional methane emissions reductions will occur - is arbitrary and capricious. There is no rational basis for taking the wholly discretionary action of regulating methane or GHGs from this part of the oil and natural gas sector where EPA would achieve no additional methane reductions beyond those achieved through existing VOC standards. None of EPA's asserted reasons have merit, and therefore, EPA has not made a showing that revision of the standards is "appropriate," as required under section 111(b)(1)(B).

Recommendation – EPA should continue the practice of indirectly regulating methane through the use of natural gas as a surrogate for VOC.

Refer to Comment 7.0 for detailed comments on this matter.

EPA Needs to Address Permitting Implications Associated with Regulation of Methane

Issue – EPA has not addressed the possible permitting implications that would flow from of the direct regulation of methane. Unintended implications could include allowing methane alone to trigger PSD and Title V permitting for all sources, not just oil and natural gas sources, which would greatly increase permitting burdens and result in costs that EPA did not consider in the rulemaking. API has raised PSD permitting issues previously with the EPA and understands that EPA does not intend for NSPS OOOOa to trigger PSD and Title V permitting applicability as that runs counter to both Congressional intent and judicial precedent. Agencies and states cannot handle an increased permitting burden, and such a trigger would drastically increase the number of permits submitted, not only for the oil and natural gas sector, but for all sectors.

Recommendation – As a threshold matter, API presents the following solution to the PSD and Title V permitting issues without conceding its position that EPA is required to make a separate endangerment finding for methane and a significant contribution finding for methane from this source category. To address the possible PSD and Title V permitting implications, EPA should adopt an approach similar to that taken in the Clean Power Plan (NSPS Subpart TTTT). Specifically, EPA should make it clear that the pollutant being regulated under NSPS OOOOa is the group of six GHGs. EPA should also make it explicitly clear that methane is being used as a surrogate for the group of six. Additionally, EPA should include an explanation as well as a provision in the final rule that extends the Tailoring Rule to cover regulation of GHGs under NSPS OOOOa.

Refer to Comment 6.0 for detailed comments on this matter.

Equipment Leak Requirements

Issue – EPA has proposed a process that requires significant, unnecessary recordkeeping and reporting and requires surveys of sites that are proven to have little to no detectable leaks. Associated proposed definitions unnecessarily complicate compliance. Additionally, the initial semi-annual frequency is not warranted, and the complex process for determining frequency introduces a burdensome paperwork exercise with no emissions reduction benefit. Closed vent systems (CVS) should not be subject to duplicative requirements. As well, leak detection should not be duplicative with other state or federal enforceable leak detection requirements.

Recommendation –Streamline program to require annual inspections at sites with a compressor or storage vessel. Eliminate the requirement for a site-specific monitoring plan. Existing programs demonstrate that monitoring with an annual frequency results in very low emissions. A companywide monitoring plan will cover all the relevant material; there is no added benefit and significant added cost of developing thousands of site-specific monitoring plans. Revise definitions according to our recommendations. CVS monitoring requirements should be the same as those for fugitive emission components. Finally, exempt sites subject to state, local, or other federally enforceable leak detection programs.

Refer to Comment 27.0 for detailed comments on this matter.

Pneumatic Pump Applicability and Technical Feasibility

Issue – EPA is proposing to regulate low emitting sources which would add considerable expense and burden while providing very limited environmental benefit. EPA has ignored critical technical and safety issues in assuming that pneumatic pumps can be readily connected to existing closed vent systems. There are numerous potential safety and operational issues with connecting the discharge from a pneumatic pump to an existing control device and closed vent system. These issues can impact both the performance of the pump and result in back pressure on the other sources being controlled.

Recommendation – EPA should exempt low emitting pumps and low usage pumps, i.e. pumps that emit at an equivalent rate lower than a high bleed controller. This would be consistent with the position taken in Subpart OOOO and reinforced under the Subpart OOOOa proposal for pneumatic controllers. EPA should also provide an exemption from the requirements to control pump emissions where it has been determined to be technically infeasible or potentially unsafe.

Refer to Comment 24.0 for detailed comments on this matter.

Oil Well Completions

Issue – EPA needs to accommodate additional exemptions for certain oil well completions. There are a wide range of conditions experienced across different oil and natural gas fields and additional provisions are needed in the rule to clearly exempt certain scenarios.

Recommendation – In addition to the exemption for wells producing less than 300 scf of gas per bbl of oil, EPA should include exemptions for wells requiring artificial lift to complete flowback and for periods when flowback has stable entrained gas, foam, emulsion, or infrequent slugging gas flow such that a separator cannot be operated.

Refer to Comment 22.2 for detailed comments on this matter.

EPA Must Recognize Implementation Challenges

Issue – As we learned in the development of Subpart OOOO, API urges EPA to exercise caution in the development of these rules to allow operational flexibility as it seeks "one size fits all" regulatory solutions. Consideration must be given to the implementation of these new rules to ensure industry is able to comply. Consistent with the original Subpart OOOO rulemaking, EPA should consider a similar compliance schedule for the proposed NSPS rule. We would also urge EPA to accommodate operators that are currently implementing leak monitoring and repair requirements, whether due to existing air permits, state or local regulations or voluntary commitments, to satisfy the federal rule requirements and minimize regulatory burden for those operators.

Recommendation – If promulgated as written, EPA should allow a phased implementation for completion, pneumatic pump, and leak detection and repair (LDAR) requirements to accommodate the number of affected facilities and the associated engineering, implementation and training needed to comply with the new rules.

Refer to Comments 22.5, 24.0 and 25.0 for detailed comments on this matter.

Compliance Assurance Requirements for Subpart OOOOa Are Overly Burdensome

Issue – The monitoring and testing requirements are overly burdensome for Subpart OOOOa. The remote, dispersed and unmanned nature of facilities that lack electrical power, make the requirements logistically impractical, technically difficult and uneconomic. The use of NESHAP HH major source-type compliance requirements for storage vessels is confusing and unjustifiably stringent for NSPS.

Recommendation – CPMS requirements for monitoring centrifugal compressors and pneumatic controllers should be eliminated in lieu of the sensory inspections required for storage vessels. Additionally, the performance testing requirements should be revised.

Refer to Comment 12.2 and 12.4 for detailed comments on this matter.

Subpart OOOO Retroactive Requirements

Issue- EPA proposed several new requirements for control devices and closed vent systems to subpart OOOO that could be viewed as new requirements to be applied retroactively to affected facilities initially constructed between August 23, 2011 and September 18, 2015. This is inappropriate as NSPS rule changes may only be prospective and not retrospective. Amongst the numerous changes, proposed paragraph §60.5370(d) encapsulates the problem best by stating: *You are deemed to be in compliance with this subpart if you are in compliance with all applicable provisions of subpart OOOOa of this part.* This suggests that new requirements in subpart OOOOa for subpart OOOO affected facilities will be applicable when subpart OOOOa is finalized. The only purpose for modifying subpart OOOO should be to end date the rule since it is being replaced with subpart OOOOa.

Recommendation – EPA should remove all new compliance requirements being proposed in subpart OOOO and only finalize changes to paragraphs §60.5360 and §60.5365 which end date the applicability of subpart OOOO and that correct issues that do not add new regulatory burden.

Refer to Comment 19.0 for detailed comments on this matter.

Multipollutant Cost Effectiveness Approach is Not Appropriate

Issue – In justifying the proposed requirements, EPA utilized a multipollutant approach to determine if costs were reasonable. EPA's reliance on the multipollutant methodology is arbitrary and capricious because it is inconsistent with EPA's own "rational basis" test for determining whether regulation of an additional pollutant from a source category is appropriate. As EPA clearly states, under its "rational basis" test, the Agency must have a rational basis for regulating *each* "pollutant." *See* 80 Fed. Reg. at 56601. EPA's multipollutant approach is inconsistent with that test because it allows the Agency to find that regulation of multiple "pollutants" is reasonable where regulation of each pollutant individually would not be. *See id.* at 56636.

Recommendation – EPA must re-evaluate and only assess the reasonableness of costs based on each pollutant.

Refer to Comment 10.0 for detailed comments on this matter.

Social Cost of Methane

Issue – EPA has inappropriately applied a social cost of methane (SC-CH_4) estimate that is highly speculative, not sufficiently peer-reviewed, and ultimately not suitable for policy applications. The SC-CH_4 is based on the approach used for quantifying the social cost of carbon (SCC) and therefore carries with it all of the same challenges to accurately calculating the benefits of the rule, and seriously affect the scientific and economic reliability of the SC-CH_4. The peer-reviewers selected by EPA did not reach a consensus and all found inconsistencies and other issues with the calculations used to generate the SC-CH_4, as did an independent review by NERA. The issues associated with the estimation and use of the SC-CH_4 include: differences in the way methane emissions was included in the three models; significant differences in the damage functions between the models; issues with the averaging approach used to synthesize the results; the inclusion of an unjustifiably low discount rate given the short atmospheric lifespan of CH_4; the inclusion of global benefits rather than domestic benefits; and the *ad hoc* nature of EPA's assumption of the indirect effects on radiative forcing. Independent review by NERA found that the benefits provided by the rule, after compensating for flaws in EPA's calculation, could be as much as 94% lower. When combined with the revised cost estimates and reduced emission benefits found by ERM, the rule could result in net costs of more than $1 billion in 2025.

Recommendation – There are significant uncertainties inherent in the newly-developed social cost of methane (SCM) calculation, and it may significantly overestimate methane's environmental impacts. Further, there has been a lack of adequate peer review for the SC-CH_4 estimate. As such, EPA's use of the social cost of methane is inappropriate to justify this rulemaking.

Refer to Comment 21.0 for detailed comments on this matter.

Next Generation Compliance

Issue – API believes the Next Generation Compliance Options discussed in the proposal preamble are unnecessary and represent an overreach by EPA of its authority. API believes the Next Generation Compliance Alternatives discussed in the preamble are not feasible or legal, nor do they achieve goals of assuring better compliance.

Recommendation – EPA must justify the legal basis for and formally propose any Next Generation Compliance provisions in a separate rulemaking before adopting them.

Refer to Comment 18.0 for detailed comments on this matter.

Electronic Reporting

Issue – EPA should not write electronic reporting into Subpart OOOO and Subpart OOOOa until the system is able to accommodate the unique nature of the oil and natural gas industry. The electronic reporting system is not proven generally at this time. Further, the system will require configuration to allow the current area based reporting vs facility by facility. In the past, system revisions have resulted in significant IT challenges, and appropriate time needs to be allowed for the agency to develop, QA/QC, user test and train reporters on the new system.

Recommendation – EPA should amend the final rule language to formally allow for continuation of current reporting approaches (under Subpart OOOO) for three years to allow for rollout of the electronic reporting system..

Refer to Comment 11.0 for detailed comments on this matter.

18.3 Independent Third-Party Verification

In the preamble, EPA asserts that third-party verification "may" improve compliance[19]; however, EPA provides no information regarding how third-party verification would actually improve compliance. EPA does not explain why self-certification programs (like those under existing NSPS programs) would not work or why third party verification would improve compliance.

The following comments provide some additional comments discussing why API believes the options discussed in the preamble are neither legal nor necessary.

18.3.1 EPA Lacks Authority To Require Third-Party Verification.

As was noted in API's November 30, 2011 comments on the original Subpart OOOO proposal and EPA's request at that time for comment on innovative compliance options, EPA has again, in this rulemaking, not explained where it finds legal authority to impose a third-party verification requirement.

While EPA has authority to require such monitoring, recordkeeping, notification, and reporting requirements as are reasonably needed to assure compliance with Part 60 emissions standards. There is nothing on the face of the statute (and the statute cannot reasonably be construed as) authorizing EPA to require affected facilities to hire contractors to do EPA's work. EPA freely admitted in the 2011 Subpart OOOO proposal that assuring compliance with the well completion requirements would be "very difficult and burdensome for state, local and tribal agencies and EPA permitting staff, inspectors and compliance officers." As was the case in the original rulemaking, it again appears the purpose of the third-party verification requirement would be for the third-party verifiers to relieve burden on EPA. Simply put, EPA does not have authority under the CAA to require affected facilities to hire contractors to do work on behalf of the Agency.

Moreover, such a requirement would run afoul of the Anti-Deficiency Act. A third party verification requirement clearly would circumvent the limited Congressional budget appropriation for EPA enforcement activity. Such circumvention violates the prohibition against authorizing expenditures "exceeding an amount available in an appropriation or fund for the expenditure." 31 U.S.C. §1341(a)(1)(A).

For these reasons, even with a re-proposal, EPA is without authority to impose a third party verification requirement.

18.3.2 EPA's Logic On Requiring Third-Party Verification Of The Adequate Design Of Closed Vent Systems Is Flawed And Such A Requirement Is Unnecessary.

EPA requests comments to whether they should specify criteria by which a professional engineer (PE) might verify that a closed vent system is designed to accommodate all streams routed to the facility's control system, or whether they might cite to current engineering codes that produce the same outcome.

The need for third-party review of well-pad designs is unnecessary if EPA believes that the proposed rule language is sufficiently clear. Further, API believe EPA could exceed its CAA authority under 111(b)(5) and (h) if such a requirement were to be finalized. The oil and natural gas industry regularly designs and builds some of the most sophisticated engineered systems in use anywhere. As such, the value derived from a third-party verification of system design would seem to only be to provide an extension of EPA's manpower and expertise. As noted above, such a requirement would run afoul of the Anti-Deficiency Act.

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[19] FR 56648: "…well-structured third-party compliance monitoring and reporting may further improve compliance."

Oil and natural gas company engineering staff, with experience in the oil and natural gas industry and emissions control systems, and many with PE registration, are able to design systems effectively. This is especially true for modern hydraulically fractured shale oil and natural gas facilities, which are very different to the small single vertical well installations that dominated the industry in years past.

In addition to the above issues, the implementation of a third-party verification system would be complicated by the fact that any validation step would only have potential utility if it occurred prior to finalizing design and equipment construction. Specifically, any validation would need to take place prior to any required air permit applications are developed, adding time to what can already be a long process.

EPA should not attempt to expand any NSPS regulations by regulating the process or mechanical design of storage vessels or the closed vent systems through the use of third-party reviews of control devices or vapor recovery systems. Owners and operators are responsible for designing process equipment based on individual site process conditions and safety considerations. It would be a massive undertaking for EPA to attempt to write regulations regarding the specific "proper" design of storage vessels and closed vent systems. It is doubtful if EPA could provide enough flexibility in process and mechanical design of equipment regulations to cover all the unique process conditions at individual facilities.

Also, EPA has failed to take into consideration the availability of enough qualified consultants to perform process design analysis and compliance auditing. It is one thing to require third-party contracting, but quite another to find qualified contractors. EPA's proposal to limit perceived conflicts of interests would further shrink this limited pool of qualified contractors.

18.3.3 EPA's Request For Details On Pressure Monitoring Systems For Storage Vessels Is Unnecessary.

In the preamble, EPA requests comment as to what types of cost-effective pressure monitoring systems can be utilized to ensure that the pressure settings on relief devices and thief hatches are not lower than the operating pressure in the closed vent to the control device and what types of reporting from such systems should be required, such as through a supervisory control and data acquisition (SCADA) system (FR 56649).

While recognizing the importance of proper design and operation of equipment, it is inappropriate for EPA to be considering this level of engineering detail as part of rulemaking. EPA has already specified requirements for inspecting closed vent systems and performing inspections to identify any leaks and these measures are adequate to address any potential issues related to how systems are designed and operated. Additionally, the design of well pads and tank batteries undergo engineering and safety reviews as part of their development. These reviews serve to ensure that materials flowing from wells are appropriately captured and routed as intended.

18.3.4 EPA Should Not Presume Industry Will Fail To Properly Implement The Proposed Leak Detection And Repair Requirements.

In Section X of the NSPS preamble, EPA solicits comments on an audit program of the collection of fugitive emissions components at well sites and compressor stations (FR 56649).

EPA explained the request for input on this matter based on the comment that they "have ample experience from our enhanced LDAR efforts under our Air Toxics Enforcement Initiative, that even when methods are in place, routine monitoring for fugitives may not be as effective in practice as in design." This analogy is flawed for numerous reasons, not the least of which is that most issues identified by the Air Toxics Enforcement Initiative relate to alleged failures related to the implementation of M21-based LDAR programs at facilities with thousands, and in some cases, up to hundreds of thousands of individual components subject to monitoring. It is noted that the scope of the oil and natural gas site operations are significantly different than any situations addressed in the enforcement initiative cited.

In the preamble (FR 56649-56650), EPA is quite detailed in describing the potential structure of an audit program for LDAR compliance as well as alternative auditor/auditing approaches with "less rigorous" independence criteria. Meanwhile, within the proposed Subpart OOOOa provisions, EPA has provided specific requirements related to the recordkeeping and work practices that must be followed as part of the leak detection requirements (see Section 27.0 of these comments for proposed provisions).

EPA is right that there will be challenges with the implementation of the LDAR requirements as proposed. See Section 27.0 of these comments for additional discussion of API's recommendations related to suggested improvements to the proposal rule to help address these challenges.

However, API believes it is unwarranted for EPA to assume or anticipate that industry will not comply with the regulatory requirements. As a result, it is inappropriate for EPA to preemptively require additional compliance measures that have been historically used as part of consent orders resulting from enforcement actions.

Even if EPA has statutory authority to require third party verifications, the same factors that make compliance assurance difficult and burdensome for State and EPA staff (such as geographically dispersed and remote locations) would make any use of third party verification costly to the regulated industry. In the proposed rulemaking and supporting documentation, EPA does not quantify or evaluate in the Regulatory Impact Analysis or proposed rule the costs associated with third party verification. In the GHG reporting program, EPA similarly proposed a third-party verification of the GHG report and declined to include in its final rule. See 74 Fed. Reg. 56,520, 56,5282-84 (October 30, 2009) (for a national program involving significant reporting such as the GHG reporting program, third-party verification was not the preferred approach). Specifically, EPA expressed concerns that a third party verification program: (1) would require EPA to establish third-party verification protocols; (2) would require EPA to develop a system to qualify and accredit third party verifiers; and (3) would require EPA to develop and administer a process to ensure verifiers do not have conflicts of interest. EPA thought that setting up a third-party program would slow down implementation of the rule. EPA also estimated that the first year of the program (with a third-party verification requirement) would cost $42 million. GHG reporting rule and Subpart OOOOa would cover a similar scope and thus raise similar concerns as were raised in the GHG reporting rule. Accordingly, any action by EPA to incorporate verification into Subpart OOOOa must progress through a formal rulemaking process with proper assessment of cost-benefit of the additional requirements.

18.3.5 Transparency And Public Access To Information Resulting From Potential Auditing Provisions (FR 56650).

"EPA seeks comment on whether, and to what extent, the public should have access to the compliance reports, portions or summaries of them and/or any other information or documentation produced pursuant to the auditing provisions. EPA is also considering the approach it should take to balance public access to the audits and the need to protect Confidential Business Information (CBI). To balance these potentially competing interests, EPA is reviewing a variety of approaches that may include limiting public access to portions of the audits and/or posting public audit grades or scores to inform the public of the auditing outcomes without compromising confidential or sensitive information. EPA seeks comment on these transparency and public access to information issues in the context of the proposed auditing provisions."

As stated above, API believes a requirement to use third-party auditing would exceed EPA's CAA authority, is unnecessary and any such program would face many changes to design and implementation. Even if EPA has the authority , it is necessary to include clear requirements in the rulemaking proposal regarding what information would be required to be submitted to the EPA or made available upon request.

Note: The above conclusions are drawn even without accounting for the additional costs for recordkeeping and reporting, which were also not considered by EPA when evaluating the cost effectiveness of pump control options.

24.3.2 EPA Did Not Consider Or Provide For Instances Where Routing A Pneumatic Pump Affected Source To An Existing Control Device Is Not Technically Feasible Or Where The Control Device Belongs To Another Party

Whether considering a VRU, flare, enclosed combustion device, or any other control technique, control devices are designed for a specific set of conditions with a number of key assumptions. For example, a flare header might be designed to allow enough flow to permit two pressure safety valves (PSV) to open simultaneously without creating so much back pressure as to take either PSV out of critical flow. The design is sensitive to other flow streams in the pipe and putting a pump exhaust into that header could result in too much backpressure for the safety devices to function as intended. Conversely, but equally important, a pneumatic pump is chosen for a specific backpressure and the backpressure imposed by a PSV could stop the pump from functioning at a critical moment, exacerbating the already unstable situation that resulted in the opening of the PSVs.

Additionally, enclosed combustion devices are designed for a maximum BTU load and may not be able to accommodate the exhaust gas from a pneumatic pump affected source without replacing the control device.

The design process for VRUs are even more sensitive to changes than other control devices. The VRU equipment is designed to recover vapors and raise their pressure enough to be useful, is expensive, and has a limited range of possible flow rates. Adding vapor loads to a VRU must be carefully evaluated on a case-by-case basis.

In some instances an existing control device on a particular site may be owned and operated by a third party, such as a control device owned and operated by a gathering and collection system operator with a glycol dehydration unit on a well site. In these instances, the well site operator does not have the right to route a pneumatic pump affected source exhaust to the control device.

EPA should provide exclusion in the rule such that routing a pneumatic pump affected source to an existing control device or closed vent system is not required if it is not technically feasible or if the control device is not owned and operated by the site operator. Proposed updated rule language is included in 24.4.1.

If needed, EPA could provide provisions in the rule for an operator to make an engineering determination that an existing control device cannot technically handle the additional gas from a pneumatic pump affected source exhaust, document this determination, and make such a determination available for inspection by EPA or other competent authority.

24.3.3 EPA Did Not Consider How This Rule And Its Requirements To Route Pneumatic Pumps To Control Devices Can Potentially Trigger Permitting Requirements.

Under the proposed Subpart OOOOa, EPA is requiring that the exhaust from pneumatic pumps be controlled by control devices if those devices are present on site.

EPA's analysis of the proposed approach to pneumatic pumps has ignored the fact that such an action may require amending the air permit for a facility simply due to a replacement in kind of a pump under Subpart OOOOa. Many state new source review (NSR) programs require permits, simply because an NSPS or NESHAP requirement applies, even if a permit is not otherwise required. Additionally, the exact requirements will vary based on the local permitting requirements, but in many cases, the act of tying a new stream into a combustion control device will result in a change in emissions from a site due to the rerouting, which can trigger permitting. Local permitting requirements are very sensitive to the reality

sampling connection system, open-ended valve or line, and flange or other connector in VOC service. For the purposes of recordkeeping and reporting only, compressors are considered equipment" (§60.591a).

Since this proposal includes separate closed vent system monitoring requirements for what is essentially a collection of fugitive emission components, *closed vent system* requires its own definition so that closed vent system requirements can stand alone and are not subject to duplicative compliance requirements as currently proposed when also included in this definition. More detailed comments that address this issue for closed vent systems are found in Section 15.0 Other equipment inappropriately included in this definition includes:

> *"access doors, ..., thief hatches or other openings on storage vessels, agitator seals, distance pieces, crankcase vents, blowdown vents, pump seals or diaphragms, compressors, separators, pressure vessels, dehydrators, heaters, instruments, and meters."*

The equipment list above that should be excluded from the definition are not fugitive components, but rather parts of systems or equipment such as the separators, pressure vessels, dehydrators, and heaters that may have fugitive components, and fugitive component monitoring would be applicable when required. Thief hatches have complexities of operation and design as discussed in Section 26.0, thief hatch monitoring is NOT needed for storage vessels with no closed vent system since thief hatch design and operation is not important with low emission tank that already vents to atmosphere. Including thief hatches with CVS eliminates unnecessary monitoring in §60.5397a.

Vents are not fugitive components because they are designed to vent and compressors are covered separately in Subpart OOOO and OOOOa. Instruments and meters are not defined and some are designed to vent.

The following language in the definition should be removed as it is confusing and sets conditions upon which it may or may not be a fugitive component which creates a circular conundrum for a monitoring plan:

> *"Devices that vent as part of normal operations, such as natural gas-driven pneumatic controllers or natural gas-driven pumps, are not fugitive emissions components, insofar as the natural gas discharged from the device's vent is not considered a fugitive emission. Emissions originating from other than the vent, such as the seals around the bellows of a diaphragm pump, would be considered fugitive emissions."*

27.2.2 EPA Did Not Consider The Inconsistencies With State LDAR Programs (CO, PA, WY, TX, OH, Etc.). This Creates Duplicative And Potentially Conflicting Requirements With Little Environmental Benefit

Similar to the exemption for storage vessels under NSPS Subpart OOOO, §60.5365(e)(3), well sites or compressor stations subject to legally and practically enforceable requirements in an operating permit or other requirement established under Federal, state, local or tribal authority should be exempt from Subpart OOOOa LDAR requirements.

For example, the non-rule standard permit for oil and natural gas facilities in Texas[27] requires quarterly monitoring using M21 or optical imaging of valves and quarterly monitoring of pumps, compressor seals, and agitator seals without shaft sealing systems if the site fugitive emissions exceed 10 tons VOC/year.

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[27] http://www.tceq.texas.gov/assets/public/permitting/air/Announcements/oilgas-sp.pdf

However, proposed Subpart OOOOa requires OGI at least semiannually (and less frequently depending on percentage of leakers) for all components. Managing multiple LDAR programs for state and federal rules will create unnecessary compliance complexities for facilities trying to comply with the varying rules. Therefore, Subpart OOOOa should have allowances to rely on state LDAR programs in lieu of those in Subpart OOOOa if the state rules provide for equivalent work practices to reduce leak emissions.

The suggested exemption provided in the rule text edits at the end of this section (see Section 27.2.12) is consistent with the approach EPA used to quantify the cost effectiveness and the overall net benefits in the benefit-cost analysis for fugitives. Specifically, EPA excluded well sites in regulated states in their baseline and projections of affected oil and natural gas well sites in 2020 and 2025. The exclusion of well sites in regulated states has the effect of reducing both costs and emission reductions, so there is no net effect on cost effectiveness. However, the rule as proposed does not exclude well sites in regulated states from complying with OOOOa, which is not consistent with EPA's cost analysis. If well sites in regulated states are not exempt from Subpart OOOOa requirements, those affected well sites would incur higher costs to implement the additional LDAR requirements with little to no net emissions reductions. The resulting cost effectiveness would be higher than EPA estimated if those regulated well sites are not exempt. Therefore, EPA should exempt well sites subject to state LDAR requirements to be consistent with the approach used to estimate cost effectiveness. This will also prevent operators from having to develop a hybrid program based on the most stringent requirement between NSPS and state program requirements, which adds additional complexity to compliance.

In the Preamble, EPA requested comment on how to determine whether existing state requirements would demonstrate compliance with this federal rule. The table provided in Attachment F compares existing state LDAR requirements for Colorado, Pennsylvania, Wyoming, and Ohio to the proposed OOOOa requirements. Highlighted cells indicate where the proposed OOOOa requirements are more stringent than the state level requirements. API believes that any program (state, local, or even voluntary) that has the same conceptual elements (i.e. work practice standards for monitoring, recordkeeping and reporting) should be considered equivalent to OOOOa and therefore exempt from OOOOa LDAR requirements.

