PIONEER
NATURAL RESOURCES

October 2, 2023

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Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Submitted via www.regulations.gov

Re: Response to Greenhouse Gas Reporting Rule: Revisions and Confidentiality Determinations for Petroleum and Natural Gas Systems; Docket No. EPA-HQ-OAR-2023-0234

Dear Ms. Bohman:

Pioneer Natural Resources USA, Inc. ("Pioneer" or "the Company") appreciates the opportunity to provide input on the Environmental Protection Agency's (EPA) publication entitled, "*Greenhouse Gas Reporting Rule: Revisions and Confidentiality Determinations for Petroleum and Natural Gas Systems*" ("Subpart W Revision Rule") published on August 1, 2023 (88 Fed. Reg. 50282).

Pioneer is a large independent oil and gas exploration and production company, headquartered in Dallas, Texas. The Company employs approximately 2,000 people and produces approximately 711,000 barrels of oil equivalent per day. Pioneer is a Permian pure-play company operating exclusively in the Midland Basin in West Texas. Pioneer's assets include the Sprayberry/ Wolfcamp Trend Areas where it is the largest operator.

Pioneer appreciates EPA's efforts to update quantification methodologies and emission factors that are intended to improve the accuracy and completeness of GHG emissions reports for the oil and gas sector and is cognizant of the Agency's directive from Congress under the Inflation Reduction Act ("IRA") to revise Subpart W to ensure that reporting (and associated calculation of waste emission charges) is based on empirical data. As a member of the Oil and Gas Methane Partnership 2.0 ("OGMP"), Pioneer supports the improvement and transparency of emissions inventories. Pioneer strives to be an industry leader in minimizing emissions from operations, promoting best practices, piloting innovative leak detection technologies, and seeking out other voluntary ways to improve the Company's emissions footprint. To the extent that the IRA mandate states that EPA shall revise Subpart W to "allow owners and operators… to submit empirical emissions data… to demonstrate the extent to which a charge" is owed, Pioneer has

some concerns with certain aspects of the proposed changes which do not align with that directive.

For example, Pioneer has significant concerns regarding EPA's proposed requirements related to "centralized production facilities" as part of the gathering & boosting segment (as opposed to the production segment where it should be classified based on its name and function). This segment classification is contradictory to previous interpretations and may have unintended consequences such as companies electing not to centralize such operations (even though consolidation serves to minimize environmental footprint) due to the more burdensome methane fee implications.

Also, Pioneer strongly recommends that EPA allow for the use of emerging, alternative technologies to monitor and measure emissions. As currently proposed, the rule specifies only currently available technology to obtain data for various sources and does not provide a pathway to demonstrate the performance of a new technology for use under the rule that may have more accurate and efficient emission measurement capabilities.

These two priority issues are discussed in detail below.

With Subpart W playing an integral role in determining a company's waste methane emissions charge liabilities, it is imperative that the final rule be clearly written and aligned with best industry operating practices as well as EPA's intent to minimize and reduce methane emissions.

Pioneer appreciates the opportunity to contribute to this important rulemaking and intends these comments to provide valuable operator insight into this proposal. Pioneer also supports the comments submitted by the American Exploration and Production Council (AXPC), Independent Petroleum Association of America (IPAA), and the Harvard Methane Roundtable. Pioneer looks forward to continuing a robust and productive dialogue with EPA on the oil and natural gas sector as it has done through various trade groups over the past decade.