27.2.3 The 15 BOE Exemption In §60.5365a(i)(1) Recognizes Low Volume Production Being Lower Emission And Sensitive To Additional Cost Burden, But Is Not The Only Exemption To Consider

The 15 barrel of oil equivalent per day (BOE/day) exemption will generally not be useful for new sites since this level of production is consistent with a stripper well. Stripper wells represent wells near the end of their productive life not the beginning. Consequently, it would be rare for operators planning to construct well sites with initial production at this low level. The usefulness of this provision is at the end of a well's productive life as an off ramp to exempt being an affected facility much like being able to remove a control device at less than 4 tpy of storage vessel emissions or for sites that are modified and pulled into the rule. It would however be useful for modified or reconstructed sources.

Another exemption is based on GOR. EPA recognizes in this proposal that oil wells with little to no gas volumes should be exempt from REC requirements based on a low GOR of 300; this same GOR should be another threshold to exempt well sites from leak detection as well. If gas volumes are so low that gas gathering is uneconomic, it is not cost effective to have leak detection requirements for little to no methane or natural gas reductions. Since VOC reduction alone is not cost effective, the lack of natural gas production should be a factor in affected facility exemptions

Rule text change recommendation to reflect these comments are provided in Section 27.2.12.

27.2.4 Fugitive Emissions Do Not Correlate To Production

The proposed rule provides a threshold for an affected facility under §60.5365a(i)(1) "A well site with average combined oil and natural gas production for the wells at the site being less than 15 barrels of oil

equivalent (boe) per day averaged over the first 30 days of production, is not an affected facility under this subpart." In the preamble, EPA solicited comment on the air emissions associated with low production wells, and the relationship between production and fugitive emissions, specifically on the relationship between production and fugitive emissions over time. EPA also solicited comment on the appropriateness of this threshold for applying the standards for fugitive emission at well sites, in addition to whether EPA should include low production well sites for fugitive emissions and if these types of well sites are not excluded, should they have a less frequent monitoring requirement.

Fugitive emissions do not correlate to production. A production rate gives no indication of the type or number of equipment that are located at the site. In addition, this exemption is irrelevant for new well sites which would not be economical to produce at 15 BOE/day. As stated in our comment above (see 27.2.3), this exemption should also be considered as an off-ramp to §60.5397a applicability or exemption in the rare event of a modification to a stripper well. However, API believes it more appropriate and would prefer that the rule be based on the process equipment located at the site rather than a low production rate since fugitive emissions are based simply on the number of components associated with the process equipment. As indicated in sections 27.2.6 and 0, API believes that sites with equipment configurations or component counts less than the model plants should be exempt from the LDAR requirements, as based on EPA's analysis, LDAR is not cost effective at sites with fewer equipment/components.

27.2.5 The Definition Of Well Site In §60.5430a Is Problematic And A New Definition For "Central Production Site" Is Needed

The proposed definition of "well site" includes both a well pad and other sites with process equipment that receives produced fluids from wells. The definition is problematic in that it can be interpreted to mean that all well pads connected to a tank battery or other centralized station can be aggregated as part of a single well site. This is unprecedented and appears to be an attempt to aggregate sites that are not otherwise contiguous or adjacent but instead functionally interrelated. This could lead to conflict with the Source Determination rule leading to potential permitting questions subject to variable interpretations. In Source Determination, courts have ruled against functional interrelatedness. In effect, EPA is applying Option 2 from the Source Determination proposal to define a source in NSPS. **It is inappropriate to aggregate sites.**

This erroneous definition change is being made to support the misconception that hydraulic fracturing increases fugitive emissions and constitutes a modification. The modification issue is discussed in more detail below in Section 0. The practical result of this error is that EPA's proposed definition of "well site" dissociates from the common sense and generally accepted and practically understood use of the term within industry. As well, tank batteries may or may not be tank batteries because of a false regulatory construct based on the activity at a distinctly separate surface site that has one or more wells. Additionally, the wellhead only exemption in paragraph (2) is rendered meaningless since aggregating separate surface sites into one means there will be no wellhead only well sites since wellhead only sites can produce to centralized tank batteries which would now be considered part of the wellhead only well site. EPA should instead consider a well site to be a distinct and separate surface site from a central processing site with no wellheads. The proposed definition change needs to be scrapped and either make no change to the original definition in Subpart OOOO or alternatively modify the definition as API recommends below in Section 27.2.12.

Another outfall of trying to define a well site other than in its generally accepted and common sense definition is that EPA assumes that any wellsite such as a wellhead only site produces to a central tank battery. This is not always true, there are other possibilities. A well could produce to a tank battery, a compressor station, or a tank battery combined with a compressor station, any of which may also happen to have one or more wells on the same surface site, making them well sites. Consequently, the collection of well sites that go to a central tank battery with no wells make the battery and the collection of well sites

27.3.4 EPA Did Not Account For The Limited Availability Of Trained Personnel And Equipment To Complete Monitoring

In the Preamble, EPA indicated they were co-proposing monitoring surveys on an annual basis at the same time soliciting comment and supporting information on the availability of trained OGI contractors and OGI instrumentation to help evaluate whether owners and operators would have difficulty acquiring the necessary equipment and personnel to perform a semi-annual monitoring and, if so, whether annual monitoring would alleviate such problems.

Many third party LDAR companies exist that perform regulatory work for LDAR in downstream portions of the petrochemical industry. However, most API companies that have implemented voluntary LDAR programs have performed their work internally with their own personnel. These companies took considerable time to train their initial core staff and required in many cases more than a year to have such a program fully operational.

Based on discussions with both OGI Instrument manufacturers and trainers, there is likely to be an initial delay in providing OGI instruments and training to meet demand once OOOOa is promulgated. EPA should provide an initial compliance period of 1 year after publication of the final rule in the Federal Register to allow LDAR detection equipment manufacturers and training organizations to meet the initial demand for equipment and training.

As well, a backlog of sites constructed between the proposal date and 60 days after the promulgation date will exist that will take time to develop any required monitoring plans in the final rule, in addition to needing time to smoothly implement a monitoring program which includes procurement of crews, equipment, and training as described above.

API requests a one-year plus 60 days phase in period from the promulgation date for compliance with the LDAR requirements, as EPA provided under §60.5370 by setting the compliance date to the later of October 15, 2012 or startup, and in defining affected facilities under §60.5360 relative to August 23, 2011. In the Response to Comments for OOOO, EPA indicated that the one-year phase-in was necessary to provide time for operators to have time to establish the need for control devices, procure and install devices. For similar reasons, a one-year phase in should be provided for the LDAR requirements to allow operators time to purchase monitoring devices, conduct training, and establish protocols.

27.3.5 EPA Did Not Consider Impacts Of Travel To/From Sites By Trained Personnel

Oil and natural gas production operations, gathering and boosting facilities, as well as transmission and storage compressor stations are geographically dispersed. Costs and impacts need to consider the time associated with traveling to and from sites, vehicle and fuel costs, and resulting vehicle emissions to conduct recurring LDAR at all new or modified well sites or compressor stations. A company may have a third party group or specific in-house person doing the OGI monitoring that is different from the person doing the repairs. Although the majority of leaks are repaired when detected, there would be additional driving costs and impacts for leaks that cannot be repaired immediately and for conducting the resurvey after leaks are repaired.

According to survey data provided by 9 companies subject to Colorado Regulation 7, the average annual number of miles driven per basin for leak detection monitoring is 28,000, and the average annual transportation cost per basin is $34,785. API members conducting voluntary LDAR programs indicated an average of 15,000 miles traveled per basin, with an average annual cost of $21,000 per basin. These costs do not include purchasing additional vehicles to accommodate the required travel. Neither transportation costs nor costs for purchasing additional vehicles were included in EPA's evaluation of cost effectiveness.

27.4.14 Recommended Text Revisions Related To Work Practices/Inspections

§60.5397a(e) Each monitoring survey shall observe each piece of equipment with fugitive emissions components for fugitive emissions.
(f)(1) You must conduct an initial monitoring survey within ~~30~~180 days of the first date of production ~~well completion~~ for each collection of fugitive emissions components at a new well site ~~or upon the date the well site begins the production phase for other wells~~. For a modified collection of fugitive emissions components at a well site, the initial monitoring survey must be conducted within ~~30~~180 days of the well site modification.

§60.5397a(f)(2) You must conduct an initial monitoring survey within ~~30~~180 days of the startup of a new compressor station or central production site for each new collection of fugitive emissions components at the new compressor station or central production site. For modified compressor stations or central production sites, the initial monitoring survey of the collection of fugitive emissions components at a modified compressor station or central production site must be conducted within ~~30~~ 90 days of the modification. For affected facility compressor station or central production sites constructed between Sept. 18, 2015 and 60 days after [final date of rule], initial surveys must be completed by [insert one year and 60 days after final rule promulgation]

§60.5397a(j)(1) Each identified source of fugitive emissions shall be repaired or replaced as soon as practicable, but no later than ~~15~~30 calendar days after detection of the fugitive emissions. If the repair or replacement is technically infeasible or unsafe ~~to repair during operation of the unit~~, the repair or replacement must be completed during the next scheduled shutdown ~~or within 6 months, whichever is earlier~~.

§60.5397a(j)(2)(ii)(A) A fugitive emissions component is repaired when the M21 instrument indicates a concentration of less than ~~500~~10,000 ppm above background.

27.5 Testing and Monitoring

27.5.1 Other Fugitive Emission Detection Technologies

EPA requested comment on whether there are other fugitive emission detection technologies for fugitive emissions monitoring, since this is a field of emerging technology and major advances are expected in the near future.

In the preamble, EPA states:

"We are aware of several types of technologies that may be appropriate for fugitive emissions monitoring such as Geospatial Measurement of Air Pollutants using OTM-33 approaches (e.g., Picarro Surveyor), passive sorbent tubes using EPA Methods 325A and B, active sensors, gas cloud imaging (e.g., Rebellion photonics), and Airborne Differential Absorption LiDAR (DIAL). Therefore, we are specifically requesting comments on details related to these and other technologies such as the detection capability; an equivalent fugitive emission repair threshold to what is required in the proposed rule for OGI; the frequency at which the fugitive emissions monitoring surveys should be performed and how this frequency ensures appropriate levels of fugitive emissions detection; whether the technology can be used as a stand-alone technique or

whether it must be used in conjunction with a less frequent (and how frequent) OGI monitoring survey; the type of restrictions necessary for optimal use; and the information that is important for inclusion in a monitoring plan for these technologies."

Ongoing Research and Development Activities

The scale up of LDAR activities under the draft rule provides a strong incentive to bring down costs while enhancing leak detection effectiveness, and is already stimulating a substantial increase in R&D investment, as EPA notes in its proposal. We call to the Agency's attention two ongoing initiatives that aim to develop improved LDAR technologies for use by companies as they seek to comply with federal and state methane emissions reduction requirements: a public-private initiative and a partnership between a number of corporate actors and an environmental non-governmental organization. These initiatives may well demonstrate within the next several years, the commercial availability of substitute technologies, equipment and approaches that are more efficient and cost-effective than the continued use of Method 21 or OGI.

Department of Energy (DOE)/ Advanced Research Projects Agency – Energy (ARPA-E). As of December 16, 2014, ARPA-E had selected eleven private sector projects involving methane observation networks with innovative technologies to obtain methane emissions reductions that would receive awards totalling some $35,000,000, (MONITOR Program). The objective is to catalyze and support the development of transformational, high impact energy technologies that can effectively promote methane emissions reduction. DOE's aim is to lower the cost of compliance through the development of low cost detection systems coupled with advanced modelling capabilities to pinpoint and quantify - major leaks and engage in mitigation prioritization with a focus on larger emitters. The proposed rule's approach, consistent with current technology, relies on detection alone as the criteria to define the need for repair without any prioritization based on the size of the leak. Generally the thrust of the work being supported by ARPA-E does not look at leaks from individual components, but will lead to examination of larger areas to identify significant leaks which can then be specifically identified and repaired.
ARPA-E is planning within 6-7 months to set up a testing facility intended to serve as a site for field tests to ensure that technologies are tested in a standardized, realistic environment outside of the laboratory. This would be followed by a second round of testing to assess previously undemonstrated capabilities and further technical gains. ARPA-E believes some of these technologies could become commercially available in from 2-3 years. The goal within 18 months to 2 years is to develop a methodology to demonstrate the superiority of one or more of these technologies to OGI that do not require the manpower, the fleets of trucks and other equipment and surveys that are time-consuming to undertake and dwarf the cost to the regulated community even of an expensive FLIR camera ($90,000). Each of ARPA-E's partners will need to demonstrate it can bring the costs down to $3,000 per site per year (many of which have multiple wells). The hope and expectation is that costs will be significantly lower, going down as to as little as $1,000 per site.

EDF Methane "Detectors Challenge" (MDC). In June 2014, the Environmental Defense Fund (EDF) along with five private sector partners issued a request for a proposal intended to target innovators from universities, start-up companies, instrumentation firms, and diversified technology companies among others to develop continuous methane leak detection monitoring for the oil and gas industry. They also sought expressions of interest in becoming part of the lab and field tests that would lead to pilot purchases and testing at oil and gas facilities. The initiative is intended to catalyze and expedite development and commercialization of low-cost, methane detection technologies that will help minimize emissions in the oil and gas industry. MDC is based upon the belief that shifting the methane emission detection paradigm from periodic to continuous will allow leaks to be found and fixed, more readily decreasing methane emissions significantly. The ideal system would serve as a "smart" alarm sending an alert to an operator when an increase in ambient methane is detected that reflects emissions beyond what one would normally expect to see. The "MDC program refers to cost as a critically important factor and EDF and its partners

sought out technologies that could reasonably be expected to be sold for roughly $1,000 or less per well pad (or compressor site) when produced at scale over the following 2-5 years.
The MDC commenced with a set of laboratory tests of five different sensor technologies in 2014, called "Phase 1." Four of these five technologies were selected for further development and assessment in a follow-up effort referred to as "Phase 2" which tested each technology developer's entire system in controlled laboratory and outdoor settings in order to ensure that the systems performed as required prior to moving into industry pilots, which is the immediate next step.

We urge EPA to stay abreast of technological developments and closely track the results of research and testing through an open dialogue with experts in the private sector and government.

Recommendations

An optical gas imaging (OGI) instrument is defined in 40 CFR 60.18(g)(4) as "… an instrument that makes visible emissions that may otherwise be invisible to the naked eye." EPA's Technical Support Document (TSD) for Optical Gas Imaging Protocol (40 CFR Part 60, Appendix K)[35] provides a summary of the current state of the technology for two commercially available OGI cameras, the FLIR GF320 and Opgal EyeCGas, to detect equipment fugitive leaks by infrared thermographic imaging.

EPA should write the rule to allow any new technology to be used that is equivalent to OGI or Method 21 in detecting fugitive leaks. Such new technologies should not be limited to meeting EPA's current definition of OGI (i.e. "… an instrument that makes visible emissions that may otherwise be invisible to the naked eye."). In addition, since OOOOa is not a quantification rule, such new technologies need only demonstrate that they can detect leaks; they do not need to quantify leaks.

27.5.2 The Regulation Should Allow Flexibility In The Methods Used To Detect Fugitive Emissions

The Agency has asked for comment on "criteria we can use to determine whether and under what conditions well sites operating under corporate fugitive monitoring programs can be deemed to be meeting the equivalent of the NSPS standards for well site fugitive emissions such that we can define those regimes as constituting alternative methods of compliance or otherwise provide appropriate regulatory streamlining."

A study performed by an API member company compared three basic leak detection methods: AVO, OGI, and M21. In general, the M21 approach was the most labor and time intensive, and, therefore, the most costly. FLIR methods could be implemented for less than 20% of the cost of M21 approaches. The results showed that AVO, while the least costly method, was not generally effective when compared to M21. On average, AVO found only 9% of the well pad leaks found by M21, and only 12% of the well pad site emissions calculated from M21 leaks. At the compressor station, because of the high ambient noise and close proximity of equipment, AVO method was not effective at all, and found 0% of the leaks found by M21 methods. The FLIR technique, on the other hand, was more effective.

- At well pads, FLIR finds 41% of leaks found by any method, but FLIR finds 89% of the total well pad emissions identified by any method (i.e. FLIR finds more of the larger leaks). It is also important to note that FLIR finds additional leaks not found by M21.

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[35] Reference: *Draft Technical Support Document for Optical Gas Imaging Protocol (40 CFR 60, Appendix K)*, Revision No. 5, August 11, 2015, EPA Contract No. EP-D-11-006 by Eastern Research Group, Inc., available at http://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2010-0505-4949&disposition=attachment&contentType=pdf

Conversely, M21 finds 89% of the leaks, but only 31% of the total emissions (i.e. M21 finds more of the smaller leaks).

- At compressor stations, FLIR finds 46% of all leaks found by any method, but FLIR finds 96% of the total compressor station emissions identified by any method. It is also important to note that FLIR finds additional leaks not found by M21. Conversely, M21 finds 75% of the leaks, but only 15% of the total emissions.

Although AVO was not effective in this particular study, there are locations with high H_2S concentrations where AVO is more effective than M21. Sites with high levels H_2S should be allowed to use AVO or H_2S monitoring systems to identify leaks at well pads.

27.5.3 For Laser Technology, Etc., How Might Performance Requirements Be Characterized?

Subpart W allows the use of an infrared laser beam illuminated instrument for equipment leak detection [§98.234(a)(3)]. Any emissions detected by the infrared laser beam illuminated instrument is a leak unless screened with M21 monitoring, in which case 10,000 ppm or greater is designated a leak. However, since OOOOa does not require quantification, API does not advocate establishing a specific ppm threshold for determining a leak.

27.5.4 A Streamlined Approval Process Is Needed For Adoption Of Alternative Technologies As They Are Developed, Shown To Be Effective And Become Commercially Available

EPA should build into its final rule an "on-ramp" that provides an alternative path for rapid substitution of new detection equipment and monitoring strategies once they are validated and shown to be effective. This should include a fast-track review process, with firm deadlines for decision-making so that alternatives to the current LDAR requirements can be approved without time-consuming amendments to the NSPS.

As a general matter, the rule should seek to establish a more streamlined "fast-track" process for approving new detection technology that can be substituted in lieu of OGI equipment whether its use does not require modification of the LDAR protocol, or is an entirely new approach (continuous monitoring).

Where a new technology has been adequately field tested and validated through the ARPA-E MONITOR or another program and meets performance specifications outlined by EPA, the rule should authorize its deployment following a review by the Agency. The review should be completed within 180-days following submission of a complete data package by the technology developer or an oil or gas company the Agency, and the technology should be deemed approved for use unless it is disapproved by the Agency within that period. This deadline should be included in the rule itself to assure expedited action.

Detection level "equivalency" should not be required as EPA has required for using OGI versus Method 21. Because new detection equipment may have very different capabilities from existing technologies, it is critical to avoid a narrow "equivalence test for approving alternative methods. Moreover, the stringency of the process and "equivalency" testing has made it impossible to get other technologies approved. The excessive requirements EPA has put under the Alternative Leak Detection Program in 60.18(g) has made it so that no company is utilizing OGI.

Colorado Regulation 7[36] provides a process for approving new alternative Approved Instrument Monitoring Methods (AIMM) that could serve as a basis for OOOOa:

At a minimum, the technology must be able to pinpoint the general location of leaking or venting emissions. For non-quantifying devices, the device must be capable of detecting all hydrocarbons, and testing and certification must be repeatable. Colorado Regulation 7 also requires an indication of limitations, other applications, how the device works, how it will be used, the process for recordkeeping, and training required. Colorado Regulation 7 may also require comparative monitoring with either an IR Camera or Method 21.

API recommends that EPA allow for the use of alternative monitoring that detects leaks based on the following criteria:

- Occurs at least annually
- Pinpoints the general location of the leak
- Detects the hydrocarbons found at the sites
- Testing and certification must be repeatable
- Indication of limitations, other applications, how the device works, how it will be used, the process for recordkeeping, and training required.

27.5.5 Allowance Of EPA M21 As An Alternative to OGI

EPA solicited comment on whether to allow EPA Method 21 as an alternative to OGI for monitoring, including the appropriate EPA Method 21 level repair threshold

Proposed Subpart OOOOa implies that the initial leak surveys must be taken using an OGI [§60.5397a(c)(7)]. We recommend revising the rule to specifically state that OGI, Method 21, or an equivalent method may be used for both the initial survey [§60.5397a(c)(7)] and repair leak surveys [§60.5397a(j)(2)].

In addition, EPA should allow the use of soap bubbles for leak detection, since EPA approves Method 21 for repair confirmation and emissions quantification is not required under OOOOa. According to Section 8.3.3 of Method 21, leaks may be screened using the presence of soap bubbles. If bubbles are not observed, then the source is assumed to have no detectable emissions under Method 21. EPA allows the use of 8.3.3 for other industries including chemicals and refining. It should be allowed here too. The leaks may not be repaired by the same person doing the leak survey. Allowing the soap bubble test would allow the person doing the repair to check the repair without requiring the leak survey person to have to go out to the site for a second time. This would reduce the time and expense required for doing repairs.

27.5.6 Proposed Text Revisions Related To Testing And Monitoring Requirements

> §60.5397a(a) You must monitor all fugitive emission components, as defined in 60.5430a, in accordance with paragraphs (b) through (i) of this section. You must repair all sources of fugitive emissions in accordance with paragraph (j) of this section. You must keep records in accordance with paragraph (k) and report in accordance with paragraph (l) of this section. For purposes of this section, fugitive emissions are defined as: Any visible emission from a fugitive emissions component observed using optical gas

[36] https://www.colorado.gov/pacific/sites/default/files/AP-BusIndGuidance-AIMMprocessmemo.pdf

imaging, methods listed under 60.5397a(h), or approved alternative detection device under paragraph (m) of this section.

§60.5397a(j)(2)(i) For repairs that cannot be made during the monitoring survey when the fugitive emissions are initially found, the operator may resurvey the repaired fugitive emissions components using ~~either Method 21 or optical gas imaging~~ one of the methods specified in §60.5397a(h) within 15 days of ~~finding such~~ repairing the fugitive emission~~s~~ source.

Add new proposed §60.5397a(h) below and re-letter paragraphs (h) through (l) to (i) to (m) to accommodate this addition:

§60.5397a(h). The initial and subsequent monitoring surveys specified in paragraphs (f) and (g) of this section must be conducted using one of the following methods:
(1) Optical gas imaging equipment.
(2) Method 21 (including soap bubbles as specified in Method 21, Section 8.3.3).
(3) A method that the company keeps records to demonstrate that is equivalent in detecting leaks to either of the methods specified in paragraphs (h)(1) or (h)(2) of this section.
(4) Screening methods, including but not limited to Tunable Diode Laser Absorption Spectroscopy (TDLAS), Interference Polarization Spectrometer (IR-CIPS), or Differential Absorption Light Detection and Ranging (DIAL LiDAR) technology, that screen for no leaks. If these methods do not detect a leak, then that survey is considered to have identified no leaks. However, if a leak is identified by one of these screening methods, then a monitoring method specified in paragraph (h)(1), (h)(2), or (h)(3) of this section must be used to confirm the presence of the leak.

Add:
(m) Alternative detection devices that can meet the following criteria can be submitted for approval for use by the Administrator or delegated authority within 180 days of a complete submittal:
(1) Occurs at least annually
(2) Pinpoints the general location of the leak
(3) Is capable of detecting the hydrocarbons found at the site
(4) Testing and certification are repeatable
(5) Information on the limitations, other applications, how the devices works, how it will be used, and the process for recordkeeping and training are provided.

27.6 Reporting and Recordkeeping

27.6.1 The Rule Should Not Require A Separate Report For Each Well Site

API interprets "each collection of fugitive emissions components" in §60.5397a(l) (provided below for reference) to refer to a single LDAR survey at a well site or compressor station. The requirement to provide a separate report for each well site, even where the report can combine multiple emission surveys at a well site, is onerous. API requests the option to combine reports for multiple wells sites or compressor stations and submit the combined reports in one annual report.

> *§60.5397a(l) Annual reports shall be submitted for each collection of fugitive emissions components at a well site and each collection of fugitive emissions components at a compressor station that include the information specified in § 60.5420a(b)(7). Multiple collection of fugitive*

L

Attachment F

Comparison of the LDAR Requirements Proposed in Subpart OOOOa to Existing State LDAR Programs

[illegible]

Highlighted cells indicate where the proposed OOOOa requirements are more stringent than the state level requirements.