In these comments, Pioneer provides concerns and recommendations in regard to the following points:

Overarching issues:

1. EPA's proposal conflicts in key aspects with the text and purpose of new CAA § 136
2. Designation of "Centralized Production Sites' in the "Gathering and Boosting" versus "Production" Segment is an improper application of the IRA and contrary to Congress' explicit intent
3. EPA's proposal has no framework for alternative measurement technologies to be utilized for compliance with Subpart W
4. Lack of timing/interrelatedness of proposed changes with other federal regulations

Source specific issues:

5. The flare Destruction and Removal Efficiency ("DRE") defaults are not accurate, and EPA should allow direct measurement
6. Potential high bias exists in the default emission rate for properly functioning intermittent pneumatic controllers
7. Recommendations for improvement in the crankcase venting calculation
8. Recommendations for improvement in the mud degassing representative sample methodology in calculation #1

Overarching Concerns and Recommendations

1. EPA's Proposal Conflicts in Key Aspects with the Text and Purpose of New Clean Air Act ("CAA") § 136

First, EPA's proposal to group its proposed new definition of "centralized oil production site" within the "gathering and boosting" category, *see* 88 Fed. Reg. at 50,437/1, is inconsistent with the text and structure of CAA § 136. Congress defined "production" and "gathering and boosting" as two distinct items in a list of eight parallel categories of applicable facilities subject to the MERP charge, CAA § 136(d)(2) ("Onshore petroleum and natural gas production"), (8) ("Onshore petroleum and natural gas gathering and boosting"). Further, the IRA has two heading in which to place these 8 subcategories – "PRODUCTION" and 'NON PRODUCTION". EPA is therefore acting contradictory to this text and to Congress's intent when it proposes to categorize *production* facilities as *gathering and boosting* ones. And this mis-categorization will have consequences because the waste emissions threshold above which a charge will be imposed on applicable facilities' emissions differs between these two categories, *see id.* § 136(f)(1), (2). The proposed definition of "centralized oil production site" is also inconsistent with the proposed definition and regulatory treatment of a "centralized production facility" in the pending CAA § 111 methane standards proposal for both new and existing sources as discussed in 2. below.

Second, although Congress was unequivocal in its direction that EPA revise Subpart W so that reporting thereunder, and calculation of the MERP charge, "are based on empirical data" and allow for the submission thereof, in key respects the Proposal *prevents* reporting from being based on empirical data. The most glaring example of this is the treatment of default flare combustion efficiency assumptions, *see* 88 Fed. Reg. at 50,334. The current default assumed efficiency is 98 percent. EPA proposes to lower this to 92 percent, which can be raised to 95 percent only if certain monitoring measures are conducted. But even if an owner can empirically demonstrate an efficiency of above 95 percent, no empirical demonstration (i.e. direct measurement) of that fact is allowed—which moves the policy in the precise opposite direction from what Congress directed.

In these examples especially, EPA's underlying rationale or factual basis is unreasonable. Further, EPA is ignoring key aspects of the statutory scheme precisely when it would be most relevant, one of the hallmarks of arbitrary and capricious rulemaking.

2. Designation of Centralized Oil Production Sites in "Gathering and Boosting" versus "Production" Segment is an Improper Application of the IRA and Contrary to Congress' Explicit Intent

EPA is considering significant changes in its reporting requirements for the various industry segments in the rule. One of the key changes involves designation of upstream operators' centralized tank batteries that EPA has named "centralized oil production sites". These are defined as sites collecting oil from multiple well pads without compressors "that are part of the onshore petroleum and natural gas gathering and boosting facility." In the proposed rule, EPA has classified centralized oil production sites under the gathering and boosting segment.

Pioneer appreciates that EPA has recognized centralized production sites as a facility type in the proposed rule. However, there are challenges and disincentives with including "centralized oil production sites" in the gathering and boosting segment.

First, EPA included "production" clearly in the name and it is nonsensical that centralized production sites would be considered part of the gathering and boosting segment.

Next, EPA's proposed definitions are contrary to IRA's Methane Emissions Reduction Plan ("MERP') waste emissions thresholds, where gathering and boosting sites are considered "Non-Production". In the MERP language, (f) Waste Emission Threshold, Congress created two categories for applicability of the threshold: "Production" and "Non-Production". The Gathering and Boosting segment (segment #8) is explicitly listed under "Non-Production". Clearly Congress did not intend for sites associated with production, such as "centralized ***production*** sites" to be considered gathering and boosting. EPA may have imposed reporting obligations for emissions from centralized tank batteries under the gathering and boosting segment in the past but for application of the fee, these sites should be considered production. Doing otherwise would result in an inequitable application of the fee that would most likely not be applied uniformly by all upstream operators. If EPA does not wish to clear up the confusion and include centralized production sites in the Production segment, Pioneer strongly recommends that EPA carve out these sites for threshold determination in the IRA implementation rule and make these sites subject to the 0.2 threshold as Congress has clearly mandated in the law.

In addition, the categorization of a centralized production site into gathering and boosting could result in a backslide from the progress industry has made in minimizing its overall footprint and emission sources. Due to the higher methane fees that may accompany categorizing production sites as gathering and boosting (subjecting these facilities to the 0.05% threshold instead of the 0.2% threshold) operators may be economically incentivized to migrate back to individual well pad installation dramatically increasing the amount of equipment in the field and increasing GHG emissions.

Further, these sites are considered by many operators as part of the upstream production process as these tank batteries are likened to "production supportive facilities." Pioneer is an upstream exploration and production company and has designed and currently operates these type of sites throughout the Permian Basin (midstream operators traditionally operate gathering and boosting sites that are typically large compressor stations that boost gas across an area). Facility design efficiency gains over the years have led to centralization of production surface equipment. The centralization of surface equipment typically results in emissions reductions relative to dispersed facilities (separation and tanks installed at each well pad) because the total equipment counts are significantly reduced (fewer emission points), there is a reduction of tank batteries/spill risk, increased operational efficiencies, and better ability to site major facilities away from sensitive areas/populations. This segment classification is contradictory to previous interpretations and may have unintended consequences such as companies electing not to centralize such operations (even though consolidation serves to minimize environmental footprint) due to the more burdensome methane fee implications. Facilities comprised of centralized surface equipment are owned and operated by producers, are considered in the industry as part of production, and may or may not include a well head or pump jack collocated on a single pad.

However, because EPA re-defined the production segment in 2016 as "associated with a single well pad" this has created a great deal of confusion with reporters and centralized tank batteries have been categorized differently both by individual owners / operators, as well as other federal rules (NSPS OOOOb). For example, under the proposed OOOOb/c regulations, the "centralized oil production facilities" (referred to in NSPS OOOOb as "centralized production facilities") are grouped under the production segment by definition, not gathering and boosting as explained below:

Currently, in Subpart W "***Centralized oil production site*** *means any permanent combination of one or more hydrocarbon liquids storage tanks located on one or more contiguous or adjacent properties that does not also contain a permanent combination of one or more compressors that are part of the onshore petroleum and natural gas gathering and boosting facility that gathers hydrocarbon liquids from multiple well-pads. A centralized oil production site is a type of gathering and boosting site for purposes of reporting under §98.236.*"

While NSPS OOOOb/c has a different name and definition of this as follow: "***Centralized production facility"*** *means one or more storage vessels and all equipment at a single surface site used to gather, for the purpose of sale or processing to sell, crude oil, condensate, produced water, or intermediate hydrocarbon liquid from one or more offsite natural gas or oil production wells. This equipment includes, but is not limited to, equipment used for storage, separation, treating, dehydration, artificial lift, combustion, compression, pumping, metering, monitoring, and flowline. Process vessels and process tanks are not considered storage vessels or storage tanks. A centralized production facility is located upstream of the natural gas processing plant or the crude oil pipeline breakout station and is a part of producing operations.*"