OOOOa Reference	OOOOa Item	Colorado Reg 7	Wyoming Ch. 8	Ohio	PA
60.5397a(a)	Monitor all fugitives as defined	Fugitive components not as extensive as OOOOa			
60.5397a(b)	Develop a corporate-wide monitoring plan (MP)	No MP requirement	LDAR protocol by 1/1/2017 for each facility	LDAR program should be developed & implemented. No deadline.	No MP requirement
60.5397a(c)(1)	MP: Specify monitoring frequencies	In Rule, based on emission actuals	Rule states no less frequently than quarterly	Rule states no less frequently than quarterly for 4 consecutive quarters.	Requires quarterly LDAR
60.5397a(c)(2)	MP: Technique for determining fugitive emissions	Not clear	No	No	Not required
60.5397a(c)(3)	MP: Manuf and Model of detection equipment	Not required	Not required	FLIR or an analyzer meeting USEPA Method 21 or 40 CFR 60, Appendix A	Not required
60.5397a(c)(4)	MP: procedures and timeframes for ID and repair detections	5 days to fix	No	No	Within 15 days otherwise DOR
60.5397a(c)(5)	MP: procedures and timeframes for verifying repairs	Rule specific monitoring timeframes (15 d to re-monitor after the	No	No	Leak must be demonstrated as repaired

Attachment F - Comparison of OOOOa LDAR Requirements to State Programs

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00031

OOOOa Reference	OOOOa Item	Colorado Reg 7	Wyoming Ch. 8	Ohio	PA
		fix)			
60.5397a(c)(6)	MP: Length of time records will be kept	Two Years	Five yrs.	Five yrs.	Five yrs.
60.5397a(c)(7)(i)(A),(B)	MP: Third party verification of IR camera	Not required	Not required	Not required	Not required
60.5397a(c)(7)(ii)	MP: Procedure for daily verification check	No	No	No	No
60.5397a(c)(7)(iii)	MP: Procedure for determining max viewing distance	No	No	No	No
60.5397a(c)(7)(iv)	MP: Procedure for determining max wind speed to conduct survey	No	No	No	No
60.5397a(c)(7)(v)(A)	MP: How operator will ensure adequate thermal background	Not required	Not required	Not required	Not required
60.5397a(c)(7)(v)(B)	MP: How operator will deal with adverse conditions (wind)	Not required	Not required	Not required	Not required
60.5397a(c)(7)(v)(C)	MP: How operator will deal with interferences (steam)	Not required	Not required	Not required	Not required
60.5397a(c)(7)(vi)	MP: Training and XP prior to performing surveys	Not required	Not required	Not required	Not required
60.5397a(c)(7)(vii)	MP: Procedures for calibration and maint. Must comply with manufacturer	Not required	Not required	Same	Same
60.5397a(d)	Site Specific Monitoring Plan (SMP)	Not required	LDAR protocol by 1/1/2017 for each facility	Not required	Not required
60.5397a(d)(1)	SMP: Deviation from MP	Not required	Not required	Not required	Not required
60.5397a(d)(2)	SMP: Site Map	Not required	Not required	Not required	Not required
60.5397a(d)(3)	SMP: Defined Walking Path	Not required	Not required	Not required	Not required
60.5397a(e)	Each survey shall observe each fugitive component	Same	Same	Rule states each ancillary component with FLIR	Same
60.5397a(f)(1)	Initial survey NEW well site: 30d of first well completion or upon startup	Initial survey between 15-30 days of commencing	Not required	90 days of startup & quarterly thereafter.	w/in 60 d of startup

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00032

OOOOa Reference	OOOOa Item	Colorado Reg 7	Wyoming Ch. 8	Ohio	PA
		operation			
60.5397a(f)(1)	Initial survey Modified well site: 30d of modification	Applies to existing and new sites	Not required	Not required	w/in 60 d of modification
60.5397a(f)(2)	Initial survey NEW Comp Sta.: 30d of startup	Within 90 days or 30 days of startup depending on fugitive emissions	Not required	Not required	w/in 180 d of startup
60.5397a(f)(2)	Initial survey Modified Comp Sta.: 30d of modification	Initial survey between 15-30 days of commencing operation	Not required	Not required	w/in 180 d of modification
60.5397a(g)	After Initial Survey, Semiannual, at least 4 months apart	No	Not required	Rule has conditions (i.e. < 2.0% leakers for 4 quarters)	Annual for Well sites, Quarterly for Comp Sta
60.5397a(h)	2 Consecutive Semi > 3% leakers, then quarterly	Frequency based on emissions not leakers	Not required	Any 1 semi-annual or annual >2.0% leakers, then quarterly	Annual for Well sites, Quarterly for Comp Sta
60.5397a(i)	2 Consecutive Semi < 1% leakers, then annually	Based on emissions not leakers, Annual evaluation of emissions for step-downs	Not required	No, 2 Consecutive Semi < 2% leakers, then annually	Annual for Well sites, Quarterly for Comp Sta
60.5397a(i)	2 Consecutive Qtrly or Annual 1% - 3% leakers, then semiannually	No, only modification	Not required	Not required	Annual for Well sites, Quarterly for Comp Sta
60.5397a(j)(1)	Repair replace within 15 days of find. If infeasible, then next shutdown or within 6 mos.	Repair within 5 days not 60/shutdown requires, Otherwise delay of repair	Not required	1st attempt w/in 5 calendar days, must be repaired w/in 30 days of find.	Yes, but no shutdown w/in 6 months requirement,

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00033

OOOOa Reference	OOOOa Item	Colorado Reg 7	Wyoming Ch. 8	Ohio	PA
					just repair at next shutdown
60.5397a(j)(2)	Resurvey within 15 days of find.	No, 15d after fix	Not required	No	Yes, to verify repair
60.5397a(j)(2)(i)	For repair not during survey when found, Method 21 or IR survey with 15days of finding.	M21 or IR.	Not required	Not required	Yes M21 or IR. Leak Detector and soap are also allowed
60.5397a(j)(2)(ii)(A)	If M21, resurvey <500ppm	Same requirement	Not required	Not required	Yes
60.5397a(j)(2)(ii)(B)	If M21, resurvey using 60.5401a(g)	No, soapy water allowed	Not required	Not required	No, soapy water allowed
60.5397a(j)(2)(iii)(A)	If IR, repair is no indication using IR	Same requirement	Not required	Not required	Same requirement
60.5397a(j)(2)(iii)(B)	If IR, Does this require a resurvey entire facility [60.5397a(a)] - all fugitives as defined?	No	No	No	No
60.5397a(k)	Recordkeeping (RK)	Same requirement	Same requirement	Yes	Yes
60.5397a(k)(1)	RK: Date of Survey	Same requirement	Same requirement	Yes	Yes
60.5397a(k)(2)	RK: Beginning and End time of Survey	Not Required	Not required	Not required	Not required
60.5397a(k)(3)	RK: Name of Operator performing Survey. Note training and experience of operator	Not Required	Not required	Yes to Name, No to requirement on training and/or experience	Not required
60.5397a(k)(4)	RK: Ambient Temp, Sky Cond, Max wind speed at time of survey	Not Required	Not required	Not required	Not required
60.5397a(k)(5)	RK: Note any Deviation from MP, or a statement no deviation were made	Not Required	Not required	Not required	Not required
60.5397a(k)(6)	For each finding (LK)	--	--	--	--
60.5397a(k)(6)(i)	LK: Location	Not Required	Not required	Not required	Not Required
60.5397a(k)(6)(ii)	LK: Digital Photo w/Lat/Long	Not Required	Not required	Not required	PA is requesting

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00034

OOOOa Reference	OOOOa Item	Colorado Reg 7	Wyoming Ch. 8	Ohio	PA
					but not in rule
60.5397a(k)(6)(iii)	LK: Date of successful repair	Same requirement	Not required	Same requirement	Same requirement
60.5397a(k)(6)(iv)	LK: Instrument used to resurvey	Specify type of instrument used in inspection	Not required	Not required	Yes
60.5397a(l)	Meet reporting requirements 60.5420(b)(7)	State Annual Report, Aggregated Summary	LDAR Protocol, if applicable, by 1/1/2016	Specific requirements included	Submit Initial Compliance Report within 6 months

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00035

Attachment 18

TXOGA, Comments on U.S. EPA's Proposed Rule Addressing Oil and Natural Gas Sector: Emission Standards New and Modified Sources 4 (Dec 2015) (excerpts)

Comments on U.S. Environmental Protection Agency's Proposed Rule Addressing Oil and Natural Gas Sector: Emission Standards for New and Modified Sources

80 Fed. Reg. 56,593 (Sept. 18, 2015)

by
Cory Pomeroy
General Counsel, Texas Oil & Gas Association

Shannon S. Broome
Lisa Lowry
Katten Muchin Rosenman LLP
Counsel to Texas Oil & Gas Association

This provision would allow owners and operators with successful existing LDAR programs in place to continue to advance these programs. TXOGA welcomes the opportunity to engage in a dialogue with the agency regarding the appropriate recordkeeping and reporting requirements.

In sum, TXOGA urges EPA to consider including an alternative compliance option in the final rule. Precedent as well as a host of sound policy reasons exist to support adopting all of the approaches outlined above and TXOGA is ready to engage in a dialogue with EPA regarding these and other options to support continued implementation of existing corporate programs. Indeed, the broad scope, complicated frequency, recordkeeping burden, and prescriptive timeframes for inspections outlined in the proposed rule for new, modified, and reconstructed sources will result in an inefficient inspection program, likely diverting resources from current existing source programs that companies are implementing even though they are not required by regulation. We note .

6. TXOGA Agrees that Low-Production Well Sites Should be Excluded from the Standards for Fugitive Emissions.

EPA proposes to exclude "low production well sites" from the fugitive emission standards.[154] A "low production" well is defined "as a well with an average daily production of 15 barrel equivalents or less. This reflects the definition of a stripper well property in IRC 613(c)(6)(E)."[155]

In support of this proposal, EPA correctly notes:

> We believe the lower production associated with these wells would generally result in lower fugitive emissions. It is our understanding that fugitive emissions at low production well sites are inherently low and that such well sites are mostly owned and operated by small businesses. We are concerned about the burden of the fugitive emission requirement on small businesses, in particular where there is little emission reduction to be achieved.[156]

EPA solicits comment on the appropriateness of this threshold for applying the standards for fugitive emissions at well sites.[157]

TXOGA supports the concept of a low production well exclusion. Imposing controls on low production wells is not cost-effective and the opportunity for reduction is not meaningful. Nor can it "reasonably be expected to serve the interests of pollution control without being

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[154] 80 Fed. Reg. at 56,639 ("We are proposing to exclude low production well sites (i.e., a low production site is defined by the average combined oil and natural gas production for the wells at the site being less than 15 barrels of oil equivalent (boe) per day averaged over the first 30 days of production) from the standards for fugitives emissions from well sites.").
[155] 80 Fed. Reg. at 56,639 n.106.
[156] 80 Fed. Reg. at 56,639.
[157] *Id.*

exorbitantly costly."[158] As EPA correctly observes, the burden placed on smaller operators, many of whom are TXOGA members, would be great and the potential for emission reduction trivial.

While TXOGA supports the proposed exclusion, we note that it is important for the rule to define barrel of oil equivalent ("BOE") in terms of units of U.S. petroleum barrels of oil per cubic feet of gas to avoid confusion arising out of the different conversion rates available.

Finally, while we support the exclusion, it is most useful as an off-ramp for leak detections since any low volume production is also indicative that a well is approaching the end of its life. In such cases, any fugitive monitoring is not going to be achieving emission reductions that EPA would estimate for a well at normal production levels. Therefore, monitoring would not be cost-effective under CAA Section 111 and the BSER standards EPA and the courts have established. Similar to allowance for storage vessel control removal, TXOGA recommends cessation of leak detection applicability if less than 15 BOE/day production is sustained continuously for any 12 month period.

7. The Schedule and Frequency of Initial and Periodic OGI Surveys, Fugitive Emissions Monitoring, and Repair Requirements for Well Sites and Compressor Stations is Overly Burdensome.

a. There Should Be a One-Year Phase Upon Initial Issuance of the Regulation.

The initial implementation of the regulation will require training and startup time (including obtaining approval of corporate leak detection programs as discussed above. Accordingly, it is important for EPA to provide an initial one-year phase in of these requirements. This will allow companies to obtain equipment, train personnel, and obtain appropriate contractors. Absent this phase-in, the rule will not be achievable and will fail the BSER test.

b. Initial Surveys and Commencement of Fugitive Emissions Monitoring Should Be Required Within 180 Days After the Date of Startup Or the Date a Modified Affected Facility Begins Operation.

In numerous instances in the proposal, EPA introduces substantial and burdensome initial survey requirements:

> For new well sites, the initial survey would have to be conducted within 30 days of the end of the first well completion or upon the date the site begins production, whichever is later. For modified well sites, the initial survey would be required to be conducted within 30 days of the site modification.
> …

[158] *Essex Chem.*, 486 F.2d at 433.

Attachment 19

IPAA/AXPC Comments for Three Regulatory Proposals issued September 18, 2015 (Dec. 4, 2015) (excerpts)

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA

AXPC American Exploration & Production Council

December 4, 2015

Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, D.C. 20460

VIA ELECTRONIC MAIL

Re: Comments for Three Regulatory Proposals issued September 18, 2015:

1) **Oil and Natural Gas Sector: Emission Standards for New and Modified Sources (80 Fed. Reg. 56,593)**

2) **Release of Draft Control Technique Guidelines for the Oil and Natural Gas Industry (80 Fed. Reg. 56,577)**

3) **Source Determination for Certain Emission Units in the Oil and Natural Gas Sector (80 Fed. Reg. 56,579)**

Dear Administrator McCarthy:

These comments are filed on behalf of the Independent Petroleum Association of America (IPAA) and the American Exploration and Production Council (AXPC) (collectively, IPAA/AXPC).[1]

IPAA represents the thousands of independent oil and natural gas explorers and producers, as well as the service and supply industries that support their efforts, that will most directly be impacted by the U.S. Environmental Protection Agency (EPA) policy decisions to regulate methane directly from the oil and natural gas sector. Independent producers develop about 95 percent of American oil and gas wells, produce 54 percent of American oil, and produce 85 percent of American natural gas. Historically, independent producers have invested over 150 percent of their cash flow back into domestic oil and natural gas development to find and produce more American energy. IPAA is dedicated to ensuring a strong, viable domestic oil and natural gas industry, recognizing that an adequate and secure supply of energy is essential to the national economy.

AXPC is a national trade association representing 30 of America's largest and most active independent oil and natural gas exploration and production companies. AXPC members are "independent" in that their operations are limited to exploration for and production of oil and natural gas. Moreover, our members operate autonomously, unlike their fully integrated counterparts, which operate in additional segments of the energy business, such as downstream refining and marketing. AXPC members are leaders in developing and applying innovative and

[1] For ease of reference, these comments include an Acronym Index, attached hereto as "Attachment A."

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advanced technologies necessary to explore for and produce oil and natural gas, both offshore and onshore, from unconventional sources.

Additionally, they are joined by the American Association of Professional Landmen (AAPL), the Association of Energy Service Companies (AESC), the International Association of Drilling Contractors (IADC), the International Association of Geophysical Contractors (IAGC), the National Stripper Well Association (NSWA), the Petroleum Equipment & Services Association (PESA), the US Oil & Gas Association (USOGA), and the following organizations:

Arkansas Independent Producers and Royalty Owners Association
California Independent Petroleum Association
Coalbed Methane Association of Alabama
Colorado Oil & Gas Association
East Texas Producers & Royalty Owners Association
Eastern Kansas Oil & Gas Association
Florida Independent Petroleum Association
Idaho Petroleum Council
Illinois Oil & Gas Association
Independent Oil & Gas Association of New York
Independent Oil & Gas Association of West Virginia
Independent Oil Producers' Agency
Independent Oil Producers Association Tri-State
Independent Petroleum Association of New Mexico
Indiana Oil & Gas Association
Kansas Independent Oil & Gas Association
Kentucky Oil & Gas Association
Louisiana Oil & Gas Association
Michigan Oil & Gas Association
Mississippi Independent Producers & Royalty Association
Montana Petroleum Association
National Association of Royalty Owners
Nebraska Independent Oil & Gas Association
New Mexico Oil & Gas Association
New York State Oil Producers Association
North Dakota Petroleum Council
Northern Montana Oil and Gas Association
Ohio Oil & Gas Association
Oklahoma Independent Petroleum Association
Panhandle Producers & Royalty Owners Association
Pennsylvania Independent Oil & Gas Association
Permian Basin Petroleum Association
Petroleum Association of Wyoming
Southeastern Ohio Oil & Gas Association
Tennessee Oil & Gas Association
Texas Alliance of Energy Producers

Texas Oil and Gas Association
Texas Independent Producers and Royalty Owners Association
Utah Petroleum Association
Virginia Oil and Gas Association
West Slope Colorado Oil & Gas Association
West Virginia Oil and Natural Gas Association

Collectively, these groups represent the thousands of independent oil and natural gas explorers and producers, as well as the service and supply industries that support their efforts, that will be most significantly affected by the actions resulting from these regulatory proposals. In addition to the specific comments made herein, we support those comments submitted separately by the participants in these comments. IPAA/AXPC also endorses and supports the comments of the Western Energy Alliance (WEA) and the American Petroleum Institute (API) submitted on the proposed rules referenced above.

As an initial matter, these comments are designed to address the three aforementioned proposed regulatory actions simultaneously and will be submitted to all three dockets as all three proposals target the oil and natural gas industry, and certain responses and arguments from IPAA/AXPC are applicable to all of the proposals. Additionally, comments on all three proposals were initially due November 17, 2015. IPAA requested an extension of the 60-day comment period on October 2, 2015, due to the complexity and breadth of the proposed regulations and that certain key supporting documents were not available in the docket for public review when the EPA published the proposals in the Federal Register on September 18, 2015. In late October/early November various informed parties who had requested additional time to comment learned that they would have until December 4, 2015. On November 13, 2015, the extension was published in the Federal Register.

EXECUTIVE SUMMARY

These comments raise a number of key issues associated with EPA's proposals for Clean Air Act (CAA or Act) New Source Performance Standards (NSPS), Control Technique Guidelines (CTG) and Source Determination for oil and natural gas production facilities.

EPA justifies its proposals in the context of the Administration's Climate Action Plan with a specific target of reducing methane emissions from the oil and natural gas sectors by 40-45 percent during the time period from 2012 through 2025. However, as these comments demonstrate, EPA's proposals are unnecessary, unjustified, poorly developed and counterproductive.

First, the Administration proclaims its intent to reduce methane emissions by 40-45 percent from the oil and natural gas sectors. At the same time, it takes credit for its 2012 volatile organic chemical/methane emissions regulations in these sectors that exceed its own target. Moreover, it fails to recognize that much of the reduction it seeks has occurred since 2012 from voluntary industry actions. The oil and natural gas production sector is 1.07 percent of the national Greenhouse Gas Inventory and its methane emissions will continue to drop because of industry emissions management. Consequently, any justification for additional regulation must

account for the increased record-keeping and reporting requirements. EPA's analysis is myopically focused on a straight up comparison of "cost-effectiveness" for semi-annual surveys versus annual and opts for semi-annual requirements because the relative cost-effectiveness is the same: $2,475 for annual versus $2,768 for annual under the single pollutant approach at the well site.[40] EPA conducted similar comparisons for the multi-pollutant approach at the well site (as well as both comparisons at a compressor station).[41] In every instance the annual survey was more cost-effective but EPA selected the semi-annual surveying because the cost/ton removed was similar. There are two problems with that philosophy. First – in selecting the semi-annual requirement, EPA basically double the cost of the requirement to industry. Second, the theoretical or modeled additional reduction in emissions is a very small percentage of the overall emission reductions associated with the proposed regulations. The additional cost associated with the annual survey requirement is substantial while the increased benefit to the environment is minimal. The additional regulatory burden will be disproportionately felt by small entities. The proposed LDAR requirements basically require all companies, regardless of size, to implement costly information systems to track and monitor compliance. For example, one of the larger, more sophisticated operators with a data management system already in place incurred an additional $10,000 in external costs associated with developing new or revised software, and an additional $37,000 associated with internal set-up costs and employee time focused on implementation. These costs were associated with complying with Colorado's LDAR program in a small gas field of 174 wells and, as indicated, were in addition to an existing management system at an estimated cost of $80,000 annually. It does not appear that costs such as these were considered in EPA's cost-effectiveness analysis. EPA's proposed requirements appear to be based on what is required at natural gas plants, and expanding that level of detail to remote, un-manned production sites is inappropriate. Such level of detail is not warranted nor has the cost been adequately justified – especially over the life of the well. The majority of the "benefit" associated with the surveying is on the initial startup of a well (or startup after modifications). It is impossible to calculate an accurate annual gas recovery rate over the life of a well site.

The new record-keeping requirements associated with the LDAR are particularly burdensome to smaller operators with limited staff. For example, the preamble provides limited to no justification for requiring the date-stamped digital photograph. If EPA retains the burdensome record-keeping requirements, companies should be allowed to keep the records on site or at a regional field office and produce them upon request. Companies should not be required to submit electronically or manually to the permitting agency. EPA requested comment on "ways to minimize recordkeeping and reporting burden." As discussed above, EPA should evaluate existing state requirements and liberally deem them sufficient for purposes of Subpart OOOOa and establish a mechanism for states to implement their own programs that supersede and satisfy Subpart OOOOa.

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[40] Oil and Natural Gas Sector: Standards for Crude Oil and Natural Gas Sector: Standards for Crude Oil and Natural Gas Facilities – Background Technical Support Document for the Proposed New Source Performance Standards 40 CFR Part 60, subpart OOOOa (Aug. 2015) (hereinafter, TSD), at Table 5-14.

[41] *Id.* at Tables 5-15, 5-17, 5-18.

IPAA/AXPC supports the limited exclusions from the LDAR requirements that EPA has proposed but requests certain clarifications and expansion of the exclusions. Excluding low production well sites – defined as the "average combined oil and natural gas production for the oil and natural gas production for the wells at the site being less than 15 barrels of oil equivalent (boe) per day averaged over the first 30 days of production"[42] -- is extremely helpful for small entities and smaller independent operators. IPAA/AXPC understands the 15 boe is also an "off ramp" – that is, when a well drops below 15 boe, it is no longer subject to the LDAR requirements. IPAA/AXPC requests the regulatory language be revised to indicate that when a well drops below 15 boe, based on a 30-day average production, the LDAR requirements no longer apply. EPA should provide an additional exclusion for well sites with component counts below EPA's model well site: below 548 components for gas well sites and below 135 components for oil well sites should be excluded from the LDAR requirements.[43] EPA concluded that it is not cost effective to implement the proposed LDAR requirements on sites with lower well component counts and therefore those well sites should be excluded. Such exclusion would help all producers but would have greatest benefit to small entities that are likely to have smaller well sites. IPAA/AXPC also supports EPA's proposed exclusion for well sites with extremely dry gas where only the wellhead exists and there is no "ancillary equipment." IPAA/AXPC requests clarification that a meter and drip present at the well site do not constitute "ancillary equipment." Finally, in response to an EPA request for comment, IPAA/AXPC suggests that the LDAR requirements should only apply to those components that are directly connected to the fractured, refractured, or added well and should not apply to tank batteries or other equipment off the well pad which may receive fluids from the fractured, refractured or added well.

C. Oil Well Reduced Emission Completions

As with the proposed LDAR requirements, in its rush to promulgate regulations aimed at additional sources of VOCs and methane, EPA assumed that reduced emission completions (RECs) on oil wells are essentially the "same" as RECs on natural gas wells. Unlike a natural gas well, where the price of natural gas dictates many operational decisions, the economic driver for oil wells is the price and volume of oil – not natural gas. When EPA promulgated Subpart OOOO regulations for VOCs and RECs on natural gas wells, EPA indicated it did not have enough information to determine if oil well RECs were cost-effective.[44] The cost-effectiveness of oil well RECs was also raised by EPA in the Methane "White Papers" released on April 15, 2014.[45] IPAA/AXPC and individual member companies submitted comments on EPA's oil well

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[42] Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 Fed. Reg. 56,593, 56,612 (Sept. 18, 2015) (to be codified at 40 C.F.R. pt. 60).

[43] TSD at Table 25-1.

[44] Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 Fed. Reg. 49,490 ,49516 (Aug. 16, 2012)

[45] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Oil and Natural Gas Sector Hydraulically Fractured Oil Well Completions and Associated Gas during Ongoing Production* (Apr. 2014), *available at* http://www3.epa.gov/airquality/oilandgas/2014papers/20140415completions.pdf

Attachment 20

Clean Air Task Force et al., Comments: Oil and Natural Gas Sector: Control Techniques for the Oil and Natural Gas Industry (Dec. 2015) (excerpts)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Oil and Natural Gas Sector: Control Techniques for the Oil and Natural Gas Industry	))))))	**Docket No. EPA-HQ-OAR-2010-0505** *Via email* *December 4, 2015*

Clean Air Task Force, Earthjustice, Environmental Defense Fund, Natural Resources Defense Council, and Sierra Club appreciate the opportunity to submit comments on EPA's Proposed Control Techniques Guidelines for the oil and Natural Gas Industry ("CTG Proposal"). All of the documents cited to in these comments are hereby incorporated as part of the record in this rulemaking proceeding. In addition to climate destabilizing methane emissions, the oil and natural gas sector is a source of harmful air pollution, including ozone-forming volatile organic compounds ("VOCs") and toxic air pollutants like benzene, a known human carcinogen.

EPA's CTG Proposal addresses many of the same types of equipment as EPA's proposed methane standards for new and modified sources, and EPA's proposed standards and guidelines for these sources are nearly identical.[1] The CTG Proposal, however, includes VOC guidelines for *existing sources* in certain areas that violate the National Ambient Air Quality Standards ("NAAQS") for ozone. As ICF International found, nearly 90 percent of the oil and gas sector's emissions come from existing infrastructure,[2] and a meaningful percentage of these sources are located in areas that are subject to CTGs. While comprehensive standards for existing sources under section 111(d) are urgently needed to protect all communities across the country, EPA's CTG Proposal is an important step forward and can provide information for state air quality planners to help reduce emissions from the oil and gas sources in areas with elevated ozone concentrations.

While affirming that CTGs are not an adequate substitute for a 111(d) existing source rule, we strongly support EPA's CTG Proposal and urge the agency to strengthen these guidelines consistent with our recommendations on the NSPS. Section 1, below, describes health harms associated with ozone pollution and emissions from the oil and gas sector that contribute to this pollution. In Section 2, we describe EPA's clear legal authority to adopt these guidelines, the contours of the agency's reasonably available control technology ("RACT") analysis, and the

[1] 80 Fed. Reg. 56593 (September 18, 2015).

[2] ICF International, "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries," (March 2014), *available at* https://www.edf.org/energy/icf-methane-cost-curve-report (hereinafter "ICF Cost Curve Report"). ICF looked specifically at the percentage of methane emissions contributed by existing sources. They did not conduct a comparable estimate of the amount of VOC emissions that come from existing oil and gas sources. Nevertheless, it is reasonable to expect that existing oil and gas sources are also responsible for the vast majority of VOC emissions from the oil and gas sector due to the sheer number of existing oil and gas facilities.

appropriateness of EPA adopting standards for new and existing sources that are aligned. Section 3 addresses EPA's proposed guidelines for particular sources and recommends approaches to strengthen them. Given the substantial overlap with EPA's 111(b) Methane Proposal, we focus our specific comments here only on those areas where our recommendations diverge from those on the methane proposal or where a feature related to controlling emissions from existing sources is particularly notable.

We conclude:

- The oil and natural gas sector is a significant source of smog-forming VOCs and reductions in these pollutants are critical to protect the health of communities;
- EPA has clear authority to adopt guidelines for the oil and gas sector and EPA's proposal to align new and existing source requirements satisfies the statutory mandate that standards be based on reasonably available control technology and is likewise supported by substantial technical evidence in the record;
- EPA should strengthen LDAR requirements, consistent with our NSPS comments, and equipment availability considerations are especially unwarranted in the CTG context;
- EPA should adopt a performance-based threshold liquids unloading standard, given substantial emissions from existing liquids unloading wells; and
- While the CTG Proposal represents a positive step toward controlling emissions from existing oil and gas sources, it is not enough: EPA must propose existing source standards for these sources under section 111(d) as soon as possible.

I. THE OIL AND NATURAL GAS SECTOR IS A SIGNIFICANT SOURCE OF SMOG-FORMING VOCS

Oil and gas equipment are significant sources of smog-forming pollutants that contribute to unhealthy air pollution in multiple areas across the country. Rigorous standards that reduce emissions of VOCs and nitrogen oxides ("NOx") that contribute to unhealthy levels of ozone are urgently needed to protect public health in states that are home to, or impacted, by oil and gas development.

A. *Ozone is a Dangerous Air Pollutant that Harms Public Health*

Since EPA revised the ozone NAAQS in 2008, there have been more than 1,000 new studies that demonstrate the health and environmental harms of ozone.[3] Based on these studies and the previous literature, EPA has concluded:

> Scientific evidence shows that ozone can cause a number of harmful effects on the respiratory system, including difficulty breathing and inflammation of the airways. For people with lung diseases such as asthma and COPD (chronic obstructive pulmonary disease), these effects can aggravate their diseases, leading to increased medication use, emergency room visits and hospital admissions.
>
> Evidence also indicates that long-term exposure to ozone is likely to be one of many causes of asthma development. In addition, studies show that ozone exposure is likely to cause premature death.[4]

An extensive body of scientific and technical analyses underscores that the risk of these harmful health effects is even more pronounced for people with asthma and other respiratory diseases, children, older adults, and people who work or are active outdoors. An estimated 23 million people have asthma in the U.S., including almost 6.1 million children.[5] Further, asthma disproportionately impacts communities of color and lower-income communities.[6]

Children, in particular, are most at risk because they breathe more air per unit of body weight, are more active outdoors, are more likely to have asthma than adults, and are still developing their lungs and other organs. In fact, EPA's Children's Health Protection Advisory Committee—a body of external experts that provides the Administrator with recommendations concerning children's health—finds that "[c]hildren suffer a disproportionate burden of ozone-related health impacts due to critical developmental periods of lung growth in childhood and adolescence that can result in permanent disability."[7]

On October 1, 2015, EPA established a revised ozone standard of 70 parts per billion ("ppb"), improving America's national air quality standard for ground-level ozone. The standard is

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[3] U.S. Environmental Protection Agency, Fact Sheet, OVERVIEW OF EPA'S UPDATES TO THE AIR QUALITY STANDARD FOR GROUND-LEVEL OZONE, *available at* http://www3.epa.gov/ozonepollution/pdfs/20151001overviewfs.pdf (hereinafter "Ozone Standard Fact Sheet"); *see also* U.S. Environmental Protection Agency, Integrated Science Assessment for Ozone and Related Photochemical Oxidants, Final Report (Feb. 2013), *available at* http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492#Download.