In addition, in the Pipeline and Hazardous Material Safety Administration's ('PHMSA") proposed Gas Pipeline Leak Detection and Repair rule, PHMSA does not define or regulate *any*

production facilities as "gathering and boosting". Specifically, as defined in API's Recommended Practice-80 and incorporated in 49 CFR 192: "The production function, in most cases, extends well downstream of the wellhead and may include several processes required to prepare the gas for transportation. *'Production Operation' means piping and equipment used for production and preparation for transportation or delivery of hydrocarbon gas and/or liquids and includes the following processes: (a) extraction and recovery, lifting, stabilization, treatment, separation, production processing, storage, and measurement of hydrocarbon gas and/or liquids; and (b) associated production compression, gas lift, gas injection, or fuel gas supply."*

Both the NSPS OOOOb/c and PHMSA's name and definition of what are essentially tank batteries are much more consistent with how these facilities operate and are managed in the field. ***In an effort to mitigate confusion and create more rule alignment, Pioneer suggests that EPA align the name and definition of the subject facility type between Subpart W and NSPS OOOOb/c.***

In this proposal, EPA claims to be striving for consistency when EPA states, on page 50288 of the proposal, "as in the 2016 rule, the proposed amendments would also allow facilities to use a consistent method to demonstrate compliance with multiple EPA programs." Also, Pioneer notes that even though EPA uses the word "gather" in the definition in Quad Ob/c, these sites are still properly defined as "part of the producing operations."

Further, the fact that EPA has proposed the definition of "centralized production sites" as sites that do <u>not</u> include compressors that are part of the gathering and boosting segment is puzzling. If these sites are part of the gathering and boosting segment as EPA has proposed, why would these sites not be allowed to have compressors that are part of the gathering and boosting segment on them? This demonstrates that EPA <u>*does*</u> understand the distinction between gathering and boosting compressors that should appropriately be included in the gathering and boosting segment and centralized tank batteries that clearly should not.

As such Pioneer requests that EPA change both the name and definition of "centralized oil production site" in the Subpart W rule to match NSPS OOOOb/c to align with other federal programs for consistency and to reflect how the industry owns and operates these facilities.

Pioneer also strongly recommends that EPA delete "associated with a single well pad" from the Onshore Petroleum and Natural Gas Production definition in Subpart W in order to clear up the confusion and properly have centralized production sites in the production segment where they belong.

3. <u>The Subpart W Revision Rule Has No Framework for Alternative Measurement Technologies to be Utilized For Compliance With Subpart W</u>

The Subpart W Revision Rule fails to include any framework for review and approval of advanced methane measurement technologies and the Proposed Rule's analysis of advanced measurement technologies—particularly, continuous monitoring systems—is insufficient.

Congress recognized the critical importance of promoting further innovation in and deployment of such technologies when it enacted section 136 in the IRA. Precluding the use of advanced measurement technologies is inconsistent with this Congressional directive to allow operators the option of using "empirical" methods to calculate their emissions, potentially making the final rule legally vulnerable. Section 136(i) requires EPA to "allow owners and operators of applicable facilities to submit empirical emissions data, in a manner to be prescribed by the Administrator, to demonstrate the extent to which a charge under subsection (c) is owed." Consistent with this Congressional mandate—and in the interest of promoting innovation—EPA should establish a framework in the final rule for approval of qualifying advanced measurement technologies for methane emissions measurement that owners and operators of applicable facilities may use to submit facility-specific emissions data.

Pioneer strongly urges EPA *not* to rely on future notice-and-comment rulemakings to approve the use of advanced measurement technologies. It is important to recognize the lessons learned from the experience with the Quad Oa regulations. Almost immediately after the 2016 promulgation of those regulations, owners and operators of regulated facilities asked to use advanced measurement technologies in lieu of the prescribed technologies, yet revised regulations are not expected until late 2023. This time lapse of seven years has been a missed opportunity for the Agency to enable the use of advanced technologies and more accurate measurement, reporting, and reductions. In those revised regulations, the Agency has now wisely proposed to establish a framework for ongoing review and approval of alternative methods. It should do the same here.