[4] Ozone Standard Fact Sheet, supra note 3.

[5] Ozone Standard Fact Sheet, supra note 3.

[6] *Id.*

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

expected to prevent up to 660 premature deaths, 230,000 asthma attacks, and 160,000 lost school days across the nation in 2025, excluding California. EPA estimates the benefits at this level of protection provide up to $5.9 billion in monetized benefits, greatly outweighing the costs of implementation.[8]

Scientific evidence overwhelmingly demonstrates that the previous 75 ppb standard was not requisite to protect human health with an adequate margin of safety, as required by the Clean Air Act.[9] Even while EPA's final standard of 70 ppb will improve upon this outdated standard, it nonetheless falls at the least protective end of the range recommended by the EPA's independent scientific advisors and the nation's leading health and medical societies,[10] and accordingly, falls short in protecting the health of all Americans. Had EPA established a more protective ozone standard of 60 ppb, more counties with oil and gas development would have been brought under the protection of the proposed CTGs.[11]

B. *The Oil and Gas Sector is a Substantial Source of Smog-Forming VOCs*

Oil and gas activities release pollutants that mix together in the atmosphere to form ground-level ozone or smog, including VOCs and NOx.[12] Several recent analyses have found these emissions from the sector are significant:

- According to the 2014 National Emissions Inventory (NEI), "Petroleum & Related Industries" was the second largest source of VOCs nationally, excluding miscellaneous emissions, and the fifth largest source of NOx emissions nationally.[13]
- The ICF Cost Curve Report found that the oil and natural gas sector was responsible for over 1.5 million tons of VOC emissions.[14]

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[8] U.S. Environmental Protection Agency, By the Numbers fact sheet (October 2015), http://www3.epa.gov/airquality/ozonepollution/pdfs/20151001numbersfs.pdf.

[9] Letter from H. Christopher Frey PhD to Administrator McCarthy, *CASAC Review of the EPA's Second Draft Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards*, EPA-CASAC-14-004, at ii (June 26, 2014), *available at* http://yosemite.epa.gov/sab/sabproduct.nsf/5EFA320CCAD326E885257D030071531C/$File/EPA-CASAC-14-004+unsigned.pdf (hereinafter "CASAC Letter").

[10] EPA's independent Clean Air Scientific Advisory Committee found that at 70 ppb there is "substantial scientific evidence of adverse effects … including decrease in lung function, increase in respiratory symptoms, and increase in airway inflammation." *Id.*

[11] Based on state-reported DrillingInfo HPDI data in conjunction with the EPA published 2012-2014 Design Values by county, *available at* http://www3.epa.gov/airtrends/values.html.

[12] Methane also reacts to form ozone, but the agency has found that methane largely contributes to background ozone concentrations.

[13] EPA, National Emissions Inventory (NEI) Air Pollutant Emissions Trends Data, http://www3.epa.gov/ttnchie1/trends/.

[14] ICF International, "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries," 4-12 (March 2014).

State and regional analyses have similarly concluded that oil and gas activities emit significant amounts of VOCs.

- A paper examining the impacts of natural gas production and use on emissions and air quality notes that production sites in the Barnett Shale Region in Texas contribute 19,888 tons of VOCs per year.[15]
- According to a recent study of VOCs and HAPs at oil and gas facilities in several regions, production facilities in the Denver-Julesburg Basin emit an average of 0.12 to 0.19 grams per second of VOCs (about 4 to 6 metric tons per year).[16] The study also notes that "VOC and HAP emissions from upstream production operations are important due to their potential impact on regional ozone levels and proximate populations ."[17]
- A study that examines top-down VOC and methane emissions for the Denver-Julesburg Basin in Colorado found that "the emissions of the measured species are most likely underestimated in current inventories."[18]
- Another Colorado study found "[o]il-and-gas-related emissions for a subset of volatile organic compounds (VOCs), which can contribute to ground-level ozone pollution, were about 25 metric tons per hour, compared to the state inventory, which amounts to 13.1 tons."[19]
- A recent study that examined VOC emissions from oil and gas in the Uintah basin in Utah found that well pads are responsible for high VOC mixing ratios in the vicinity of the site, specifically that "[s]trongly elevated mixing ratios of the measured VOCs were found at almost all source locations…".[20]
- The Uinta Basin Winter Ozone Study found very high ozone episodes observed in the December 2013 – March 2014 winter study and concluded that, "activities associated

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[15] David T. Allen, "Atmospheric Emissions and Air Quality Impacts from Natural Gas Production and Use," *Annu. Rev. Chem. Biomol. Eng.* 2014. 5:55–75, 2014. doi: 10.1146/annurev-chembioeng-060713-035938, *available at* http://www.annualreviews.org/doi/abs/10.1146/annurev-chembioeng-060713-035938.

[16] Brantley, et al., (2015) "Assessment of volatile organic compound and hazardous air pollutant emissions from oil and natural gas well pads using mobile remote and onsite direct measurements," *Journal of the Air & Waste Management Association.* ISSN: 1096-2247 (Print) 2162-2906 (Online) Journal homepage: http://www.tandfonline.com/loi/uawm20.

[18] Pétron, G., et al., (2012), "Estimation of Emissions from Oil and Natural Gas Operations in Northeastern Colorado," Earth System Research Laboratory, National Oceanic & Atmospheric Administration, *available at* http://www3.epa.gov/ttnchie1/conference/ei20/session6/gpetron.pdf.

[19] Pétron, G., et al., (2014), "A new look at methane and non-methane hydrocarbon emissions from oil and natural gas operations in the Colorado Denver-Julesburg Basin," J. Geophys. Res. Atmos., 119, 6836–6852, doi:10.1002/2013JD021272, *available at* http://onlinelibrary.wiley.com/doi/10.1002/2013JD021272/full.

[20] Warneke, C. et al., (2014) "Volatile organic compound emissions from the oil and natural gas industry in the Uintah Basin, Utah: oil and gas well pad emissions compared to ambient air composition," *Atmos. Chem. Phys.*, 14, 10977–10988, *available at* www.atmos-chem-phys.net/14/10977/2014/.

with oil and gas exploration and production are the predominant sources of ozone precursors."[21]

- The most recent Alamo Area Council of Governments Oil and Gas Eagle Ford Shale emissions inventory projects that the Eagle Ford will produce 929 tons per day VOC and 302 tons per day NOx in 2018 under a moderate development scenario, and 1,248 tons per day VOC and 423 tons per day NOx under a high development scenario.[22]

As many of these studies indicate, oil and gas activities are significant sources of VOC and NOx emissions that contribute to ozone pollution.

C. *Emissions from the Oil and Natural Gas Sector Have Been Linked to Unhealthy Levels of Ozone*

The oil and gas sector's substantial emissions have been linked to unhealthy levels of ozone pollution, including monitored ozone exceedances and ozone "action days" (days when the air quality in an area becomes unhealthy and people, especially susceptible populations, are encouraged to take certain precaution or stay indoors).[23] Examples include the following:

1. Wyoming. In designating Sublette County and portions of Lincoln and Sweetwater Counties in Wyoming as failing to attain the 2008 ozone standard, EPA noted that the ozone air quality problems were "primarily due to local emissions from oil and gas activities: drilling, production, storage, transport and treatment of oil and natural gas."[24] The Wyoming Department of Environmental Quality provided a similar assessment, and then-Governor Freudenthal recommended that parts of the Upper Green River Basin be designated as an ozone non-attainment area,[25] which EPA did in May of 2012.[26] Since this time, ozone levels have fallen. This decline is likely due in part to oil and gas air quality standards put in place by Wyoming Department of Environmental Quality.
2. Utah. The Utah Department of Environmental Quality has noted that "[i]ncreased oil and gas development in the Uinta Basin have [sic] led to environmental issues regarding air

[21] ENVIRON, "Final Report: 2013 Uinta Basin Winter Ozone Study," (March 2014), *available at* http://www.deq.utah.gov/locations/U/uintahbasin/ozone/docs/2014/06Jun/UBOS2013FinalReport/UBOS_2013Secs_1-2.pdf.

[22] Alamo Area Council of Governments, "Oil and Gas Emission Inventory Update, Eagle Ford Shale: Technical Report," (2015), prepared for Texas Commission on Environmental Quality, *available at* http://www.aacog.com/DocumentCenter/View/30289.

[23] AirNow Action Days: http://airnow.gov/index.cfm?action=airnow.actiondays; Air Quality Guide for Ozone, http://www.airnow.gov/index.cfm?action=pubs.aqiguideozone.

[24] 77 Fed. Reg. 34221 et. seq; see also EPA, TECHNICAL SUPPORT DOCUMENT, WYOMING AREA DESIGNATIONS FOR THE 2008 OZONE NATIONAL AMBIENT AIR QUALITY STANDARDS (2012), *available at* http://www.epa.gov/ozonedesignations/2008standards/documents/R8_WY_TSD_Final.pdf (Wyoming).

[25] Letter to Ms. Carol Rushin, Acting Regional Administrator from Governor Dave Freudenthal (March 12, 2009), http://deq.state.wy.us/AQD/Ozone/Gov%20Ozone%20to%20EPA%20(Rushin)_Final_3-12-09.pdf.

[26] 77 Fed. Reg. 30,088, 30,157 (May 21, 2012).

quality, water quality, and management of drilling wastes."[27] The Uinta Basin Winter Ozone Study found that the high ozone episodes observed in the December 2013 to March 2014 time period, which corresponded with colder temperatures, snow cover, and atmospheric inversions, were triggered by compounds "directly released from various emission sources and form in the atmosphere from directly emitted volatile organic compounds (VOCs) such as those emitted from oil and natural gas exploration and production activities."[28]

3. Texas. EPA has found that emissions from Wise County Texas, including from oil and gas collection and production in the Barnett Shale field, are contributing to unhealthy levels of smog in nearby Dallas-Fort Worth.[29]

Updated CTGs will provide much needed help to states in addressing areas with smog problems and complying with EPA's ozone standard. In fact, about 17% of the oil and gas wells nationally are located in counties that have current design values in excess of the recently announced new ozone NAAQS threshold of 70 ppb.[30] Moreover, several states have recognized the need to control VOCs from oil and gas to address ozone issues, and adopted standards to minimize VOC emissions from both new and existing sources. For example, Colorado requirements to address these pollutants from certain sources date back to early 2004.

II. EPA Has Clear Authority to Issue Control Techniques Guidelines for the Oil and Natural Gas Industry

In this section, we describe EPA's authority to adopt CTGs for the oil and gas sector, along with the timing and applicability of these guidelines in areas with elevated levels of ozone pollution. We then briefly describe the contours of EPA's RACT assessment and the reasonableness of the agency's proposal here to align guidelines for existing sources with proposed standards for new and modified sources under section 111(b).

A. EPA's Authority to Adopt CTGs for the Oil and Natural Gas Sector

The Clean Air Act provides EPA with clear authority to issue CTGs for sources in the oil and natural gas sector. Section 7511b(a) requires that the Administrator issue CTGs for certain

[27] Utah Dept. of Environmental Quality, "Uinta Basin, Ozone in the Uinta Basin," *available at* http://www.deq.utah.gov/locations/U/uintahbasin/ozone/overview.htm

[28] "Final Report: 2014 Uinta Basin Winter Ozone Study" (2015) Prepared by Environ for the Utah Division of Air Quality, http://www.deq.utah.gov/locations/U/uintahbasin/ozone/docs/2015/02Feb/UBWOS_2014_Final.pdf.

[29] *Mississippi Comm'n on Envtl. Quality v. EPA*, No. 12-1309, slip opinion at 46 (D.D.C., June 2, 2015) available at https://www.cadc.uscourts.gov/internet/opinions.nsf/74C882991045080985257E580051699C/$file/12-1309-1555205.pdf.

[30] Percentage of wells based on DrillingInfo HPDI data in conjunction with the EPA published 2012-2014 Design Values by county, *available at* http://www3.epa.gov/airtrends/values.html.

categories of consumer and commercial equipment and likewise authorizes EPA to "issue such additional control techniques guidelines as the Administrator deems necessary."[31]

The Administrator has reasonably exercised that discretion here. As demonstrated above, the oil and gas industry is a significant source of smog-forming VOCs. While EPA has promulgated or proposed standards to address VOC emissions from various *new* oil and gas sources, existing oil and gas sources remain largely unaddressed and are responsible for the vast majority of emissions from this sector. Moreover, available, low-cost technologies can dramatically reduce VOC emissions from existing oil and gas sources. And there is precedent for EPA promulgating CTGs for VOCs from oil and gas sources, as EPA has issued CTGs for a variety of VOC sources in the past, including natural gas processing plants located in the oil and natural gas industry.[32]

CTGs provide EPA's guidance on the technologies that the agency considers presumptive reasonably available control technology, or "RACT," for VOC source categories and for pieces of consumer and commercial equipment.[33] EPA determines RACT for each particular industry, accounting for technological and economic feasibility of control techniques.[34] States are free to propose their own approach, which is subject to EPA approval,[35] and must be consistent with the Act's RACT requirements.

The Clean Air Act requires that state implementation plans ("SIPs") include RACT for existing source of emissions in a variety of circumstances where air quality fails to meet the NAAQS. Specifically:

- Section 172 (addressing nonattainment plan requirements generally) requires that SIPs for nonattainment areas include "reasonably available control measures," including RACT for sources of emissions within the nonattainment area.[36]

- Section 182(b)–(e) (applying to states with moderate and above ozone nonattainment areas) requires that SIPs be updated to include RACT for various VOC sources, including all VOC sources covered by a CTG;[37] and

- Section 184(b) requires that states located in Ozone Transport Regions include RACT for all sources located in their state that are covered by a CTG issued before or after the 1990 Clean Air Act Amendments.[38]

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[31] 42 U.S.C. § 75411b(a).
[32] EPA, "Guideline Series. Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants," (Dec. 1983).
[33] *NRDC v. EPA*, 571 F.3d 1245, 1254 (D.C. Cir. 2009); *see also Conn. Fund for Env't v. EPA*, 672 F.2d 998, 1003 (2nd Cir. 1982); *U.S. v. Ford Motor Co.*, 736 F. Supp. 1539, 1543 (W.D.Mo. 1990).
[34] *See* Consumer and Commercial Products, Group II: Control Techniques Guidelines in Lieu of Regulations for Flexible Packaging Printing Materials, Lithographic Printing Materials, Letterpress Printing Materials, Industrial Cleaning Solvents, and Flat Wood Paneling Coatings, 77 FR 58745, 58746-47 (Oct. 5, 2006).
[35] *Id.*
[36] 42 U.S.C. § 7502(c)(1).
[37] 42 U.S.C. § 7511a(b)-(e).

In EPA's final guidelines, we recommend the agency broadly encourage adoption of these measures, including in marginal nonattainment areas and in those areas that, while not designated nonattainment, nonetheless experience elevated concentrations of ozone. With respect to the latter, we encourage EPA to clarify how states choosing to broadly adopt these CTGs can incorporate them into programs like Ozone Advance.

B. EPA Reasonably Determined that the Same Measures Available to Reduce Emissions from New Sources Are Likewise Applicable to Existing Sources

As EPA states in the proposal, RACT is defined as the "the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility."[39] Courts have recognized EPA's discretion to determine RACT based on these and other factors.[40]

Here, EPA has reasonably determined that RACT for existing sources constitutes the same suite of measures EPA proposed to control emissions from new and modified oil and gas sources. This determination is based on extensive evidence demonstrating the technical and economic feasibility of requiring the same controls for both new and existing sources. Namely, EPA considered:

- State and local regulations and permit requirements that require the control of VOCs from oil and gas sources;
- The 2012 NSPS for oil and gas sources that require control of VOCs and the underlying technical documents in support of those standards;
- Information on costs and available control technologies obtained by EPA since promulgation of the oil and gas NSPS in 2012; and
- Information on costs and available control technologies EPA relies on in support of the proposed 2015 oil and gas NSPS.

In addition to this information, EPA's determination is supported by state analyses, documenting the feasibility and cost-effectiveness of deploying the same measures at both new and existing sources. Specifically:

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[38] 42 U.S.C. § 7511c(b).

[40] See e.g., *NRDC v. EPA*, 571 F.3d 1245, 1254 (D.C. Cir. 2009).

- Colorado requires the same measures to control VOC and methane emissions from new and existing storage tanks, equipment leaks, liquids unloading activities, pneumatic controllers, and glycol dehydrators;[41]

- Wyoming requires the same measures to control VOC emissions from new and existing storage tanks, glycol dehydrators, pneumatic controllers, pneumatic pumps, and liquids unloading activities;[42]

- Utah requires the same control measures to reduce emissions from existing pneumatic controllers as EPA requires for new controllers;[43]

- California requires the same type of inspection and maintenance program to identify and repair VOC equipment leaks at new and existing oil and gas facilities;[44] and

- California has proposed to require the same measures to control methane emissions from a suite of new and existing oil and gas equipment and activities, including storage vessels, compressors, liquids unloading activities, equipment leaks, and pneumatic controllers and pumps.[45]

Various technical assessments and studies likewise support application of the same control measures at both new and existing oil and gas sources. The ICF Cost Curve Report evaluated and applied the same measures to control emissions from new as existing oil and gas sources.[46]

We agree that there is substantial information documenting the "technological and economic feasibility" of applying these control measures at existing sources, and accordingly, that EPA's determination to align RACT requirements with 111(b) new source standards is reasonable.

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[41] *See, e.g.,* Colorado Department of Public Health and Environment, 5 C.C.R. 1001-9, CO Reg. 7, §§ XVII.C, XVII.F.4.b, XVII.H, XVIII.C.1.b and XVIII.C.2.b, XVII.D (Feb. 24, 2014) *available at* https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=5670&fileName=5%20CCR%201001-9.

[42] *See, e.g.,* Wyoming Department of Environmental Quality, Oil and Gas Production Facilities Permitting Guidance (Revised Oct. 2015), pp. 6, 11, 13, 17, 19 and 21 (storage tanks), 7, 14 and 19 (glycol dehydrators), 10, 15 and 20 (pneumatic controllers), 9, 15 and 20 (pneumatic pumps), and 12 (liquids unloading), *available at* http://deq.wyoming.gov/media/attachments/Air%20Quality/Rule%20Development/Proposed%20Rules%20and%20Regulations/Oil-and-Gas-Guidance-Revision_Draft-9-24-2015.pdf.

[43] *See* Utah Administrative Code Rule R307-502. Oil and Gas Industry: Pneumatic Controllers (effective October 1, 2015), *available at* http://www.rules.utah.gov/publicat/code/r307/r307-502.htm

[44] *See, e.g.,* San Joaquin Valley Air Pollution Control District R. 4409 (2005); South Coast Air Quality Management District R. 1173 (1989); Santa Barbara County Air Pollution Control District R. 331 (1991); Ventura County Air Pollution Control District R.74.10 (1989).

[45] *See, e.g.,* California Draft Proposed Regulation Order, at 6 (April 22, 2015 Draft), *available at* http://www.arb.ca.gov/cc/oil-gas/meetings/Draft_Regulatory_Language_4-22-15.pdf

[46] ICF Cost Curve Report, supra note 2.

III. Comments on Specific RACT Determinations

In our comments on the proposed NSPS for methane from the oil and gas sector, we recommend that EPA strengthen a number of standards applicable to new sources. Those comments apply equally to EPA's CTG Proposal, given the effectiveness and low-cost of deploying these technologies at existing sources, as discussed above. Here we comment only on aspects of EPA's RACT determinations that differ from the proposed NSPS or are otherwise notable in light of the inventory of existing oil and gas sources.

A. *Equipment Leaks at Well Sites and Compressor Stations*

i. EPA should strengthen frequency requirements in the Proposed CTGs

EPA has proposed that semi-annual inspections using OGI and repair of leaking components constitutes RACT for existing well sites that produce at least 15 barrels of oil equivalents (per well per day) (BOE/d) and compressor stations.[47] In reaching this recommendation, EPA relied on the same technical analysis it performed for its 111(b) proposal, though here, the agency does not evaluate or explain the basis for the proposed 15 BOE/d exemption for wells.

EPA declines to adopt quarterly monitoring based on concerns that requirements may adversely affect small businesses. Specifically, EPA suggests small businesses may not have the resources or expertise to conduct OGI inspections in-house, and will therefore rely on third-party contractors, which may not be available in sufficient numbers to ensure that small businesses can timely comply with a quarterly OGI inspection requirement.[48] EPA cites this same concern in its LDAR proposal for new compressor stations.[49]

Here, as in EPA's NSPS proposal, EPA's assumption is unfounded. As we discuss in our comments on the proposed NSPS, air quality standards, such as LDAR programs, often accelerate production of these technologies,[50] and with them, the availability of service providers. Moreover, as EPA recognizes in the CTG Proposal, many operators, including small operators, already are complying with state rules that require the use of OGI or similar inspection technologies.[51] EPA specifically mentions the Colorado, Wyoming, and Ohio LDAR requirements,[52] though Pennsylvania and Utah also require LDAR inspections routinely at well sites and compressor stations for which operators may use OGI.[53] These requirements have been implemented without any evidence of hardship to small businesses.[54]

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[47] CTG Proposal at 9-31.
[48] CTG Proposal at 9-32.
[49] *See* 80 Fed. Reg. 56637, 56641 (Sept. 18, 2015).
[50] See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.
[51] *See* CTG Proposal, Section 9.3.1.1 at 9-16 – 9-23 and Section 9.3.2.2 at 9-30 – 9-31.
[52] CTG Proposal at 9-30 – 9-31.
[53] *See, e.g.,* Pa. Dep't of Envtl. Prot., General Permit for Natural Gas Compression and/or Processing Facilities (GP-5) Section H (1/2015); See also Utah Department of Environmental Quality, Division of Air Quality, Approval

Finally, the equipment availability argument is particularly unfounded in the context of CTG implementation, which will not take effect immediately. Indeed, EPA has proposed a RACT SIP submittal deadline 2 years after finalization of these guidelines, and this substantial lead time should alleviate any concerns with equipment availability.[55] Accordingly, EPA should strengthen LDAR frequency requirements as we recommend in our NSPS comments.

ii. EPA Should Remove the BOE/d Exemption

EPA likewise proposes to exempt wells that produce less than 15 BOE/d from its CTG LDAR guidelines, though the agency provides no rationale for this exemption. As we demonstrate in our comments on the proposed NSPS LDAR requirement, this exemption is unfounded and allows wells with potentially significant emissions to avoid inspection.[56]

The 15 BOE/d exemption is particularly problematic for existing wells. The table below shows that 79% of existing oil and gas wells produce less than 15 BOE/d and therefore would be exempt from LDAR requirements under the guidelines. Moreover, existing oil and gas wells that produce 15 BOE/d or less are responsible for 83% of emissions from all existing oil and gas wells. The proposed exemption works to exclude the majority of existing wells and emissions from LDAR requirements, and accordingly, we urge EPA to remove it.

TABLE 1:

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B. *Liquids Unloading Activities*

EPA has not proposed CTGs to address liquids unloading activities nor provided any rationale for declining to do so. EPA's failure to consider this significant source is arbitrary, given the agency's recognition in its NSPS proposal that liquids unloading events are a significant source of emissions.[57]

Order: General Approval Order for a Crude Oil and Natural Gas Well Site and/or Tank Battery, II.B.10 (June 5, 2014).

[54] See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.

[55] See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.

[56] See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.

[57] 80 FR. 56,645; See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.

In our comments on EPA's proposed NSPS for oil and gas sources, we recommend that EPA address liquids unloading emissions by establishing a performance-based annual venting limitations.[58] We recommend that EPA take the same approach here. As with the other CTGs EPA recommends, the control technologies and measures available to reduce emissions from existing wells during liquids unloading activities are the same as those available for new and modified wells. For example, both Colorado and Wyoming require operators of new and existing wells to undertake steps to limit emissions from liquids unloading activities.[59]

IV. Conclusion

We greatly appreciate EPA's consideration of these comments and urge the agency to finalize rigorous, control techniques guidelines to reduce oil and natural gas sector VOC emissions.

Respectfully submitted,

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[58] See Joint Comments Submitted by CATF, et al., on EPA's proposed NSPS for Quad OOOOa.
[59] Colorado Department of Public Health and Environment, 5 C.C.R. 1001-9, § XVII.H.; Wyoming Department of Environmental Quality, Oil and Gas Production Facilities Permitting Guidance (Revised Oct. 2015), p 12.

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Attachment 21

U. S. EPA, **EPA's Responses to Public Comments** on the EPA's Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources (May 2016) (excerpts)

EPA's Responses to Public Comments on the EPA's *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources*

May 2016

Comments, letters, and transcripts of the public hearings are also available electronically through *http://www.regulations.gov* by searching Docket ID EPA-HQ-OAR-2010-0505

FOREWORD

This document provides the EPA's responses to public comments on the EPA's Proposed Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources. The EPA published a Notice of Proposed Rulemaking in the Federal Register on September 18, 2015, at 80 FR 56593. The EPA received comments on this proposal by mail, facsimile, and at three public hearings held in Denver, Colorado, Dallas, Texas, and Pittsburgh, Pennsylvania, in September 2015. Copies of the transcripts for the public hearings are available at the EPA Docket Center Reading Room. Public Comments and transcripts of the public hearings for our rulemaking are available electronically through http://www.regulations.gov by searching Docket ID EPA-HQ-OAR-2010-505.

The EPA signed and announced the proposed rule on August 18, 2010. The full text of the proposal was available for public review that same day on the EPA's website (www.epa.gov/airquality/oilandgas/actions.html). The proposed rule was published in the Federal Register on September 18, 2015, at 80 FR 56593, which comment period began, ending November 17, 2015. Stakeholders requested additional time to review the proposal, the EPA extended the comment period to December 4, 2015 on November 13, 2015, at 80 FR 70179.

Over 900,000 public comments were received on the Docket for the proposed rule. The consolidated approximately 77 mass mail campaigns into single document control numbers (DCNs), resulting in approximately 2,400 unique comments. Each of these comments was reviewed and all significant comments have been included in this document. Please note that footnotes included in letters have been omitted from the comment excerpt. Please see the original document for these footnotes.

Many commenters submitted comments to this rulemaking docket specific to Review of New Sources and Modifications in Indian Country; Federal Implementation Plan for Managing Air Emissions from True Minor Sources in Oil and Natural Gas Production in Indian Country; and Release of Draft Control Techniques Guidelines for the Oil and Natural Gas Industry. Some commenters submitted comments on both rules, while others submitted a separate DCN specific to each. Many commenters submitted identical comments to both dockets. In order to reduce the volume of comments, we have removed from this document comments associated with these actions. For this reason, the EPA encourages the public to read the Response to Comments prepared for these other three actions.

As a result of changes made to the preamble and signature rule and due to the volume of comments received, it is possible some Responses to Comments

Document may not reflect the language in the preamble in the final respect. Where the response is in conflict with the preamble, the language in the final preamble and rule controls and should be used for purposes of scope, requirements, and basis of the final rule. The responses document are intended to augment the responses to comments that appear in the final rule or to address comments not discussed in that preamble. Although preamble to the final rule are paraphrased in this document where it is useful to responses, the preamble itself remains the definitive statement of the rationale adopted in the final rule. In many instances, particular responses Response to Comments Document include cross references to responses to issues that are located either in the preamble, the Technical Support Document, or the Response to Comments Document. The number of comments received may have resulted in errors or inconsistencies within the Response to Comments Document.

Accordingly, the Response to Comments Document, together with the NSPS and the information contained in the Technical Support Document, is part of the administrative record should be considered collectively response to all of the significant comments submitted on the proposed rule. The Response Document incorporates directly or by reference the significant issues addressed in the preamble to the NSPS as well as other significant public comments submitted on the proposed rule.

TABLE OF CONTENTS

CHAPTER 1: SOURCE CATEGORY

CHAPTER 2: REGULATION OF METHANE

CHAPTER 3: WELL COMPLETIONS

CHAPTER 4: FUGITIVES MONITORING

CHAPTER 5: PUMPS

CHAPTER 6: CONTROLLERS

CHAPTER 7: COMPRESSORS

CHAPTER 8: EQUIPMENT LEAKS AT NATURAL GAS PROCESSING PLANTS

CHAPTER 9: LIQUIDS UNLOADING

CHAPTER 10: STORAGE VESSELS

CHAPTER 11: COMPLIANCE

CHAPTER 12: REGULATORY IMPACT ANALYSIS

CHAPTER 13: EXISTING STATE, LOCAL, AND FEDERAL RULES

CHAPTER 14: SUBPART OOOO

CHAPTER 15: MISCELLANEOUS

CHAPTER 16: COMMENT PERIOD EXTENSION

CHAPTER 4 FUGITIVES MONITORING

This chapter addresses the EPA's responses to public comments on fugitive emissions monitoring in the EPA's *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources.*

Commenters also raised issues on topics that are not covered in this chapter. Please refer to the following chapters for responses specific to those issues:

- **Chapter 1**: Source Category
- **Chapter 2**: Regulation of Methane
- **Chapter 3**: Well Completions
- **Chapter 5**: Pumps
- **Chapter 6**: Controllers
- **Chapter 7**: Compressors
- **Chapter 8**: Equipment Leaks at Natural Gas Processing Plants
- **Chapter 9**: Liquids Unloading
- **Chapter 10**: Storage Vessels
- **Chapter 11**: Compliance
- **Chapter 12**: Regulatory Impact Analysis
- **Chapter 13**: Existing State, Local, and Federal Rules
- **Chapter 14**: Subpart OOOO
- **Chapter 15**: Miscellaneous
- **Chapter 16**: Comment Period Extension

TABLE OF CONTENTS

4.1 General Support for Proposed Standards . . . . . .
4.2 General Opposition to Proposed Standards 4
4.3 Best System of Emission Reduction. . . . . .
4.4 Method 21 . . . . . 8. 9. . . . . .
4.5 Other Detection Technologies . . . . . .
4.6 Initial Monitoring Survey. . . . . .
4.7 Applicability . . . . . .
4.8 Compliance . . . . . .
4.9 Monitoring Plan . . . . . .
4.10 Third Party Contractors . . . . . .
4.11 Recordkeeping . . . . . .
4.12 Emission Reductions . . . . . .
4.13 Other . . . . . 4. 7. 4. 8. . .

4.1 General Support for Proposed Standards

Commenter Name: Haley Colson Lewis, Programs and Michael Hansen, Interim Executive Director
Commenter Affiliation: GASP
Document Control Number: EPA-HQ-OAR-2010-0505-6436;
Comment Excerpt Number: 6

Comment: GASP also supports the proposal to conduct fugitive emissions monitoring with optical gas imaging cameras and to repair the sources of fugitive emissions within 15 days that are found during those surveys. The semi-annual requirement to repair the sources of fugitive emissions within 15 days will not be like the existing "super" emitters

Response: The EPA thanks the commenter for their support for the proposed standards for fugitive emissions from well and compressor station sources. We finalized standards to require semi-annual monitoring using OGI or Method 21 at well sites and quarterly monitoring using OGI or Method 21 at compressor stations. However, we revised the repair requirement to allow facilities 30 days to repair fugitive leaks found during the OGI or Method 21 survey (See response EPA-HQ-OAR-2010-0505-6436 Excerpt 48).

Commenter Name: Public Hearing Comments on Proposed Air Quality, and Permitting Rules for the Oil and Gas Industry; Wednesday, September 23, 2015; 9 AM - 7:55 PM, Public Hearing, Denver, Colorado
Commenter Affiliation: None
Document Control Number: EPA-HQ-OAR-2010-0505-7337
Comment Excerpt Number: 86

Comment: Federal laws should be a stronger than laws because are not influenced by too many special interests take over everybodys welfare account to. The first law should be, Do no harm

Companies should have to monitor emissions and liable for environmental degradation, just like earth liable for toxic waste. The CEO who makes a hundred million dollars a year should be paid for their carbon emissions. Right now they are polluting without paying for damage, and the most vulnerable are the first to suffer.

Response: We agree that companies should monitor emissions. The rule includes compliance requirements for all affected facilities. These include specific monitoring, recordkeeping, and reporting requirements that regulatory agency can use to determine compliance. See response to DCN EPA-HQ-OAR-2010-0505-7337, Excerpt 37, for discussion of state program equivalency.

Commenter Name: J. Roger Kelley
Commenter Affiliation: Domestic Energy Producer's Alliance (DEPA)
Document Control Number: EPA-HQ-OAR-2010-0505-6793
Comment Excerpt Number: 12

Comment: Proposed NSPS OOOOa's fugitive emissions requirements are problematic and unworkable for several reasons. Upon finalization of the proposed fugitive emissions requirements would immediately go into effect for affected facilities that have "commence[d] construction, modification or reconstruction" after September 18, 2015." This cover numerous sources that have been constructed or modified since September 18, 2015, and the date the rule goes into effect. Immediate compliance with fugitive emissions requirements for all these sources will be burdensome and even unworkable for many localities due to the remote nature of facilities, depending on the time of year, weather, difficulties in hiring, and harsh cold climates. The proposed fugitive emissions regulations require the engagement of consultants as well as equipment, and it would be impossible to accomplish for numerous sources in rural (and possibly winter) landscape. In addition, supply issues associated with labor and equipment inventory could inhibit compliance with the rule. DEPA requests that EPA allow for a long-term phased implementation of the Proposed NSPS OOOOa fugitive emissions requirements. DEPA anticipates that adequate time is required to consider logistics, resources and to develop the process required to have a fugitive emissions monitoring program may take up to five years.

Response: Based on comments received from equipment suppliers and service providers, we do not agree with that there is a shortage of equipment or trained contractors on the effective date of the final rule. However, we agree with that owners and operators of both wellsites and compressor stations need to complete certain steps in order to establish their program structure and build in foundations to assure continuous compliance. For these reasons, requiring in the final rule that the initial monitoring survey must take place within a year after the date of publication of the final rule in the Federal Register or within 60 days after the start-up of production for wellsites or 60 days after the start of a new compressor, whichever. We believe that small businesses in particular may need this additional time to develop plans because they have less staff available for these activities. See sections VI. F. 1. g and VI. F. 2. of the preamble for more detail regarding this issue.

Commenter Name: Laredo Petroleum
Commenter Affiliation: Laredo Petroleum
Document Control Number: EPA-HQ-OAR-2010-0505-6474
Comment Excerpt Number: 15

Comment: EPA's estimate of 20,000 wellsites in 2012 does not take into consideration the number of facilities that have been built in the last 4 years in the cycle the industry has gone through. Many of these facilities would be subject to the modification. Therefore, we believe that EPA is significantly underestimating the number of facilities that would be impacted by the rule as well as the amount of personnel to conduct fugitive monitoring.

Response: We disagree with the commenter. We have not considered the cyclic nature of the oil and natural gas industry. The wells used for calculating the impacts of the final rule were derived from the HPDI database. The HPDI database includes the most recent completion date for all wells in the US database. There are 20,000 wellsites with wells initially fractured in 2012 that are wells fractured (or completed) in 2012. From this number of wells, the EPA subtracted those that assumed to be covered by state leak regulations as of the effective date of the revised NSPS. Based on research, four states have recently enacted leak emission regulations: Colorado, Ohio, Wyoming and Utah. Projections from the National Energy Modeling System (NEMS) Oil and Gas Supply Model used to estimate the total number of new natural gas completions, both conventional and hydraulically fractured in the years 2020 and 2025.

Commenter Name: Kari Cutting
Commenter Affiliation: North Dakota Petroleum Council (NDPC)
Document Control Number: EPA-HQ-OAR-2010-0505-6789
Comment Excerpt Number: 15

Comment: Second, the proposed fugitive emissions rule requires the engagement of consultants as well as procurement, and it is impossible to coordinate both for numerous sources across (and possibly within) states. Third, supply issues associated with both qualified consultants and equipment or inventory would inhibit compliance with the Proposed NSPS OOOOa. The NDPC requests that EPA allow for a long-term phased implementation of the Proposed OOOOa NSPS fugitive emissions requirements. NDPC anticipates that the time required to adequately, consider logistics to develop the processes required to have an adequate fugitive emissions program for all assets in North Dakota will take up to five years.

Response: See response to DCN EPA-HQ-OAR-2010-0505-6793, Excerpt 1

Commenter Name: Urban Obie O'Brien
Commenter Affiliation: Apache Corporation
Document Control Number: EPA-HQ-OAR-2010-0505-6808
Comment Excerpt Number: 11

Comment: §60.5397a Fugitive Emissions: This section adds VOC fugitive emissions from well sites producing an average production rate of less than 15 BOE/day during the first 30 days of production.

Rule Application: Existing regulatory protocol does not consider geographic and logistical constraints of the gas exploration and production industry. Thus proposed LDAR program is only suitable in a stationary facility setting where components are in one location. In the case of Apaches upstream operations and using the definition of "facility", LDAR activities would impact 17,300 production wells associated with 4 production facilities located across 3,200 square miles in the Permian Basin. Outside definition of "an affected facility", the number of facilities subject to monitoring would more than triple to 16,204.

Implementation of a full LDAR program for affected wells so must consider the cost and local availability of additional service providers and whether feasibly monitor all the required components according the proposed rule. In addition, Apaches cost of air travel to applicable regions, car travel mileage to locations, wells and lodging costs (as monitoring staff will most likely not be local) are significant additional to the costs associated with LDAR in a centralized facility. These complex logistical issues teamed with the program to monitor all well sites, compounds focusing on the highest potential emitting components to an inefficient program that does not efficiently reduce emissions.

Response: The EPA disagrees with the commenter that focusing on the emitting components represents BSER for purposes of developing a stringent National New Source Performance Standard. In order to achieve the goal of reducing fugitive emissions of methane and VOC, the EPA is finalizing monitoring and repair of well sites. Monitoring of

the components must be conducted using optical gas imaging (OGI) and repairs must be made if any visible emissions are observed in accordance with the duty provisions specified within the final rule. Method 21 is used as an alternative at a repair threshold level at 500 parts per million (ppm). Please see the preamble to the final rule for more information.

Concerning travel costs for locations, the EPA took into consideration. See Chapter 4 of the TSD for the final rule.

Commenter Name: Howard J Feldman
Commenter Affiliation: American Petroleum Institute
Document Control Number: EPA-HQ-OAR-2010-0505-6884
Comment Excerpt Number: 117

Comment: EPA Did Not Account For The Limited Availability Of Trained Personnel And Equipment To Complete Monitoring

In the Preamble, EPA indicated that it is proposing monitoring on an annual basis at the same time it solicit comment and supporting information on the availability of trained OGI contractors and OGI instruments to help evaluate whether and how operators would have difficulty acquiring the equipment and personnel to perform semi-annual monitoring and, if so, whether an annual monitoring would alleviate such prob

Many third party LDAR companies that perform regular or LDAR in downstream portions of the petrochemical industry. However, most API companies that have implemented voluntary LDAR programs have performed their work internally with their own personnel. These companies took considerable time in their initial and required in many cases more than a year to have program fully operational.

Based on discussions with both OGI Instrument manufacturers, there is likely to an initial delay in providing instruments and training demand once OOOOa is promulgated. EPA should provide initial compliance period of one year after publication of the final rule in the Federal Register to allow LDAR detection equipment manufacturers and training organizations to meet the demand for personnel and training.

As well, a backlog of structures between the proposal and 60 days after the promulgation date will exist that will take time to develop any required monitoring plans in the final rule, in addition to needing time to implement monitoring program which includes procurement of equipment, and training based above.

API requests a one-year plus 60 days phase-in period from the compliance with the LDAR requirements as EPA provided under § 60.5370 for compliance date to the later of October 15, 2012, and on detection facilities under § 60.5360 relative to August 23, 2011. Response to Comments 60, EPA indicated that the

one- year phase- in was necessary to provide time for operators to establish the need for control devices, procure all devices. For similar reasons, a one- year phase in should be provided for the LDAR requirements to allow operators to install monitoring devices, conduct training, and establish protocols.

Response: See response to DCN EPA- HQ- OAR- 2 0 1 0 - 0 5 0 5 - 6 7 9 3 , Excerpt 1

Commenter Name: Kathleen M Sgamma, Vice President, Government and Public Affairs
Commenter Affiliation: Western Energy Alliance
Document Control Number: EPA- HQ- OAR- 2 0 1 0 - 0 5 0 5 - 6 9 3 0
Comment Excerpt Number: 3 2

Comment: Proposed 4 0 C. F. R. § 6 0 . 5 3 7 a (a) requires compliance within 6 0 days after publication of the final rule in the Federal Register. This is not feasible, realistic, or reasonable. One of the most difficult aspects of implementing a new LDAR program is the time required to set it up. This includes system tracking (databases), hiring and allocating personnel, and conducting training. Sixty days is not even close to sufficient time for operators to perform these tasks for hundreds, thousands of facilities. In addition, experienced LDAR personnel in Colorado, there may not be sufficient, hire or trained LDAR personnel available to implement programs in certain areas. There will be numerous operators (contractors) that will have to invest in new monitoring equipment. Lead time alone for ordering equipment, such as OGI, is, itself, approximately 6 0 days. Once a rule is finalized, this will likely increase the lead time based on increased demand for instrumentation by operators. Where Colorado finalized its LDAR requirements in Region 7, CDPHE allowed nearly 8 0 operators to begin LDAR monitoring using Approved Instrument Monitoring Method (AIMM). With the storage vessel requirements under original NSPS OOOO, the Administrator's revisions to the rule include reasonably sufficient implementation time. We suggest 9 0 to 1 2 0 months as a reasonable implementation timeframe.

Response: See response to DCN EPA- HQ- OAR- 2 0 1 0 - 0 5 0 5 - 6 7 9 3 , Excerpt 1

Commenter Name: Anonymous public comment
Commenter Affiliation: Citizen
Document Control Number: EPA- HQ- OAR- 2 0 1 0 - 0 5 0 5 - 6 8 6 3
Comment Excerpt Number: 1

Comment: I am writing to respond to concerns about the availability of OGI contractors as well as the effectiveness of OGI verses Method 2 1 .

First, I would like to the responsible to bid for this service and experienced operators. I am partners in a company with operators that each have 1 0 0 hours of operating the camera. Their experience is in a range of areas to include Well Inspections, refinery

CHAPTER 5 PNEUMATIC PUMPS

This chapter addresses the EPA's responses to public comments on pneumatic pumps in the EPA's Proposed *Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources.*

Commenters also raised issues on topics that are not covered in this chapter. Please refer to the following chapters for responses specific to those issues:

- **Chapter 1**: Source Category
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- **Chapter 7**: Compressors
- **Chapter 8**: Equipment Leaks at Natural Gas Processing Plants
- **Chapter 9**: Liquids Unloading
- **Chapter 10**: Storage Vessels
- **Chapter 11**: Compliance
- **Chapter 12**: Regulatory Impact Analysis
- **Chapter 13**: Existing State, Local, and Federal Rules
- **Chapter 14**: Subpart OOOO
- **Chapter 15**: Miscellaneous
- **Chapter 16**: Comment Period Extension

TABLE OF CONTENTS

5.1 Support for Proposed Requirements . . . . . .
5.2 Opposition to Proposed Requirements . . . . . .
5.3 Best System of Emission Reduction. . . . . .
5.4 Applicability Threshold for Small Pumps 5
5.5 Removal of Existing Control Device . . . . . .
5.6 Permitting Implications for Existing Control Devices . . . . . .
5.7 Availability of Electrical Power at Facilities Throughout Source Category . . . . . .
5.8 Glycol Pumps . . . . . .
5.9 Other Comments Regarding Pneumatic Pumps . . . . . .5.-.5.0. . . . .

5.1 Support for Proposed Requirements

Commenter Name: Michael J. Meyers, et al., Assistant Attorneys General
Commenter Affiliation: Attorneys Generals of New York, Massachusetts, Oregon, Rho Island, and Vermont (States)
Document Control Number: EPA-HQ-OAR-2010-0505-6940
Comment Excerpt Number: 6

Comment: The Proposed Standards for Compressors and Pneumatic Devices Technically Achievable and Cost Effective. Proposed Rule demonstrates methane can be significantly and cost-effectively reduced by installing emission reduction devices on centrifugal compressors. Emissions may be cost-effectively controlled by installation of a capture and combustion device. Emissions from reciprocating compressor emissions may be controlled by replacement of rod packing systems. 80 Fed. Reg. at 56,619. Emissions from pneumatic controllers can be significantly reduced by replacing high-bleed controllers with zero-bleed or low-bleed controllers. Methane emissions from pneumatic pumps can be curtailed by replacing the pumps at natural gas processing plants with instrument air or electric pumps. Emissions from pumps in the production, transmission, and storage segments to a stationary control device or a process. Id. at 56,623-27. These findings are consistent with prior EPA determinations with respect to these equipment and in other studies. e.g., S. Compressors White Paper; Pneumatic Devices White Paper at 56-57; Prod. U.S. Agency, Reducing Emissions from Compressor Rod Packing Systems 1 (2006) (indicating payback periods for compressor maintenance activities reduce methane emissions); NRDC Clearing the Air Report at 6 (replacing existing high-bleed pneumatic devices with low-bleed throughout natural gas system identified as a three strategies cost-effectively cut methane emissions by thirty percent); Natural Res. Def. Council, The Oil and Gas Industry Can Reduce Pollution, Conserve Resources, and Prevent Wasting Methane Waste 1 (2012) [hereinafter NRDC Report] (finding improved maintenance of reciprocating compressors and replacement of high-bleed controllers with low-

5.3 Best System of Emission Reduction

Commenter Name: Howard J Feldman
Commenter Affiliation: American Petroleum Institute
Document Control Number: EPA-HQ-OAR-2010-0505-6884
Comment Excerpt Number: 11

Comment: Issue ... EPA has ignored critical technical and safety issues in assuming pneumatic pumps can be readily connected to existing closed vent systems. There are numerous potential safety and operational issues with changing the connection from a pneumatic pump to an existing control device and closed vent system. These can impact both the performance of the pump and result in back pressure on the control devices be

Recommendation ... EPA should also provide an exemption from the control requirements to pump emissions where it has been determined to be technically infeasible or potentially unsafe.

EPA Did Not Consider Or Provide For Instances Where Routing A Pneumatic Pump Affected Source To An Existing Control Device Is Not Technically Feasible...

Whether considering a VRU, flare, closed combustion device, or other control technique, control devices are designed for a specific set of conditions based on key assumptions. For example, a flare header might be designed to allow enough pressure to open safety valves (PSV) to operate properly without creating back pressure as to take either PSV out of critical design. Flow is sensitive to streams in the pipe and putting a pump exhaust into that header could create pressure for the safety devices to function as intended. Conversely, but equally important, if a pneumatic pump is chosen for a specific backpressure, the pressure imposed by the PSV could stop the pump from functioning at a critical moment, creating the already unsafe situation that resulted in the opening of the PSVs.

Additionally, enclosed combustion devices are designed for a BTU load and may not be able to accommodate the exhaust gas from a pneumatic pump without replacing the control device.

The design process for VRUs is more sensitive to changes than other control devices. The VRU equipment is designed to recover vapors and must be sized enough to be useful, is expensive, and has a limited range of possible flow rates. Adding vapor loads to a VRU must be carefully evaluated on a case-by-case basis.

In some instances an existing control device owned or operated by a third party, such as a control device owned and operated by a gathering and collecting system operator with a glycol dehydration unit on a remote site, the site operator does not have the right to route a pneumatic pump affected exhaust to the control device.

EPA should provide exclusion in the rule such that routing an affected source to an existing control device or closed vent system is not required if it is not technically feasible

if the control device is not owned and operated by the proposed site-specific rule language is included in 24.4.1.

If needed, EPA could provide provisions in other rule makers for an engineering determination that an existing device cannot technically handle the additional gas from a pneumatic pump affected source exhaust, documentation of this determination available for review by EPA or other competent authority.

Response: The EPA agrees that instances are where it may be technically infeasible to connect a pump to an existing control device and our rule does provide the affirmative exemption in certain circumstances where it is technically infeasible to pump to an existing control device or process. See section VI.D.3 of the preamble for more detail regarding this issue.

Commenter Name: James Martin
Commenter Affiliation: Noble Energy
Document Control Number: EPA-HQ-OAR-2010-0505-6852
Comment Excerpt Number: 11

Comment: EPA proposed that if a new pneumatic pump is installed at an existing well site where a control device is present, the operator would be required to route that pneumatic pump into the control device. While Noble appreciates that EPA is doing some modest reduction in emissions, Noble believes there are numerous operational reasons why doing so would be infeasible or unsafe or both.

Typically, a methanol pump, for example, would be located at the wellhead, while a control device could be located some distance away, or at a gas gathering tanks nearer to such situations, the pump would be required to push gas a substantial distance and would have to overcome tubing line (back) pressure that would be a significant challenge. In addition to mechanical challenges, since the pump generally will not be designed to overcome such pressures. If the tubing line between a pump and a control device may be required for safety reasons- that tubing have a propensity to freeze and make the entire system inoperable.

While EPA's proposal may be much more easily accommodated at sites, Noble has significant reservations that it will be feasible to pump to a safe control device at many existing locations without entirely replumbing the system, necessarily, operators necessarily will make a calculation of whether the spirit of the rule as the added cost that would be entailed by that replumbing; experience has shown that Noble such a requirement would leads to the abandonment of a significant number of Noble wells. Noble therefore recommends that EPA reconsider the merits of requiring pumps to be tied into a control device at any well sites, given the feasibility and safety concerns. Alternatively, EPA could make this provision apply only to new well sites, so as to avoid the retrofitting of pumps at existing sources.

Attachment 22

Declaration of Lois Bower-Bjornson, Sierra Club and Earthworks Member

DECLARATION OF LOIS BOWER-BJORNSON

I, Lois Bower-Bjornson, declare as follows:

1. My name is Lois Bower-Bjornson, and I am of legal age and competent to give this declaration. All information herein is based on my personal knowledge unless otherwise indicated.

2. I live in Scenery Hill, Washington County, Pennsylvania. I have lived at the same address in Scenery Hill for the last thirteen years.

3. I am a dues-paying member of the Sierra Club. I joined the Club in February 2016 because I support the organization's environmental goals on justice issues and its work towards a cleaner environment and healthier community.

4. I am also a dues-paying member of Earthworks. I joined Earthworks in 2004 because they were the first to talk to me about the oil and gas threat. My colleague Nadia from Clean Air Council and Moms Clean Air Force also works for Earthworks, and helped introduce me.

5. I am currently self-employed, a performing arts and house cleaning business. I contract sometimes for Clean Air Counsel.

6. My residence sits on twelve and a half acres of rural land, and my young children are very active outside. They ride their bicycles, play in the woods, and shoot BB guns in the aggressive open expanse

shale gas fracking within our community in the last decade, m
have begun to have nose bleeds and full-body rashes. My husb
moved to this property because we wanted to give our very act
children more space to play outdoors and engage with nature.
frequent Action Ozone Days throughout the winter and summer, we
hesitant to send them outdoors. Because of these high pollution
monitor their activity on Ozone Days so that they are not exc
exposed to such pollution.

7. We live in close proximity to natural gas wells that have b
fracked since September 18, 2015. In the time we have lived tha
sites have been drilled within 5 miles of our house with the clos
about 2,000 feet of each other which include a total of 21 wells. individ
Three of these four sites include wells that are already producing
natural gas—15 in total. The Pennsylvania Department of
Environmental Protection's website shows that in the first three
2017 alone, these wells produced over 13 billion of natural gas.

8. I understand that in Washington County, there are over 18
wells that have been drilled since September 2015, about 200 of
these wells are already producing oil or natural gas that I also

another five wells in Washington County were completed after Se
18, 2015, all of which are now producing oil or gas.

9. I understand that in the oil and natural hagasfulsecator, numerc
pollutants, including methane, volatile organic compounds (VOCs)
hazardous air pollutants (HAPs), are oftemtenquantities signifi
from leaking equipment parts at wells sites iands. compressor stat

10. I understand that the Unitedlonstental Protec Agency (EPA)
recently finalized methane emission standards for and, modified
reconstructed sources in the oil and gas indlstryinclude These stand
requirements that owners and operators of newmpwellsorsites and c
stations conduct regular nsinspectthese facilidieandtorepfaim
leaking equipment, signifiedcutiyg the methane, VHAP and
emissions that would otherwise occur. These lreapairdetection and
requirements will be a mafjtortobeme and my familhey wihce
help reduce not only climate- disrupting greenhousethgaskinds but
of conventional air pollutants that exist in excessive quantiti
live.

11. I understand that both methane and VOCs nleadf tozonthe formati
the primary component of smog. I understand tullat tozonthe is har
human respiratory system and can lead to shortness of breath,

attacks, cardiovascular disease, stroke and premature death. I am concerned about the impact of ozone on my health and that of others, which also reduces my quality of life. I am worried about the levels of ozone in Washington County, which are above the legal limit that EPA has established in order to protect our health.

12. In addition to ozone, that under VOCs lead to the formation of fine particulate matter, another pollutant that causes the same health problems as ozone. I understand that children are especially susceptible to the negative impacts caused by ozone and particulate matter, and as a parent of four, this concerns me.

13. I am aware that many Pennsylvania counties other than Washington County have unlawfully high atmospheric levels of ozone, fine particulate matter, or both, and I am worried that the ongoing oil and gas development and in Pennsylvania more generally will make it difficult and more reduce the amount of pollution in the air to safe levels.

14. I also am aware that oil and gas development results in significant emissions of HAP emissions, including such as formaldehyde, benzene. I know that these toxins can lead to cancer and other serious health problems, which is yet another reason I am worried about oil and gas in and around our community, county, and state.

15. I understand that methane is a powerful greenhouse gas that change when released into the atmosphere. I am deeply worried about the impacts of climate change, which I know will continue to get worse if we don't reduce greenhouse gas emissions. I understand that climate change will influence extreme weather events such as storms, increased precipitation, flooding, and droughts, extreme heat waves, crop failures, increase in insects, pathogens and pests, and many other problems.

16. I am worried that anthropogenic climate change will influence continue extreme and unusual weather, such as ninety mile gusts of hurricane wind and blizzards. Throughout the 13 years that I have resided in Southwestern Pennsylvania, the weather has shifted to more extreme events. There has been an uptick in harsh winters, making it not unlike those found as Chicago. Our winters have varied from very extreme cold, including blizzards, cold with harsh winds and more precipitation than what was previously considered normal, to very mild winters with little or no precipitation. I am concerned that my children and grandchildren will be unable to enjoy the outdoors and enjoy a lower quality of life from the phenomena stemming from climate change.

17. I understand that operators are required to comply with LDAR detection and repair requirements for new well sites and compressor stations

by June 3, 2017. unbeknown and that EPA announced it would delay the compliance deadline for the program by 90 days to reconsider portions of it. This delay will postpone much-needed reduction benefits that the leak detection and repair program will exposing me and my family to pollution that we otherwise would have been exposed to and causing us harm. This delay is especially because it means that oil and gas operators will not have to repair equipment leaks this upcoming summer, when ozone pollution is most severe.

18. I am aware that Sierra Club and Earthworks are challenging a lawsuit EPA's reconsideration of and its 90-day delay of the leak detection and repair requirements. If Sierra Club and Earthworks succeed in their lawsuit, my family and I will benefit, because the operators in our community and state will be required to identify and repair leaks equipment as early as June, some not later date after additional pollution have already passed. I therefore strongly support Sierra Club and Earthworks in bringing this lawsuit and any similar ones that filed to ensure that EPA fully implements and enforces the leak and repair program on June 3 of this year, without any delay.

19. I also understand that EPA is reconsidering and delaying two other requirements for oil and gas operators: the emission standards for pneumatic pumps at well sites, and the requirement that operators receive certification from a professional engineer for closed-vent systems. I understand that delaying these requirements will postpone their emission reduction benefits even further. This delay will therefore harm me and my family. I support Sierra Club's lawsuit challenging the delay of these requirements, and my family and I will benefit if Sierra Club's lawsuit is successful.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed in Scenery Hill, PA, on June 2, 2017.

Lois Bower-Bjornson

Attachment 23

Declaration of Huda Fashho, Sierra Club

DECLARATION OF HUDA FASHHO

I, Huda Fashho, declare as follows:

1. I am the Manager of Member Services at the Sierra Club. I have worked for the Sierra Club for six years and have been the Manager of Member Services for six years.

2. In my role, I manage all aspects of the Sierra Club's customer service functions related to members, including maintaining an accurate list of members and managing the organization's member database.

3. The Sierra Club is a non-profit membership organization incorporated under the laws of the State of California, with its principal place of business in Oakland, CA.

4. The Sierra Club was founded in 1892, and is the nation's oldest grassroots environmental organization.

5. The Sierra Club's mission is to explore, enjoy and protect the wild places of the Earth; to practice and promote the responsible use of the Earth's resources and ecosystems; to educate and enlist humanity to protect and restore the quality of the natural and human environment; and to use all lawful means to carry out these objectives.

5. Sierra Club's Dirty Fuels Program, which is part of the Club's Our Wild America Campaign, is a coordinated effort to use grassroots organizing, legal

advocacy, and political strategies to reduce and prevent the extraction of oil and natural gas from our country's wild places and to protect our physical, geological, and biological heritage—as well as our communities—from these harmful fossil fuels.

6. Sierra Club has undertaken numerous efforts to combat pollution stemming from natural gas and oil production across the United States. For example, the Sierra Club has actively participated in federal methane and VOC pollution rulemaking processes, providing extensive comments on the United States Environmental Protection Agency's methane and VOC pollution rule at issue in this litigation. Our members are also very concerned by the adverse impacts to human health and the environment from harmful air pollution, including pollution from oil and natural gas extraction and production.

7. When an individual becomes a member of the Sierra Club, his or her current residential address is recorded in the Sierra Club's membership database. This database is regularly updated each business day to add new members, reflect address changes, and change membership status for those who are no longer active members.

8. According to data updated in April 2017, The Sierra Club currently has approximately 775,000 members in the United States. These include members living in states that have significant oil and gas production activities. For example,

the Sierra Club currently has 30,892 members in Pennsylvania, 26,735 members in Texas, 8,913 members in New Mexico, 5,229 members in Utah, 3,867 members in Oklahoma, 3,201 members in Louisiana, and 681 members in North Dakota. These members have a strong interest in protecting human health and the environment from air pollution from oil and natural gas sites, which are at stake in this EPA litigation.

9. I understand that Sierra Club is participating in this litigation in order to ensure that EPA's emission standards for the oil and gas industry (including its leak detection and repair requirements) are not delayed. Sierra Club has many members who live in states with new oil and gas wells that lack any state-level leak detection and repair requirements. For example, 18,793 Sierra Club members who live in such states reside in counties where there are one or more new or modified wells and where ozone levels are above EPA's ambient air quality standards for 2008 and/or 2015. And 137 Sierra Club members who live in such states reside in counties where there are 300 or more new or modified wells.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Executed on June 1, 2017.

Huda Fashho

Attachment 24

Declaration of John Stith, Environmental Defense Fund

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

DECLARATION OF JOHN STITH
Submitted In Support of Environmental Defense Fund

I, John Stith, declare as follows:

1. I am Director of Database Marketing and Analytics at the Environmental Defense Fund (EDF). I have had this position for more than ten years.

2. My duties include maintaining an accurate list of members. My colleagues and I provide information to members, acknowledge gifts and volunteer actions, and manage the organization's member databases. My work requires me to be familiar with EDF's purposes, staffing, activities, and membership.

3. EDF is a membership organization incorporated under the laws of the State of New York. It is recognized as a not-for-profit corporation under section 501(c)(3) of the United States Internal Revenue Code.

4. EDF relies on science, economics and law to protect and restore the quality of our air, water and other natural resources. EDF employs more than 150 scientists, economists, engineers, business school graduates and lawyers to help solve environmental problems in a scientifically sound and cost-effective way.

5. It is my understanding that EPA's 2016 New Source Performance Standards for the oil and natural gas sector are crucial in limiting emissions of

volatile organic compounds (VOCs) and methane, a potent greenhouse gas. As a co-benefit, the standards will also limit hazardous air pollutants, including benzene, a known human carcinogen. I understand that EPA has issued a stay of certain provisions of the standards that would require oil and gas operators to monitor and fix leaks at their facilities, to route emissions from pneumatic pumps to a control device at well sites, and to have a professional engineer certify compliance with emission standards for other equipment.

6. EDF has a strong organizational interest, and a strong interest that is based in its members' recreational, aesthetic, professional, educational, public health, environmental, and economic interests, in reducing harmful air pollution from the oil and gas sector, including sources addressed by EPA's new source performance standards.

7. Through its programs aimed at protecting human health, EDF has long pursued initiatives at the state and national levels designed to reduce emissions of health-harming and climate-altering air pollutants from all major sources, including facilities in the oil and gas sector. This work has addressed emissions of methane, as well as VOCs and other harmful pollutants.

8. When an individual becomes a member of EDF, his or her current residential address is recorded in our membership database. The database entry reflecting the member's residential address is verified or updated as needed. The

database is maintained in the regular course of business and each entry reflecting a member's residential address and membership status is promptly updated to reflect changes. I obtained the information about our membership discussed below from our membership database.

9. EDF currently has over 410,000 members in the United States, and we have members in all 50 states and the District of Columbia. These members likewise have a strong interest in protecting human health and the environment from air pollution. Many live in and near areas affected by air pollution. For instance, EDF currently has over 68,000 members in the 13 states that represent over 95% of natural gas production in the United States: Alaska, Arkansas, Colorado, Louisiana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, Utah, West Virginia, and Wyoming. And EDF has 451 members in the thirteen counties with more than 300 wells subject to the standards, as identified in a separate analysis supporting a declaration submitted by Dr. David Lyon.

10. I understand that recent studies have shown harmful impacts on human health for individuals who live, work or recreate in close proximity to active oil and gas facilities, which emit hazardous air pollutants such as benzene.

11. I worked with graphic information systems (GIS) specialists at EDF to compare the geographic coordinates of members' addresses to those of affected wells using EDF membership data; well location data from the data analytics

company, Drillinginfo; and ESRI ArcGIS software. EDF's GIS specialists determined that EDF has 22 members who live within a quarter of a mile of a well that is covered by the standards, 411 members who are within a mile of one of these wells, and 18,596 members who are within 10 miles.

12. It is my understanding that only a handful of states currently have regulations that require oil and gas operators to conduct leak detection and repair: California, Colorado, Ohio, Pennsylvania, Utah, and Wyoming. In states that do not require leak detection and repair, EDF has 14 members who live within a quarter of a mile from a well subject to these standards, 215 members who live within one mile from one of these wells, and 9,594 members who live within 10 miles from one of these wells.

13. I also understand that VOC emissions from oil and gas facilities contribute to ozone formation, which causes and aggravates respiratory diseases such as asthma. EDF has 33,253 members who live in counties that have oil and gas development and are designated nonattainment for the 2008 national ambient air quality standards for ozone. These members, who live in areas already overburdened by unhealthy smog pollution, are particularly vulnerable to the ill effects of oil and gas pollution.

14. If the agency's decision is not stayed, EDF's members will be harmed both by continued emissions of health-harming air pollutants from the oil and gas

sector, as well as by the detrimental effects of climate change that this rule helps to address.

I declare that the foregoing is true and correct.

John Stith

Dated: June 2, 2017

Attachment 25

Declaration of Francis Don Schreiber, Environmental Defense Fund Member

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

DECLARATION OF FRANCIS DON SCHREIBER
Submitted In Support of Environmental Defense Fund

I, Francis Don Schreiber, declare as follows:

1. I am currently a member of the Environmental Defense Fu
("EDF"). I am a rancher and landowner in o.Gobernaldor,wife,New Me
Jane, and I own the Devil's Spring Ranch ("d Ranch's") in onRio480
Arriba County, and have a permit to graze cattlefor sheep and hor
approximately 3,000 additional acres of landd adjacent to the Ra

2. My ranch is located in the San Juan Basin in northweste
Mexico, at times one of the most active areasoilinandthegascountry fo
production. The Ranch is subject to a splitfacestrightsown mythe s
land, and the mineral rights are owned by tthe fedEreale governmen
currently 122 oil and gas wells on and itmediRanedly. adjaWent to
graze our own horses on the Ranch, and I cfurrentlgrazieasse some o
rights to other ranchers, who run cattle on the land.

3. Because there are oil and gas operations rony, and near m
closely follow regulatory ohtvelopncerning federad gas regulations,
including through communications that I receivevefrandvoEDFed for ha
the adoption of measures that would limit emissgons devohopoeht.an

4. I am aware that EPA finalized new source performance sta
new, reconstructed, and modified oil and natural gas sources ("new
source performance standards"). These standards ensure emissions reduction
from oil and gas production through equipment and performance
new and modified sources, including periodic monitoring and pro
equipment leaks and gas capture and control. The agency stayed that
stayed the compliance deadlines for requirements in performance sou
standards, including the requirement that operators monitor and repair
equipment leaks, the requirement that pneumatic pumps route well s
emissions to a control device, and the provision allowing that
emission standards for numerous other equipment be professionally
engineer.

5. Jane and I bought our land in 1999, with the goal
model for sustainable agriculture with cattle ranching and passing on the
children and grandchildren. At that time there were operating or 75 w
construction on the land. We have since curtailed our ranching
instead on mitigating the environmental impacts that have come
land.

6. I am aware that oil and natural gas facilities emit sig
of harmful air pollution, both through designed and unintended leaks and un

leaking equipment. I understand that these methane pollutants volatile include organic compounds ("VOCs"), carcinogenic air toxics such as benzene, toluene, and other harmful air pollutants. I understand that methane is a potent greenhouse gas, capable of warming the over a 20-year period at 86 times the rate of carbon dioxide over a 20-year period. I understand that VOCs also contribute to the formation of ground-level ozone, or smog, which harms health, and exacerbating existing respiratory and cardiovascular conditions causing respiratory disease and premature death. I understand that the best practices that reduce methane and VOC emissions also help mitigate other harmful pollutants.

7. I have personally experienced air emissions associated with flaring, and leaking wells and other facilities. When I ride, hike, walk, or drive around the Ranch, I can often see vapors escaping from leaks distorting the air and creating shadows on the green ground. I have numerous times when Forward Looking Infrared ("FLIR") identified emissions leaking and venting from wells on the Ranch. I spook horses under me when they were startled by the roar of flaring, venting, well s which sounds like a jet engine.

8. Most noticeable is the near-constant smell, which leaking can be extremely strong when we are driving, g around, and walkin

with oil and gas development on our property and in the vicinity. These odors make breathing uncomfortable and often cause us to leave as quickly as possible, as I am concerned that many of the hydrocarbons being such as benzene, toluene, ethylbenzene, and xylene (these toxic components of natural gas are sometimes referred to as BTEX) put the aggregate effect of oil and gas operations in our region on these toxics in the ambient air we breathe.

9. VOC emissions from oil and gas operations in the San Juan, including facilities covered by the new source performance standards, contribute to elevated ozone levels in the Four Corners region, including in northwestern New Mexico. While the Four Corners is a sparsely populated region, we have roughly the same ozone levels as San Francisco. In 2016 ozone season, Rio Arriba County experienced 58 days of low flag ozone according to EPA's AirNow database, meaning the air quality poses health concern for some individuals who are particularly sensitive to ozone levels. I am aware that people with cardiovascular diseases are at risk from breathing ozone. In 2014, I underwent open heart surgery for congestive heart failure, and have post-operative residual congestive heart failure. I am concerned about the impact of the air quality on my own heart condition. levels w

in my county will cause respiratory or cardiovascular problems in my family.

10. Jane and I have five grown children and eight grandchildren. Although we had hoped the Ranch would be a place where we would share grandkids, the oil and gas operations in our area enjoy it to our vital to them. We worry about their exposure to air pollutants from oil development in the region, and always are careful to keep them and above-ground pipeline equipment. Protecting our grandchildren from negative health effects of oil and gas emissions is a constant concern when they come to visit us.

11. The impacts of climate change caused by greenhouse gases like methane are evident on the Ranch. Weeds flourish in the hotter and warmer inhibit the growth of essential native grasses. Climate Change weather patterns, including drought, increased wind storms, severe and increased erosion, have required a shift in the timing of ranch operations should be bred. Other conventional wisdom that has been informed pr generations is no longer applicable. For example, when I began first 1999, my neighbor, whose family has been ranching early Rio Arri century, taught me that on September 28th of each year I would checking for ice on our cows' water sources then wake the morning after O

would freeze deeply and the cows would not be able to drink. H
passed down for decades, has become obsolete—in recent years, w
to break ice until much later in the season. We did not have winter,
worry about breaking ice until December.

12. The new source performance standards apply to wells newly
modified after September 2015, including wells located within five new
approximately 10 miles from the Ranch. During my activities, I regularly and
often in even closer proximity to these sources. The new standards require
conduct leak detection and repair (LDAR) beginning on June 3rd.
requirement is stayed, I am concerned that these wells will continue
pollution that is harmful to me, my community, the standards will
also cover any wells drilled or modified in the future. I understand the R
that the Mancos Shale formation, containing additional natural gas and
present under our ranch and the surrounding possibility of hydraulic
development is of great concern to me and my family.

13. I anticipate that EPA's new source performance standards
harmful air pollution near my home and in the Bayfield area where I live, my fa
work, and recreate: there are over 100 new gas and oil wells drilled in Rio Arriba
Arriba and neighboring San Juan County currently subject to LDAR to the
standards, and more than 1,500 active oil and gas wells in these counties

New Mexico. These wells represent one of the most in the any state country, which is particularly concerning given that New Mexico lacks level LDAR standards. Protective emission standards for new oil and gas facilities will help reduce harmful pollution throughout my and the surrounding San Juan Basin region, where I live, work and recreate. This area is currently disproportionately impacted by pollution from methane, VOCs, air toxics and other airborne contaminants

14. I am concerned that the stay of compliance deadlines for will result in new and modified sources in the region emitting high levels of harmful pollution. And I am concerned that the stay of enforcement from oil and gas operations near my home will continue to threaten my health and well-being and that of my family.

I declare that the foregoing is true and correct.

Francis Don Schreiber

Dated June 3, 2017

Attachment 26

Declaration of Hugh Fitzsimons, Environmental Defense Fund Member

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

DECLARATION OF HUGH FITZSIMONS
Submitted In Support of Environmental Defense Fund

I, Hugh Fitzsimons, declare as follows:

1. I am currently a member of Environmental Defense Fund (E
rancher and landowner near San Antonio, Texas. I also own and operate a
and a honey bee farm on the 13,000 acres of land in Dimmit C
has owned and lived on for generations.

2. My property is located in the Eagle Ford Shale, one of
areas in the country for oil and gas production. My property is ripe for
energy development, including for an oil and gas bearing land
with oil tanks, water tanks, compressors, natural gas transfer points, treaters,
and flares. Just outside my property, oil and gas production i
producing wells and active rigs in the region. Drilling near new well
Dimmit County, there are over 300 wells subject to EPA's new s
standards for the oil and gas sector. Indeed, company, energy analy
Drillinginfo, reports over 30,000 active Eagle Ford gas and oil wells in
Texas Railroad Commission lists over 1,100 ued drilling permits iss
Between November 2016 and May 2017, Commission 2017 data likewise
approved wells in Dimmit County alone, half of which drilled not y

3. I am aware that oil and natural gas facilities emit significant amounts of harmful air pollution, both through intentional releases and equipment leaks. I understand that these pollutants include methane, such as VOCs, benzene, and other harmful air pollutants. I understand that methane is a greenhouse gas, capable of warming the climate at a rate that is 84 times that of carbon dioxide over a 20-year period. I am aware that reducing methane emissions and VOCs also help mitigate other harmful air pollutants.

4. I understand that VOCs contribute to the formation of ground-level ozone, or smog, which is hazardous to human health. I am aware that recent scientific studies show ozone contributes to a broad range of harmful respiratory and cardiovascular effects in humans, including asthma attacks. I also understand that exposure to hazardous air pollutants, such as benzene, toluene, ethylbenzene, and xylenes, emitted from oil and natural gas operations is particularly harmful for sensitive populations such as pregnant women and children. I am aware that recent studies demonstrate that living near oil and gas operations is associated with high-risk pregnancy, preterm birth, birth defects, low birth weight babies, who are at increased risk of death, and developmental disabilities.

5. I have personal experience with the negative health impacts of pollutants contained in oil and gas sector emissions. My 17-year-old manager was riding his four-wheeler past one of the wells on my property

and unknowingly passed through a thick plume of harmful visible emissions but that left him blind for over an hour, his tears burning his eyes for more

6. The components of the emissions from one production facility ranch have since been studied by Dr. Susan Stuart at A&M Institute for Texas Renewable Natural Resources. Data collected monthly November March of 2015 detected 73 chemicals released from the facility, including benzene, methane, and VOCs, including acetone, methanol, toluene, and eth

7. As a land and mineral owner, and fourth generation Texan beneficiary as well as a recipient of the negative hydrocarbon consequences I receive royalties from the resources extracted from my land, shed when natural gas is wasted through these emissions the significant economic benefit that oil and gas development have brought to I also experience the harmful effects of these emissions, we and I do know much better job of mitigating these harms.

8. Because there are oil and gas operations on my property, regulatory developments concerning the Clean Air Act and federal regulations, including through communications that EDF remember. as

9. I am aware that EPA finalized emission standards for methane VOCs from new and modified facilities in the oil and natural gas 2015 and I understand that the agency has with compliance deadlines for the standards' requirements that operators conducting periodic

equipment leaks, curb emissions from pneumatic pumps, and verify compliance with emission standards for numerous other equipment by a professional engineer. These standards have already begun to ensure emission reductions from oil and gas wells, compressor stations, gathering and boosting stations, and natural gas processing plants with crucial equipment and performance standards such as gas capture from compressors in the gathering and boosting, processing, transmission and storage segments.

10. The standards have reduced harmful air pollution in and near my the region where my family, my employees, and relatives reside. According to Drillinginfo, almost 1,000 wells were completed in the Eagle Ford last year, and active rigs in the region drill hundreds of new wells every year. Protective emission standards for oil and gas facilities will help reduce harmful pollution throughout the Eagle surrounding region impacted by this dangerous air pollution.

11. I am familiar with Texas' regulatory programs for the oil I am aware that the state does not currently regulate methane emissions from the sector, and does not regulate volatile organic compounds (VOCs) outside of some limited measures for counties in nonattainment ozone areas.

12. Now that EPA has stayed requirements under its standards, I am concerned that new and modified oil and natural gas resources will not conduct leak detection and repair, and that equipment in the oil and

levels of harmful pollution. Indeed, there are wells subject to the 0 0 new source performance standards in Dimmit County alone, and I have identified one well on my property as being subject to the standards.

13. The resulting increase of emissions from these wells threatens my health and well-being and that of my family, and my ranch employees. The prevailing southeasterly winds carry the pollutants from these facilities and through the ranch house where my family and employees spend substantial amounts of time. This is a constant source of concern for me. I am particularly concerned about the health of my daughter, who is pregnant and periodically visits the ranch. Pregnant women and children face heightened risks from exposure to pollution that would otherwise be reduced by the leak detection and repair requirements.

14. My brother and sister own a ranch abutting the southern portion of my property. There are two wells on their ranch and a well pad, which would be conducting leak detection and repair if not for the standards. I am also concerned for their health and the health of their children, who spend time in close proximity to these wells.

15. My pecuniary interests are also harmed by the elimination of the economic and air quality benefits derived from preventing the waste of a salable resource—natural gas. When natural gas is wasted through leaks, production companies do not have to make royalty payments to landowners

myself. The rule's leak detection and repair requirements cont protect my interest in these royalties.

I declare that the foregoing is true and correct.

Hugh Fitzsimons

Dated June 2, 2017

Attachment 27

Declaration of Gina Trujillo, Natural Resources Defense Council

DECLARATION OF GINA TRUJILLO

I, Gina Trujillo, declare as follows:

1. I am the director of Membership at the Natural Resources Defense Council, Inc. ("NRDC"). I have been the director of membership since January 2010, and I have worked at NRDC in the membership department for a more than 23 years.

2. My duties include supervising the preparation of NRDC material that distributes to members and prospective members. Those materials describe NRDC and identify its mission.

3. NRDC is a membership organization incorporated under the laws of the State of New York. It is recognized as a tax-exempt non-profit corporation under 501(c)(3) of the United States Internal Revenue Code.

4. NRDC's mission statement has been: "The Natural Resources Defense Council's purpose is to safeguard the Earth: its air, land, water, and the natural systems on which all life depends." The mission statement states that NRDC works "to restore the quality of the elements that sustain life — air, land, water — and to defend endangered natural places." NRDC's mission includes prevention and mitigation of global warming in order to maintain and improve NRDC's members' use and enjoyment of natural resources, as well as members' own health and safety.

5. Through its Clean Air Program, NRDC pursues federal and state policies to curb air pollution, particularly those pollutants that are causing climate change. NRDC seeks to reduce emissions of methane from the oil and gas sector, which is responsible for over one-third of methane pollution.

6. When an individual becomes a member of NRDC, his or her current residential address is recorded in NRDC's membership database. When a member renews his or her membership or makes a contribution to NRDC, the database entry reflecting the member's residential address is verified or updated.

7. NRDC currently has more than 1,034,000 members. There are NRDC members residing in each of the fifty United States and Columbia, including over 8,000 members in Pennsylvania, Texas, Louisiana, North Dakota, Oklahoma and New Mexico that (a) have experienced development since EPA's proposal of its methane standards for the oil and gas sector on September 18, 2015, and (b) lack leak detection and repair programs for wells. These counties also have high levels of ground-level ozone air pollution as well.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Executed on 5/25/17.

Gina Trujillo

Gina Trujillo

Attachment 28

Declaration of Joseph Luxbacher, Natural Resources Defense Council Member

DECLARATION OF JOSEPH LUXBACHER

I, Joseph Luxbacher, do hereby affirm and state:

1. I am currently a member of the Natural Resources Defense Council (NRDC). I have been a member since 1996.

2. I support NRDC's work to protect public health and the environment from the hazards associated with air pollution from oil and gas development. I am concerned about the air and water pollution caused by oil and gas production and the effects of that pollution on the health of nearby communities.

3. In particular, I understand that the air emissions from gas wells include methane that contributes to climate change, as well as other pollutants that harm the lungs and heart and that can cause cancer. I am concerned about the health effects that these air pollutants emitted by leaking gas wells and infrastructure may have on myself and on people in the local community and the region.

4. I live in southern Allegheny County, approximately ten miles southwest of downtown Pittsburgh. I have lived in my present home since 1994, and in southwest Pennsylvania for most of my life.

5. The Pittsburgh metropolitan area routinely ranks among the most air-polluted cities in the nation. I am concerned that oil and gas

development in the areas around Pittsburgh is contributing to the region's poor air quality.

6. My home is approximately five miles from the Washington County line. It is my understanding that there are numerous recently-drilled gas wells in Washington County. Several of these new wells are located approximately ten miles from my home.

7. It is my understanding that gas wells and associated gas production equipment frequently leak methane and other air pollutants. Further, I understand that the EPA standards coming into full effect on June 3, 2017, require companies that own or operate these wells and equipment to have monitored for leaks by that date and to fix leaks that are detected within 30 days. I am concerned about the potential for exposure to pollutants from unmonitored and unrepaired leaks.

8. Specifically, I am concerned about exposure to pollution from such leaks from newly drilled wells and associated equipment located in areas of Washington County that I frequent in the course of my regular activities. For example, since my retirement as head coach of the University of Pittsburgh men's soccer team, I continue to coach youth soccer and run soccer clinics for the Pennsylvania West Soccer Association. My work involves spending much of my time outdoors at soccer practices and games.

9. Across western Pennsylvania, PA West Soccer has 130 youth clubs and 45,000 youth players. Many of these teams practice and play games in Washington County. My duties as a coach require frequent trips to Washington County for soccer games and clinics. I am concerned about the impacts of air pollution from gas wells in the area on my own health and the health of the children who participate in the soccer league.

10. I am an avid hiker and nature enthusiast. I enjoy spending time outdoors hiking and biking with my wife and children in the areas around Pittsburgh. The surrounding area has numerous trails, converted from old rail beds, that run through forests and farmland, some of which run nearby new gas wells and other equipment. When we choose destinations for hiking or biking we try to stay away from areas with gas wells – both to protect our family's health and to avoid encountering the impacts of gas development on the natural scenery.

11. It is my understanding that the EPA has issued regulations to control emissions of methane and other harmful pollutants emitted from oil and gas sources, that these regulations are scheduled to come into full effect on June 3, 2017, and that these regulations apply to recently-drilled wells, including those in Washington County. I support these regulations

and believe they should be fully implemented to limit air pollution from the oil and gas industry.

12. I understand that the EPA has issued a three-month delay of the requirements to monitor for and repair methane leaks from oil and gas infrastructure, and that NRDC intends to file a lawsuit to challenge that delay. I support this lawsuit, because these requirements would reduce harmful and unnecessary air pollution from leaking wells in my community. If NRDC prevails in the lawsuit, I believe that my health and the health of my family and the children I coach will be better protected, and I would worry less about the quality of the air we are breathing when we engage in the outdoor activities that we love.

13. I fully support NRDC in this action.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge, information, and belief.

Joseph A Luxbacher

Joseph A. Luxbacher, Ph.D.

6/1/2017

Date

Attachment 29

Declaration of Michael C. Harris, Sierra Club Member

DECLARATION OF DR. MICHAEL C. HARRIS

I, Michael C. Harris, declare as follows:

1. My name is Michael C. Harris, and I am over the age of 18 and competent to give this declaration. All information herein is based on my own personal knowledge unless otherwise indicated.

2. My address is 7037 Meandering Creek Lane, Fort Worth, Texas, 76179, which is in Tarrant County. I have lived here for three years. I am self-employed as a consultant. I consult with clients on matters relating to agricultural chemistry.

3. I have been a Sierra Club member for at least 5 years. I joined the Sierra Club because of my concern for the environment. I donate monthly.

4. I live with my wife. In my spare time I enjoy gardening. I have a yard where I tinker around all the time. My wife always finds projects for me.

5. I know that there are oil and gas wells in our area. Within a five mile radius of my house, there are dozens of active gas and oil wells. My wife's sister lives Azle, Texas, also in Tarrant County, and she can see the fracking rigs from her house. Another one of my wife's sisters lives in Arlington, Texas, which is about 20 miles from here. I know that they have gas exploration in Arlington. I understand that oil and gas wells leak harmful pollutants into the atmosphere, including particles that form smog and soot, climate-forcing

methane pollution, and hazardous air pollutants like benzene. This causes me to be concerned for the health of me and my family.

6. The air quality here in the summer can be very poor due to smog (formed mostly from ozone) and haze. I am aware of the health impacts from ozone to human health, especially to those with respiratory diseases, children, and the elderly. I am elderly, so I know that may be particularly susceptible to this pollution, and that worries me. I know that high levels of ozone cause days where outdoor activity—such as gardening— is unhealthy and should be avoided. I understand that ozone levels in Tarrant County exceed the legal limit set by the U.S. Environmental Protection Agency (EPA) to safeguard our health, and this concerns me.

7. I also understand that leaks from oil and gas wells emit hazardous air pollutants such as benzene, a known carcinogen. I am also worried about these air toxins and what they might do to the health of me, my family, and my community.

8. I also have concerns about climate change. It is getting hotter in this area. I have lived in the area since I was born, and I can remember as a child the ponds would freeze over and we would go out and play hockey. It doesn't get cold like that anymore. Spring also begins earlier than it used to. I

believe January 8th was the last freeze this year. The previous record was February 8th. All the fertilizer instructions are six weeks late because of it.

9. I am aware of the climate change issues posed by methane, which is a greenhouse gas many times more powerful than carbon dioxide. I know that methane will be in atmosphere for an average of twelve years before becoming carbon dioxide, which will be in the atmosphere for hundreds or even thousands of years.

10. I know that methane is the primary component of natural gas, and that leaks from oil and gas production result in large methane emissions into the atmosphere. The amount in the atmosphere of methane and other greenhouse is growing exponentially, not linearly. The last three years there have been higher concentrations than the previous twelve years, which were higher than the fifty years before that. This seriously concerns me; the net effect is like a snake eating its own tail.

11. I understand that EPA finalized safeguards last year that will require oil and gas operators to find and repair leaks from new or modified oil and gas wells starting June 3, 2017. I understand that there are over a dozen active wells in Tarrant County that have been drilled since September 17, 2015 and another 10 in the neighboring Denton County. I also understand that there are over 70 active wells in Tarrant County that have been completed since

September 17, 2015—including six within a 10 mile radius of my home—and another 38 in Denton County.

12. EPA's leak detection and repair requirements would benefit me and my family, since they will help reduce the amount of smog- and soot-forming pollution, methane, and hazardous air pollutants that result from leaks at oil and gas wells. Since ozone is worst in the summer, it is especially important that EPA implement this program according to schedule.

13. However, I understand that EPA now plans to reconsider and delay this program for 90 days. If this delay occurs, it will harm me and my family by exposing us to greater amounts of dangerous air pollution than would otherwise be emitted if the program were fully implemented starting June 3.

14. I am aware that Sierra Club is filing a lawsuit to challenge EPA's reconsideration and delay of the leak detection and repair program. If EPA succeeds in this lawsuit and the program is implemented without delay, my family and I will benefit because we will be exposed to less air pollution from oil and gas wells in our area. I therefore support Sierra Club filing its lawsuit to protect pending regulations under the Clean Air Act for the oil and gas industry and ensure that the leak detection and repair program goes forward without delay.

15. I am also aware that EPA is reconsidering and delaying two other requirements for oil and gas operators: the emission standards for pneumatic pumps at well sites, and the requirement that operators receive certification from a professional engineer for closed-vent systems. I realize that any additional delay in these requirements will postpone their emission reduction benefits, and the delay will therefore harm me and my wife. For this reason, I support Sierra Club's decision to challenge EPA's delay of these requirements in court, and my wife and I will benefit if the lawsuit is successful.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed in Fort Worth, TX, on June 1, 2017.

Michael C. Harris PhD.

Dr. Michael C. Harris

Attachment 30

Declaration of Shirley J. McNall, Sierra Club Member

DECLARATION OF SHIRLEY (SUG) J. MCNALL

I, Sug J. McNall, declare as follows:

1. My name is Sug J. McNall, and I am 72 years old and competent to give this declaration. All information herein is based on my own personal knowledge unless otherwise indicated.

2. My address is 840 Navajo Dam Road, Aztec, New Mexico, 87410. Aztec is in San Juan County, and my first husband and I moved here in 1976. I was born and raised in 1944 in Farmington, New Mexico, also in San Juan County. I am currently retired.

3. I have been a Sierra Club member for 21 years. I love the great outdoors, and Sierra Club is interested in protecting the environment and the beauty of the land in the U.S.A.

4. I live with my husband in Aztec, and my daughter and two grandchildren live within six and fifteen miles of us, respectively. My husband and I enjoy taking walks out in the desert and birding and looking for wildlife. Unfortunately, we have an ozone problem in the San Juan Basin. When you drive or fly into our area, there is a big brown cloud of smog over our basin. We have to be careful about being outside when it is hot and the ozone levels are really high. In 2001, the Environmental Protection Agency (EPA) came in and told us how bad our ozone problems here are. We have three

ozone monitor stations sponsored by the state of New Mexico and EPA, and I look at the reports.

5. Our entire population is impacted by the fossil fuel industry. Our town of Aztec has over 100 gas wells within the city limits. One gas well is 400 feet from McCoy Elementary School where my grandchildren attended. There are also two dozen active gas wells within about a mile of our house, including one within 800 feet and two within 1,200 feet. Over a dozen additional wells have been plugged and abandoned near where we live, and more have been built and are scheduled to become active in the future, including one well about two-thirds of a mile east of us that has already been drilled.

6. I understand that oil and gas wells emit harmful air pollutants, including smog- and soot-forming emissions, hazardous air pollutants like benzene, and methane. I am very concerned about the negative impacts of smog (which is mostly composed of ozone) and other harmful air pollutants to human health, especially to those with asthma, the elderly, and children. My daughter is 50 years old, and in the last three to four years has had severe asthma.

7. I am part of the Four Corners Ozone Task Force. We have done extensive studies on ozone and the effects that it has on asthmatics, the elderly, and

children. According to the New Mexico Department of Health, the three hospitals in the area have noted that high ozone has resulted in a direct increase in visits by asthmatics, children, and the elderly with respiratory distress. Our Four Corners area has high asthma and respiratory distress rates. In addition to human health concerns, I know that tribal members have reported that ozone is killing the vegetation in their reservations, which make up almost two-thirds of the land in San Juan County.

8. I am also concerned about hazardous air pollutants from oil and gas development in our area. We did a project in 2010 called the Bucket Brigade, where a group came in and trained us to take air samples. One well, BP Storey BLS #004 (API No. 3004509624), which is close to our house, was emitting high levels of benzene. This really worried me because benzene is a known human carcinogen.

9. I was also involved in a program with Earthworks where we did a Toxic Tour of Hell that showed how we have to survive around gas facilities. We did Forward Looking Infrared (FLIR) camera work, which detects emissions. We took film footage near the top of the tank at the well near my grandchildren's school. The pollution comes out of the well and drifts over the playground at the school. It was clear from the footage how much these wells pollute our communities.

10. I am also aware that methane, which is released during oil and gas drilling, is a powerful driver of climate change. We are under the Four Corners methane hot spot that was discovered by NASA and NOAA. They came in and did a lot of testing. I live in the high desert and have concerns about climate change. The temperatures are rising, and we depend on river water and snow pack for water. It gets scary when you don't have any water in your river.

11. I understand that EPA finalized a rule last year to control pollution from new oil and gas equipment. I know that this rule includes a program that requires operators of newly fracked oil and gas wells to identify and repair leaking components on a regular basis starting on June 3 of this year.

12. If EPA's leak detection and repair program were enforced as planned, it would benefit me, my family, and my community. I understand that at least 25 new wells have been drilled in San Juan County since September 18, 2015, and that at least 16 of these wells are now actively producing natural gas or oil. I also understand that another 36 wells have been completed since September 18, 2015, all of which are active. I understand that the owners of these active wells are supposed to begin inspecting the well sites for equipment leaks no later than June 3. This will help reduce the serious

methane, ozone-forming, and hazardous air pollutants that are a problem in our area.

13. However, I understand that EPA is now planning to reconsider and delay the leak detection and repair program by 90 days at the request of the oil and gas industry. If this delay happens, it will negatively affect my health and my family's health by exposing us to more pollution. This is especially a problem because the delay will happen during the summer, when ozone is at its worst. Every day that EPA delays controlling the emissions from these oil and gas facilities is another nail in our coffin because none of this pollution is healthy.

14. I am aware that Sierra Club is filing a lawsuit to challenge EPA's reconsideration and delay of the leak detection and repair program. I support Sierra Club in filing the lawsuit because I know that my family and I will be harmed by the delay. If Sierra Club succeeds, we will benefit from the emission reduction benefits that will occur due to the leak detection and repair program's timely implementation.

15. I am also aware that EPA is reconsidering and delaying two other requirements for oil and gas operators: the emission standards for pneumatic pumps at well sites, and the requirement that operators receive certification from a professional engineer for closed-vent systems. I understand that

delaying these requirements will further postpone the emission reduction benefits they will provide, and the delay will therefore harm me and my family. For this reason, I support Sierra Club's lawsuit challenging the delay of these provisions and will benefit if the lawsuit is successful.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed in Aztec, NM, on June 1, 2017.

Sug J. McNall

Sug J. McNall

Attachments 300

Attachment 31

Declaration of Bruce Baizel, Earthworks

DECLARATION OF BRUCE BAIZEL

I, Bruce Baizel, hereby declare and state:

1. This declaration is my personal knowledge, information and belief. I am over the age of eighteen years and have the capacity to make this declaration. I submit this declaration in support of Earthworks's motion for preliminary injunction.

2. I am the Energy Program Director for Earthworks, a nonprofit organization dedicated to protecting communities and the environment from the impacts of oil, gas, and mineral development while seeking sustainable solutions. Since 1998, Earthworks has addressed threats to human health from oil and gas development and advocated to close the persistent gaps in federal law and the enforcement of regulations intended to reduce such health effects.

3. I have been a staff member at Earthworks since 2002. In my capacity as Energy Program Director at Earthworks, I am responsible for organizing in accordance with the mission, to protect communities and the environment from the impacts of oil and gas development while seeking sustainable solutions. Earthworks works with communities to reform government policies, improve corporate practices, and expose the health, environmental, economic, and social impacts of oil and gas development. This involves holding the industry accountable for the regulations we advocate including the reduction of forming smog from oil and gas development. In my capacity as Energy Program Director

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00133

Earthworks, I am also responsible for activities related to our oil and gas program.

4. Earthworks' membership consists of approximately 70,000 individuals residing in all 50 states.

5. As a result of my work at Earthworks, I am aware that organization has focused much of its recent work on maintaining attention on greenhouse gas emissions and harmful air pollution caused by, and associated with, oil and gas development. Earthworks participated in the process during the development of the final rule and in the "Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources," published at 81 Fed. Reg. 35,824 (June 3, 2016) ("NSPS"). In our comments, we urged the Environmental Protection Agency ("EPA") to require Leak Detection and Repair ("LDAR") for the regulated industry.

6. In addition, Earthworks has developed our Community Emissions Project, a tool enabling communities to use the best available technology to document emissions of volatile organic compounds ("VOCs") from oil and gas development. Over the last three years, our organizers have verified and documented leaks, venting, flaring, and other emissions at gas facilities in sixteen states.

7. As a result of my work at Earthworks, I am aware that natural gas sector is the single largest emitter of methane. I am further aware that other pollutants are co-emitted with VOCs and methane, including hazardous air pollutants such as benzene, toluene, and xylene. Earthworks staff have authored two reports and published a peer-reviewed scientific paper detailing in detail the health problems associated with oil and gas development.

8. As a result of my work at Earthworks, I am aware that emitted to the ambient air, can react with sunlight and other nitrogen oxides ("NOx") to form the pollutant commonly-called ground-level ozone, referred to as smog. I am further aware that ozone exposure can lead to respiratory ailments, including irritation of the respiratory system, reduction of lung function, and inflammation and damage to cells lining the lungs. I am also aware that exposure to ozone can aggravate asthma and chronic lung disease, and can cause permanent lung damage. I am also aware that physically active are at higher risk of adverse effects from ozone exposure.

9. As a result of my work at Earthworks, I am also aware that exposure to hazardous air pollutants emitted by the oil and gas development and production facilities around the country have an array of adverse effects and links to cancer, genetic mutations, developmental malformations, and death.

EPA-HQ-2018-001886 3/2/2018 ED_001544_00000005-00135

10. Moreover, I am aware that methane is a potent and es greenhouse gas. I am further aware that greenhouse gases global r warming that is causing climate change.

11. As a result of my work at Earthworks, I am aware t members live, work, or recreate in areas where oil and gas deve occurred since September 18, 2015. These members are therefore ar increased levels of air pollution, including summer time ozone and win formation and hazardous air pollutants.

12. Due to my work with Earthworks, I am aware that on EPA finalized the Oil and Gas NSPS. I am familiar with the rule opinion and based on my experience at Earthworks, NSPS the Oil and G provides significant benefits to members who live and work near development and constructed or modified after the rule's effective date. This is reductions in air pollutant emissions as a result of leak detection and ("LDAR") programs, which the Oil and Gas NSPS requires operators to conduct the initial inspection by no later than June 3, 2017.

13. One outcome of the Fenceline Project I direct, involves bringing greater accountability for LDAR programs under the Oil and Gas NSPS. Earthworks, in partnership with communities struggling with oil and gas development, employs similar technologies used by regulators and operators to

find leaks and other sources of emissions. When we find a leak, we typically follow up by alerting the operator to the problem. This project works hand in hand with the LDAR and NSPS programs by supplementing the required inspections and protocols of the oil and gas industry as well as those led by regulators.

13. I am therefore concerned that EPA's decisions to roll back the LDAR and the Oil and Gas NSPS will adversely impact our Community Empowerment Project's effectiveness and EarthWorks' members' exposure to unnecessary amounts of air pollution, including ozone, toxic hazardous pollutants, and methane emissions that contribute to climate change. These emissions would not likely occur otherwise if LDAR and NSPS provisions remained in effect.

14. I make this declaration in support of EarthWorks' challenge for the benefit of the organization and its members, officers, and/or members to the delay notice.

I declare under the penalty of perjury that the foregoing is true and correct.

Executed on June 1, 2017.

Bruce C. Baizel

Bruce Baizel

Attachment 32

Declaration of Eric Schaeffer, Environmental Integrity Project

DECLARATION OF ERIC SCHAEFFER

I, Eric Schaeffer, declare and state as follows:

1. I am the Executive Director of the Environmental Integrity Project (EIP). I founded the organization in 2002, and have served as the Executive Director since then.

2. EIP is a nonprofit organization based in Washington, D.C. and Austin, Texas, dedicated to ensuring the effective enforcement of state and federal environmental laws to protect public health and the environment. EIP's offices are located at 1000 Vermont Avenue, NW, Suite 1100, Washington D.C., 20005, and 707 Rio Grande, Suite 200, Austin, Texas 78701. EIP also has a senior attorney based in Philadelphia, Pennsylvania, a senior attorney based in Atlanta, Georgia, an attorney based in Burlington, Vermont, and a community outreach coordinator based outside of Pittsburgh, Pennsylvania.

3. EIP was specifically founded to advocate for the effective enforcement of environmental laws pertaining to large sources of air pollution (including power plants, refineries, and oil and gas facilities) due to their significant effects on public health and the environment and the political pressures that can come into play in regulating and enforcing compliance for these facilities. EIP's mission includes ensuring equal access to clean air and water, regardless of one's income or racial background.

4. EIP has a genuine interest in ensuring that the improvements to be implemented by EPA's 2016 New Source Performance Standards for the Oil and Natural Gas Sector are realized and not delayed by the Environmental Protection Agency's (EPA) administrative stay of the requirements.

5. EIP submitted technical comments on the proposed regulations in December 2015 individually and as part of a larger coalition. EIP has expended significant resources toward improving, strengthening, and preventing attempts to weaken EPA's 2016 New Source Performance Standards for the Oil and Natural Gas Sector. In our technical comments and work with the larger coalition, EIP reviewed EPA's proposed rule closely and submitted recommendations to EPA on a number of ways to strengthen the rule, including improvements to the rule's leak detection and repair requirements.

6. EIP has been tracking EPA's progress toward developing New Sources Performance Standards for the Oil and Natural Gas Sector well before the 2016 New Source Performance Standards for the Oil and Natural Gas Sector. EIP submitted comments on EPA's New Source Performance Standards originally proposed in 2011 and again on the revised standards proposed in 2013. EIP has expended significant staff time and resources to advocate that EPA issue the strongest requirements possible.

7. In August 2016, EIP also intervened in these consolidated challenges to the 2016 New Source Performance Standards for the Oil and Natural Gas Sector, in order to defend the standards from the state and industry petitioners' attempts to weaken and vacate them.

8. EIP supports important progress made by EPA's 2016 New Source Performance Standards for the Oil and Natural Gas Sector. The new regulations are necessary to reduce methane emissions from this sector by 40-45 percent by 2025. The rule will also reduce volatile organic compound emissions by 210,000 tons per year and toxic air pollution by 3,900 tons per year in 2025. These reductions will help reduce the magnitude of climate change our planet will be confronted with in the years to come and reduce exposure to harmful chemicals that are carcinogenic and known to trigger asthma.

9. Most of the rule's reductions are due to its leak detection and repair requirements. These leak detection and repair requirements will achieve the majority of the rule's methane reductions, between one third and one half of the rule's reductions of volatile organic compounds (VOCs), and over 90 percent of the rule's reductions of hazardous air pollutants—including carcinogenic pollutants such as benzene. These leak detection and repair requirements have been rightly considered to be the "cornerstone" of the 2016 New Source Performance Standards for the Oil and Natural Gas Sector.

10. Many of the rule's provisions—including the leak detection and repair requirements—will require oil and gas operators to more accurately report emissions from a several different industrial sources of methane and VOCs. These sources include tanks, flares, and well head venting. These industrial sources are poorly understood, and actual emissions are likely significantly underestimated.

11. EIP's interest in this rulemaking comes not only from its mission to protect public health and the environment from the negative effects of air pollution but also from its mission to make information and data on pollution and industry compliance freely available to the public. The improved data reporting required by the rule will allow EIP to more accurately research and report on the pollution impacts of this industrial source, the effectiveness of the rule's controls, and the industry's compliance with these controls. EIP's reporting would provide this information to the public in a transparent and easily accessible manner.

12. EPA's administrative stay will delay and thwart the benefits of several of these requirements, including the leak detection and repair requirements, standards for pneumatic pumps at well sites, and certification requirements for closed vent systems.

13. For example, the first of the leak detection and repair requirements would otherwise go into effect on June 3, 2017, requiring owners and operators of new and modified wells and compressor stations to complete their first round of

monitoring. Thereafter, the owners and operators would have to repair any leaks found during this monitoring within 30 days and would have to report on these activities by October 31, 2017. As stated in analysis by Dr. David Lyon and submitted in a separate declaration, these requirements are expected to have applied to thousands of sources, including an estimated 18,000 wells.

14. EIP issues reports to document how air pollution caused by the oil and gas industry is a significant source of global warming gases and threatens human health and the environment. For example, in February 2016, EIP published a report cautioning that the oil and gas industry is expanding at break-neck pace and that new and pending Clean Air Act construction permits will authorize the release 47 million tons of greenhouse gases per year. This would constitute a 34-percent surge in emissions from this sector. Accordingly, EPA's New Source Performance Standards are necessary to curb some of the negative impacts from this growing industry.

15. EIP also serves and represents people and nonprofit groups, on a pro-bono basis, whose health, recreational, aesthetic and other environmental interests are harmed by oil and gas facilities. EIP has an ongoing alliance with local groups to further strengthen air pollution requirements for these sources and improve monitoring and enforcement of existing requirements. Weakening EPA's 2016 New Source Performance Standards for the Oil and Natural Gas Sector will

hamper our ability to advocate on behalf of individuals and nonprofit organizations.

16. Among other things, EIP provides information, technical assistance, and advocacy on behalf of these individuals and organizations by reviewing permits required under the Clean Air Act, providing comments to strengthen pollution protections as necessary to protect public health and the environment, challenging permits when they fail to do so, and by bringing enforcement actions when sources violate conditions of state-issued permits or federal law, in order to protect public health and the environment in exposed communities.

17. As counsel and/or a party, EIP has challenged permits issued to oil and gas facilities in several states for failure to comply with federal Clean Air Act permitting requirements, including in Pennsylvania and Texas.

18. For EIP to be able to fulfill its mission to achieve strong protection for individuals and groups it serves and represents, it is vital that the requirements of EPA's 2016 New Source Performance Standards for the Oil and Natural Gas Sector are properly implemented on schedule and not administratively stayed or otherwise delayed. It is particularly important for EIP and the people we serve that oil and gas infrastructure is not leaking enormous amounts of methane, VOCs, and hazardous air pollutants. Absent the rule's fugitive emissions requirements, including its leak detection and repair requirements, these facilities will continue to

release this preventable pollution unabated and expose the residents and communities with whom EIP partners to unnecessary pollution.

19. Through its participation in this challenge to EPA's administrative stay, EIP seeks to prevent EPA's administrative stay of certain requirements of the 2016 New Source Performance Standards for the Oil and Natural Gas Sector. An order by this Court fully or partially granting the motion for judicial stay of EPA's administrative stay or granting summary disposition of the petition for review will serve EIP's mission and interests in ensuring the effective enforcement of state and federal environmental laws to protect public health and the environment and in making data and information on pollution and compliance freely and transparently available to the public.

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on this 2nd day of June, 2017.

Eric Schaeffer
Executive Director
Environmental Integrity Project

Attachment 33

Declaration of Joseph O. Minott, Clean Air Council

DECLARATION OF JOSEPH O. MINOTT

I, Joseph O. Minott, declare and state as follows:

1. I am the Executive Director and Chief Counsel of the Clean Air Council (CAC). I have served in this position for thirty years. As CAC's attorney for forty years. As Executive Director, I am responsible for making sure that CAC achieves its goals and mission. I am also required to be up-to-date about and knowledgeable about current and future threats to the environment in Pennsylvania.

2. CAC is a 501(c)(3), non-profit, environmental organization. CAC is headquartered at 135 South 15th Street, Suite 300, Philadelphia, Pennsylvania 19103.

3. CAC's mission is to protect and defend everyone's right to a healthy environment. CAC works to achieve its goals and mission through public education, government oversight, and enforcement of environmental laws.

4. CAC has approximately 8,000 members, some of whom are concerned about air pollution emitted from sources in the oil and natural gas industry, including compressor stations.

5. Among CAC's approximately 8,000 members, recently organized in our members who reside in areas that already have or have had oil and gas development. Specifically, CAC members who reside in Allegheny County, Pennsylvania; one (1) member who resides in Beaver County, Pennsylvania; four (4) members who reside outside Pennsylvania; and two (2) members who reside in Westmoreland County, Pennsylvania

6. Through my work, I am familiar with CAC's sectors, goals, its current membership, proj information, and its activities surrounding emissions of greenhouse gases (GHGs), hazardous air pollutants (HAPs), and volatile organic compounds (VOCs) from the oil and natural gas industry. I am also familiar with the Environmental Protection Agency's (EPA) efforts to reduce GHG and VOC emissions from the oil and natural gas industry.

7. Through my work, I am aware that in a letter dated April 7, 2018, EPA Administrator Scott Pruitt announced he would proceed with reconsideration of the fugitive emission requirements at oil and gas compressor stations in the final rule, "Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources," published in the Federal Register at 40 CFR Part 60, June 3, 2016 (the Rule). The Administrator announced his intention to stay these Rule requirements pending reconsideration. The current deadline for compliance with these Rule requirements is June 3, 2017.

8. Many wells in the counties CAC members live have been drilled since September 18, 2015, and would be subject to the fugitive emission requirements of the Rule but for EPA's stay of the Rule. There are at least four hundred (400) such wells in Allegheny County, thirteen (13) in Beaver County, forty-nine (49) in Butler County, and five (5) in Westmoreland County.

9. Any outcome that results in the fugitive emission requirement being weakened, or vacated would harm CAC and its members, particularly those in Allegheny, Beaver, Butler, and Westmoreland Counties. All respective counties are located in the Pittsburgh-Beaver Valley nonattainment area, which is designated as

nonattainment with EPA's 2008 8-hour ozone national ambient air quality standards (NAAQS). I understand that EPA's decision to waive the Rule's fugitive emissions requirements will allow leaks and other fugitive emissions of VOCs—a precursor—to go undetected. This is the most dangerous for ozone formation. Additional VOC emissions this summer may cause the Pittsburgh-Beaver Valley area to have ozone days that exceed the NAAQS, asthma attacks, other cardiovascular and respiratory ailments, and hospitalizations.

10. The fugitive emissions requirements of the Rule directly affect key CAC program areas. CAC works hard to protect Pennsylvania from the impacts of pollution, and the reduction in GHG and VOC emissions from soil and natural gas well compressor stations is of great importance to CAC. CAC filed public comments on the Rule and has intervened to defend the Rule against challenges from several states and industry groups. CAC plays a significant role in educating communities on the air pollution threats to health and natural resources and the pervasiveness of GHG and VOC leaks. CAC empowers citizens to express their concerns regarding air pollution at public hearings, through social media, and in letters to local newspapers.

11. Additionally, Pennsylvania's state environmental agency does not currently impose fugitive emission standards that meet or exceed those of the Rule at well sites. For years, CAC has been actively engaged in a campaign to urge Pennsylvania to establish the strongest air pollution controls such controls are finalized, however, the fugitive emissions requirements provide the

most effective protection for CAC members and the general public from the harmful air pollution resulting from oil and natural gas operations.

12. Furthermore, I am personally aware that many of CAC's members, including those members residing in Allegheny, Beaver, Butler, Indiana, Westmoreland, live, and recreate around oil and gas natural well sites and/or compressor stations. CAC's members will be exposed to, and affected by, Ozone pollution generated by the NSPS Rule's fugitive emission requirements emitted by oil and gas natural well sites and compressor stations, as well as HAPs emitted from these sources.

13. These Rule requirements will reduce the exposure to air pollutants, including methane, emitted by oil and gas natural well sites and/or compressors. These Rule requirements will allow CAC to fulfill its mission of defending and protecting everyone's right to breathe clean air.

14. CAC believes that strong fugitive emission requirements, such as the Rule, will further CAC's goals and objectives to protect its members and the general public from harmful pollutants.

I declare under penalty of perjury that the foregoing is true to the best of my knowledge and belief.

Executed on this 7th day of June, 2017.

Joseph Otis Minott, Esq.
Executive Director and Chief Counsel

Attachments 319

Attachment 34

Declaration of Jonathan R. Camuzeaux and Dr. Kristina Mohlin,
Environmental Defense Fund

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

DECLARATION OF JONATHAN R. CAMUZEAUX AND DR. KRISTINA MOHLIN

We, Jonathan R. Camuzeaux and Dr. Kristina Mohlin, declare as f

1. I, Jonathan R. Camuzeaux, am the Senior Manager, Economics & Poli Analysis, Office of Economic Policy and Analysis at Environment Defense Fund ("EDF"). I earned a Master's degree in International Columbia University's School of International and Public Affair Concentration in Environment and Energy, and a Specialization i Advanced Policy and Economics Analysis in 2011. I also e of Contemporary History from University Michel de Montaigne Bor in 2006. I have over six years of professional experienc economic analysis on environmental issues throughout the world, focus on climate and energy economics, including oil and gas and production. At EDF, I lead the Office of Economic Poli Analysis' work on mitigating methane emissions from oil and ga My curriculum vitae is attached as Exhibit A.

2. I, Kristina Mohlin, am a Senior Economist at EDF. I ear Economics from the University of Gothenburg, Sweden, earned in 201 a Master of Science in Industrial Engineering from Chalmers Uni

Technology, Gothenburg, in 2008. At EDF, analysis perform eco
climate and energy policy, with a focus on reliable electricity and na
markets, and provide support to the organization's efforts to
methane leakage from the natural gas supply chain. I co-author have a
authored several peer-reviewed journal articles environmental climate and
economics. My curriculum vitae is attached as Exhibit B.

3. Our expert declaration addresses the cost of performing leak de
repair ("LDAR") at oil and gas facilities, as required by U.S.
Environmental Protection Agency's ("EPA") *Oil and Natural Gas*
Sector: Emissions Standards for New, Reconstructed and Modified Sources
(the "Final Rule").[1] The EPA Administrator has now signed a notice
suspending these leak detection and repair requirements.

4. EPA estimates in the Final Rule show that leak detection and repair costs are
low, these costs do not drive development decisions, harm and they
producers or reduce oil and gas production. Our review of c
estimates by EPA and additional estimates of revenues and capital costs
site LDAR compliance costs estimated by EPA are small, on an per-
basis, as well as very small relative to per-well capital values a

[1] 81 Fed. Reg. 35,824 (June 3, 2016).

costs, and that LDAR costs estimated by EPA are a very small total industry revenues and total costs.

5. The actual costs of LDAR are likely even less than EPA has estimated on the documented experience of industry and service providers. As a result, the costs and impacts of the LDAR requirements of the Rule will likely be even less than the limited EPA estimates by analysis for the Final Rule.

6. LDAR costs are likely to further decrease over time as technology and compliance methods improve. A stay has the potential to delay technological improvements.

Based on EPA's Own Estimates, Both the Absolute and Relative LDAR Compliance Costs of the Final Rule are Small and Would Not Harm Producers or Reduce New Oil and Gas Development.

7. We have reviewed the EPA estimate of average per compliance costs completed while finalizing the Final Rule, which EPA's are located in the 2016 Technical Support Document for the Oil and Natural Gas Emission Standards for New, Reconstructed, and Modified Sources Background Technical Support Document for the Final New Source Performance Standards ("TSD"[2]) and April 2016 memorandum from

[2] EPA, Background Technical Support Document for the Final New Source Performance Standards 40 CFR Part 60 subpart OOOOa (May 2016) available at https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0507631

Bradley Nelson, EC/R[3] to WEPA have also reviewed EPA's May 20
Regulatory Impact Analysis for the Final Rule (the "RIA"), which
well cost estimates.[4]

8. For oil and gas sites regulated under the Final Rule, EPA
the TSD that the total per-site annualized cost of inspections semi-ann
range from $1,521 for a natural gas well site to $1,9
with gas-to-oil ratio of more than 300, to $2,1 for sites with a
gas-to-oil ratio of less than 300.[5] This reflects the full cost o
compliance, including the costs of completing an LDAR survey t
year—estimated at $600 per inspection—plus other costs incl
subsequent activities planning and the costs of repairs, resurv
reporting, among other things.[6] These values also reflect additional
revenues and savings from captured natural gas due to reduced leaks.[7]
These inspection estimates from the TSD are for well sites, w
contain multiple individual wells.

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[3] *Memorandum from Bradley Nelson, EC/R to Jodi Howard, Evaluation of Cost methodologies for OGI Monitoring,* (April 5, available at https://www.regulations.gov/document?D=EPA-HQ-OAR-2011-0027-7622 referenced in footnote 48 of the TSD).

[4] EPA, Regulatory Impact Analysis of the Final Oil and Natural Gas Sector New Source Performance Standards for New, Reconstructed, and Modified Sources available at https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0505-7630

[5] TSD at 48, Table 4-10.

[6] TSD at 44-45.

[7] TSD at 48.

9. In its RIA, EPA estimates the individua pecticons well $ 0 9 t 0 5 of for an oil well and $ 1 1 0[8] 1 Thirs aper-gas well cost estimate in RIA, unlike the estimate in the TSD, does ngsot frioml ude cost recaptured natural gas, which would reduce the heper- well cost[9]

10. While we recognize that there are some cosmpsetiasgociated wi LDAR survey, an annual cost of $ 1 , 5 2 1 oro $$920, 51 1 t4 pe $ 1 1 0 1 per well, is extremely small relatated by tohd revenu and gas wells, and such costs are unlikelyns to of affect the dec companies to drill or operate oil and gas wells.

11. We have reviewed the expert declaration Dand d anlayoysis of Dr. who has identified wells subject to the strRuldardsandinoi the Final and natural gas production attributable[10] to Ushose wells. production data from Dr. Lyon's analysis, wenulave calculated t estimates for the wells subject to the standlardsproducbased on ac

[8] EPA, Regulatory Impact Analysis of the Finalas OSlectand NEmissalionG Standards for New, Reconstructed, and Modified Sou*rcesavailable at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-05.05-7630

[9] *Id.*

[10] Declaration of Dr. David Lyon at Tables bn, data. from Dr. Lyon ingieficed a proprietary database that compiles information from state oil and gas nicogmiassiwnsde crange of drilling and production-related information, to identify affected wellsed aoid thedr gassoprlodutcti*on*. 7.

and the average oil and gas price from the corresponding perio
production from the U. S. Energy Information Administration ("

12. We calculated that wells drilled or modified since 20 September have produced on average more than $3 million in revenue per well aggregate total of more than $42.5 billion in the nineteen months between September 18, 2015 and April 24, 2017. The cost of relaLDAR at $905 to $1101 per year is trivial, compared to less than 0.06% of the average per-well revenue. The anticipated size of these incremental costs shows they are unlikely to have appreciable effect on decisions about the drilling of new wells operation of those wells. Moreover, as discussed more fully cost estimate of $905 to $1101 per well is likely too may well be lower.

13. These costs likewise represent a very small percentage of re production" wells. We have reviewed the revenue that would be

[1] To calculate per-well revenue for producing oil and gas wells, total actual production of oil (in bbl) between Sep. 19, 2015 and April 24, 2017, and average selling price (in $/bbl) between Sep. 19, 2015 and April 24, 2017, and converted the actual production from Mcf to MMBtu, and then multiplied by the average Henry Hub price between Sep. 19, 2015 and April 2017. We have then divided the total revenue by the one hundred oil and gas producing wells. Note, estimated oil and gas production data only include completions or recompletion that occurred after Sep. 18, 2015. Average price gas from Sep. 19, 2015 to April 24, 2017 obtained Henry Hub ($2.55/MMBtu) *available at* https://www.eia.gov/dnav/ng/hist/ and Cushing (m $45 per barrel (bbl)) *available at* https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC

by these "low-production" wells drilled or modified since Sep 2015, as defined in the proposed rule[12]. Those 2,179 of these "production" wells from this period in Dr. Lyon's dataset generated on average $340,365 per well in revenue between 2015 and April 24, 2017. Therefore, even for these "low production" wells, the cost of LDAR is so small—roughly 0.5% of annual revenue—that it would not affect decisions to drill, or operators would continue the well the likely overstated EPA cost estimate for LDAR.

14. In addition to this revenue analysis, we also have to compare LDAR costs operators would face when drilling a new well. This helps to contextualize the magnitude of these inspection costs compared to the capital costs operators face when drilling. To do so, we we have evaluated a recent report issued by the U.S. Energy Administration that assesses capital costs for oil and gas prod

[12] 81 Fed. Reg. at 35856 (defining "low production" wells as average combined oil and natural gas production is less than 15 barrels of oil equivalent per day averaged first 30 days of production").

[13] To calculate per-well revenue for low production oil wells, we multiplied total actual production oil (in bbl) between Sep. 19, 2015 and April 24, 2017, by the average Cushing price (in $/bbl) between Sep. 19, 2015 and April 24, 2017, and converted gas to barrels of oil equivalent (BOE) between Sep. 19, 2015 and April 24, 2017 from Mcf to MMBtu, and multiplied by average Henry Hub price ($/MMBtu) between Sep. 19, 2015 and April 24, 2017. We have then divided the total revenues from the oil and gas low production wells. Note estimated oil and gas production data only include completions or recompletion that occurred after Sep. 18, 2015. Average price gas from Sep. 19, 2015 to April 24, 2017 from EIA Henry Hub ($2.55/MMBtu), available at https://www.eia.gov/dnav/ng/hist/rngwhhd.htm and Cushing ($41.55/bbl), https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC

the United States for the period 2 0A0 6 reported 0 by 6 the EIA, during that time period, the total capital costs range per from shore $4.9 to $8.[14] 3 The mid-point per-well capital costs far outweigh the fractional, incremental cost of LDAR estimated by EPA at $90 per year per well or, as explained further below, LDAR even less. costs are so small relative to total capital costs that LDAR it is un compliance costs would affect decisions about new wells, to drill otherwise harm producers or reduce new oil and gas development.

The Aggregate LDAR Compliance Costs of the Final Rule Are Small and Will Not Harm Producers or Reduce New Oil and Gas Development.

15. We have reviewed the RIA for the Final Rule, the number of facilities affected by the LDAR portion of the Final Rule (incrementally affected facilities) and the total compliance costs.[16] EPA has estimated the total compliance costs for the emissions element of the rule, which includes LDAR, for Well Gathering and Boosting Stations and Transmission Compressor Stations be $189.8 million in 2015 and $290.2 million in 2025.[17] These costs are a

[14] EIA, *Trends in U.S. Oil and Natural Gas Upstream Costs* (March 2 0 available at https://www.eia.gov/analysis/studies/drilling/pdf/upstream.pdf
[15] *Id.* at 2-5.
[16] RIA at 0 3-3-25, 3-26.
[17] RIA at Table 2, 3-Table 3-13.

very small fraction—less than 0.2%—of the lowest of recent annual produced oil and natural gas.[18]

16. We have also evaluated EPA's RIA estimate of the entire Final Rule's impact on domestic oil and gas production. The EPA found that the zero projected impact from the entire Final Rule on domestic natural gas production and domestic national oil production.[19] EPA's finding in the RIA is rigorous and well supported through its use of the established National Energy Modeling System ("NEMS") developed and maintained by EIA, and extensively used by the Department of Energy to produce reports, legislative analyses, and responding to Congressional inquiries. In addition, the incremental impacts of the LDAR provisions are likely more limited because these costs represent only a portion of the compliance costs EPA used to model the potential impact of the Final Rule. Moreover, as explained below, EPA's cost estimate of LDAR is overstated, so an evaluation of impacts based on yield lower costs is even less than the near-zero change in resource production predicted by EPA's RIA. From an economic standpoint, the modeled result from EPA

[18] We have calculated the average value of annual produced natural gas and oil as $224,049,000,000, multiplying the total oil and gas production in 2016 by average prices of natural gas and oil, respectively. The average gas and oil price for 2016 obtained from Henry Hub ($2.52/MMBtu), *available at* https://www.eia.gov/dnav/ng/hist/ and Cushing ($43/bbl), *available at* https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D. The production for 2016 obtained from EIA, *available at* https://www.eia.gov/totalenergy/data/monthly/pdf/sec4_3.pdf.

[19] RIA at 6-9. *See also* Final Rule, 81 Fed. Reg. at 35886.

supports our conclusion that because LDAR and other Rule compli costs are small, other factors, including, among other, price and con the costs related to drilling and completions, about drive decis and gas production.

17. EPA's finding that compliance costs are itself effect have a l covered entities is consistent with and supported by the recent record oil and gas rulemaking in Colorado. Colorado has LDAR requiren are similar to, and in some instances more stringent than, t requirements in the Final Rule.[20] Colorado Department of Public Health and the Environment estimated the net costs to industry oil to implement the Colorado rules would be $42.4 million per representing approximately 0.4% of industry's annual revenues.[21] The Commission concluded: "Given this small percentage, the D proposal is unlikely to have any appreciable impact on the eco competitiveness of the industry as a whole."[22]

18. Reports of drill rig activity in Colorado and gas industry has not become any less competitive since the state LDAR requi

[20] Colorado Department of Public Health and Environment, *Regulation Number 7, available at* https://www.colorado.gov/pacific/sites/default/files/5-CCR-1001-9.pdf

[21] Colorado Air Quality Control Commission, Cost-Benefit Analysis: Proposed Revisions to AQCC Regulations No. 3 and 7 at 1, 21 (February 11, 2014), *available at* https://www.edf.org/sites/default/files/consent-attachment-2-0-3-analy0.1217.pdf

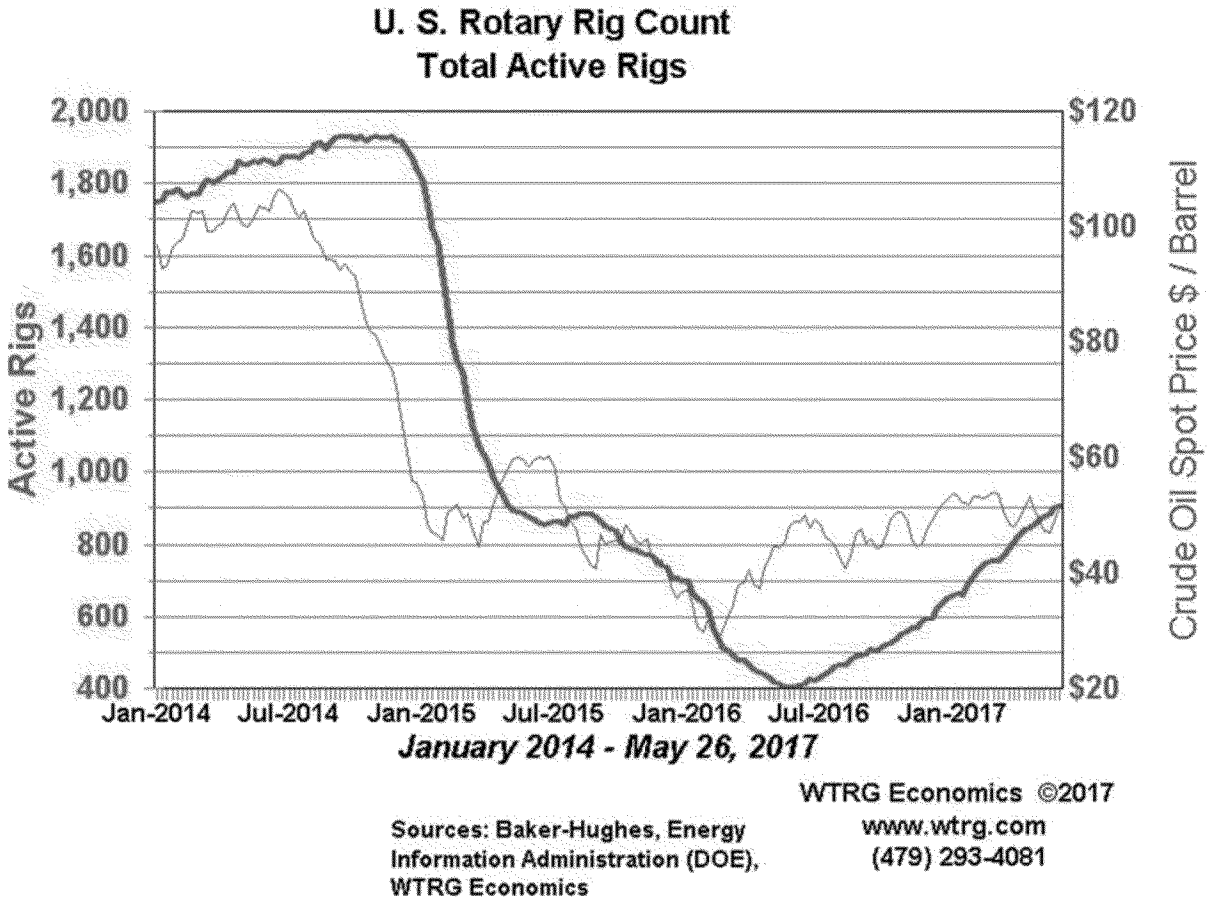
[22] *Id.* at 21.

took effect. Instead, Baker Hughes Inc. has reported that Colorado have increased to 34 rigs, an increase of 18 rig year.[23] While these increases in rig count are likely largely changing commodity prices, the fact that drilling increased Colorado significantly over the past year, while operators have complied Colorado's rigorous LDAR program, further supports the opinion LDAR provisions of the Final Rule will not affect the decisions ab to drill new wells.

19. We have also reviewed data on North American Rotary Rig Cou published by WTRG Economics and drawing source data from Baker-Hughes, EIA and WTRG Economics. Figure 1 below shows how drill rigs change over time relative to the crude oil price over the period January 2014 to May 2017. This figure shows that dri commodity price

[23] Matt Zborowski, *BHI: Colorado, gas-directed rigs lead latest US rig count rise*, Oil & Gas Journal (May 26, 2017), http://www.ogj.com/articles/2017/05/bhi-colorado-gas-directed-rig-count-rise.html

Figure 1: Active Drilling Rigs and Crude Oil Price[24]



Data Suggests EPA Cost Estimate for LDAR Are Overstated.

20. EPA's estimates of the absolute LDAR compliance cost are co and, based on our review of available data, actual compliance likely to be even lower than EPA's projection. As a resul impacts of the LDAR portion of the rule will be even less severe than now

[24] WTRG Economics, *available at* http://www.wtrg.com/oilgasrigs.html.

estimates presented by EPA, particularly when the LDAR program evaluated in isolation.

21. EPA estimated site-level LDAR survey costs, at $6,000 per compliance costs being higher, based on the number of surveys and other compliance requirements, including fugitive leaks and a reporting requirements.[25] EPA's total site-level compliance costs f are up to $2,185 per year per facility, based on two s facility and including revenue from[26] captured gas.

22. We have reviewed public hearing testimony provided by Rebell Photonics on the cost estimate that EPA developed for the LDAR its proposed standards, which EPA did not change in the Final Rule.[27] Rebellion is a technology manufacturer and provider of LDAR services. In its comments, Rebellion provided first-han about the actual cost to conduct LDAR inspections based on "turn-ke which include the cost of conducting not only the LDAR inspect additional services such as data management.[28] Rebellion reported that its

[25] TSD at 43.
[26] *Id.* at 48.
[27] *Id.* at 43.
[28] Rebellion Photonics, Comments *available* at EPA, https://www.edf.org/sites/default/files/content/rebellion-photonics-hearing-testimony.pdf

turn-key services are available for $250 per visit, which is substantially less than EPA's $600 per survey estimate.[29]

23. We have also reviewed recent LDAR cost information provided by FLIR Systems, a manufacturer of optical gas imaging technology that has collected information from purchasers about its equipment and the costs of LDAR.[30] FLIR's surveys of oil and gas companies indicate that LDAR inspections by third-party consultants have an average cost of $350 per visit (consistent with the information above), while Rebellion's in-house OGI programs cost even less—in "the range of $15 per visit."[31]

24. This data from oil and gas companies and leak detection service providers indicates that actual LDAR costs can be substantially lower than EPA's estimates.

A Stay of the Final Rule Threatens to Impede Innovation.

25. The compliance costs of implementing LDAR will likely decrease over time as methods improve and innovation occurs, undermining the potential benefits from prompt rule implementation. As technologies develop and detection costs decrease over time, operators will benefit from efficiency gains associated

[29] *Id.*

[30] FLIR Systems, Inc., Comment Letter on Waste Prevention, Production Subject To Royalties, And Resource Conservation, Proposed Rule (April 3, 2016), https://www.regulations.gov/?D=BLM-2016-0001-9035

[31] *Id.* at 5.

compliance with the Final Rule. A delay in the LDAR effectiveness provisions threatens to delay this innovation.

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Attachments 336

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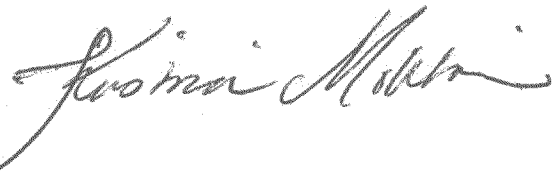

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EXHIBIT A

Jonathan R. Camuzeaux

[illegible]

EDUCATION

COLUMBIA UNIVERSITY SCHOOL OF INTERNATIONAL AND PUBLIC AFFAIRS
New York, NY
Master of International Affairs
Concentration [illegible]
Fall 2010 position [illegible]

UNIVERSITY MICHEL DE MONTAIGNE BORDEAUX 3
Bordeaux, France
Master of Contemporary History
[illegible]
[illegible]
Bachelor of Arts in Human and Social Sciences, [illegible]

PROFESSIONAL EXPERIENCE

[illegible]

ENVIRONMENTAL DEFENSE FUND
New York, USA
Senior Manager, Economics & Policy Analysis, Office of Economic Policy and Analysis
[illegible]

THE CLIMATE GROUP
New York, USA
Electric Vehicle Analyst
[illegible]

BOOZ ALLEN HAMILTON Center for Climate Change Excellence
New York, USA
Student Consultant Project Manager – Climate Change Adaptation
[illegible]

COLUMBIA CLIMATE CENTER, EARTH INSTITUTE
Junior Researcher, Global Network for Climate Solutions
New York, USA
[illegible]

EARTH INSTITUTE / HSBC Climate Change Adaptation Initiative Intern
New York, USA
NYC NATURAL RESOURCES GROUP – DEPARTMENT OF PARKS & RECREATION
Data Analyst Intern
[illegible]

EUROPEAN COMMISSION
New York, USA
External Results-Oriented Rapid Evaluation Co-Monitor (Consultancy)

SEVAO promoting sustainable and economic development to 260,000 people in Tamil Nadu, India
Tamil Nadu, India
Project Coordinator and Analyst

CARE FRANCE
Fundraiser Representative
Paris, France

OTHER SKILLS AND ACHIEVEMENTS

Efficiency on the Climate Implications of Heavy-Duty Natural Gas Trucks Environmental Science & Technology

Doubling Down on Carbon Pricing

ICAO Market-Based Measure

Languages
Countries of residence
Work and leisure related travels

EXHIBIT B

Kristina Mohlin

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E-mail	kmohlin@edf.org
Alternative e-mail	kristina.mohlin@gmail.com
Office phone	212 616 1284
Cell phone	718 290 7108

Current position

April 2017-	Senior Economist, *Environmental Defense Fund*, New York, NY, USA

Previous positions

Oct 2014-March 2017	Economist, *Environmental Defense Fund*
Sept 2013-Sept 2014	Visiting Economist, *Environmental Defense Fund*
Sept 2008 – Sept 2013	PhD candidate, Department of Economics, *University of Gothenburg,* Gothenburg, Sweden
March – May 2008	Research Assistant, Department of Energy and Environment, *Chalmers University of Technology,* Gothenburg, Sweden

Degrees

2013	PhD in Economics, *University of Gothenburg*
2008	Master of Science in Industrial Engineering and Management, *Chalmers University of Technology*

Teaching and other academic experience

2009-2012	Teaching assistant in undergraduate courses in mathematics and introductory microeconomics, *University of Gothenburg*
2011	Exchange Spring Semester at the Department of Agricultural and Resource Economics, *University of California, Berkeley,* USA
2010	PhD student representative in the Committee for Research and Research Education at the School of Business, Economics and Law, *University of Gothenburg*
2009-2010	Vice-Chair, Graduate Student Association at the School of Business, Economics and Law, *University of Gothenburg*
2008-2009	Treasurer, Graduate Student Association at the Department of Economics, *University of Gothenburg*

Publications

"On refunding of emission taxes and technology diffusion." (2017) (with Jessica Coria). *Strategic Behaviour and the Environment.* 6 (3), 205-248.

"Designing Electric Utility Rates – Insights on Achieving Efficiency, Equity, and Environmental Goals" (2017) (with Frank Convery and Beia Spiller). *Review of Environmental Economics and Policy*, 11 (1), 156-164.

"An introduction to the Green Paradox: The unintended consequences of climate policies" (2015) (with Svenn Jensen, Karen Pittel and Thomas Sterner). *Review of Environmental Economics and Policy*, *9* (2), 246-265.

"Refunded emission payments and diffusion of NOx abatement technologies in Sweden" (2015) (with Jorge Bonilla, Jessica Coria and Thomas Sterner). *Ecological Economics*, *116*, 132-145.

Essays on Environmental Taxation and Climate Policy (2013). PhD thesis. Economic studies nr 214. University of Gothenburg.

"Putting a Price on the Future of Our Children and Grandchildren" (2013) (with Maria Damon and Thomas Sterner). In: Livermore, M.A., Revesz, R.L. (eds), *The globalization of cost-benefit analysis in environmental policy*, Oxford University Press.

"Greenhouse gas taxes on animal food products: Rationale, tax scheme and climate mitigation effects" (2011) (with Stefan Wirsenius and Fredrik Hedenus). *Climatic Change*, 108 (1-2), 159-184.

"Greenhouse gas-weighted consumption taxes on food as a climate policy instrument" (2010) (with Fredrik Hedenus and Stefan Wirsenius. In: Dias Soares, C., Milne, J.E., Ashiabor, H., Kreiser, L., Deketelaere, K. (eds), *Critical issues in environmental taxation: International and comparative perspectives,* Volume VIII, Oxford University Press.

Work in progress

"Raising Rivals' Costs: Vertical Market Power in New England's Wholesale Natural Gas and Electricity Markets" (with Levi Marks, Charles Mason and Matthew Zaragoza-Watkins).

"Factoring in the Forgotten The Role of Renewables in CO2 Emission Trends: the Case of the 2007-2013 US CO2 Emissions Decline" (with Jonathan Camuzeaux, Adrian Muller, Marius Schneider and Gernot Wagner).

Determining the Factors behind the 2005-2013 Decline in CO2 Emissions from the US Electricity Sector (with Jonathan Camuzeaux and Susanne Brooks).