Notably, Congress granted the Agency considerable procedural leeway to develop and implement this kind of framework. Section 136(h) expressly authorizes EPA to issue not only regulations but also *guidance* "as necessary" to carry out its Methane Emission Reduction Program mandates. The matrices that EPA has developed for the Section 111 Supplemental Proposal provide a model for such a method-by-method approval framework.

Further, to support consistent treatment of technologies and incentives among the rulemakings by EPA, BLM, and PHMSA, EPA has an opportunity to ensure the Subpart W rulemaking reflects the technology opportunities other rulemakings are advancing. Pioneer respectfully urges the EPA to consider its statutory mandate and the extent to which advanced measurement technologies can materially advance the Agency's goal of methane reduction. Postponing individualized review and approval of such technologies to future notice-and-comment rulemakings—which could take years—will chill innovation and deployment.

Pioneer recommends that EPA adopt an approval process pathway for new technologies as they have proposed in Quad Ob. Further, to the extent EPA approves an advanced technology to detect fugitive emissions under OOOOb/c regulations, EPA's Subpart W rule should explicitly enable operators to utilize such technologies that can more accurately reflect the duration of any emissions event for a facility (e.g., aerial surveys, drones, continuous monitors, satellites etc.) as well as to gather data for compliance with this rule.

4. Lack of Timing/Interrelatedness of Proposed Changes with Other Federal Regulations

The proposed Subpart W requirements expressly reference and/or are directly related to a number of other pending regulations or legislation, namely CAA Section 111(b) standards of performance for certain new, reconstructed, and modified oil and natural gas sources (40 CFR Part 60, Subpart OOOOb, a.k.a. "NSPS OOOOb"), emissions guidelines under CAA Section 111(d) for certain existing oil and natural gas sources (40 CFR Part 60, Subpart OOOOc, a.k.a. "EG OOOOc"), and the IRA Section 60113 methane emissions reduction program's waste emission charge for oil gas facilities ("MERP WEC").

In principle, Pioneer supports EPA's efforts to allow facilities to use a consistent method to demonstrate compliance with multiple applicable regulatory programs. However, significant portions of the proposed Subpart W requirements are inherently intertwined with critical compliance aspects of these other programs, which have not yet been finalized. This presents considerable compliance risk to affected facilities by introducing regulatory uncertainty. Facilities that are faced with implementing new monitoring requirements calculation methods under this proposal will want to evaluate any correlating requirements under NSPS OOOOb or EG OOOOc in order to proceed with the most cost-effective compliance option that meets the requirements of both rules. For example, when facilities are evaluating the monitoring options and calculation method hierarchy for flares under proposed Subpart W, they will need regulatory certainty for corresponding requirements under NSPS OOOOb and EG OOOOc before making the significant investment in monitoring equipment, personnel training, analytical services, etc. Facilities cannot make fully informed decisions, which have significant economic impacts, unless all of these interdependent rules have been finalized with adequate consideration to their interaction.

We urge EPA to delay taking final action on the proposed Subpart W changes until EPA finalizes NSPS OOOOb, EG OOOOc, and the yet to be proposed regulatory framework for administering the MERP WEC. Given the inherent interrelatedness of Subpart W with these other CAA programs, it is imperative that any potential inconsistencies and uncertainties across the various programs be avoided. Affected facilities are unable to fully evaluate their technical or financial compliance obligations under the proposed Subpart W requirements until such time as these other regulations are finalized.

Therefore, Pioneer recommends that EPA delay the effective date of the proposed Subpart W changes to go into effect only after NSPS OOOOb standards, EG OOOOc presumptive requirements, and the MERP WEC regulatory language have been finalized.

Specific Source Concerns and Recommendations

5. The Flare DRE Defaults Are Not Accurate and EPA Does Not Allow Direct Measurement

The proposed rule requires that a default destruction rate efficiency ("DRE") of 92% be used, rather than the previously allowed 98%, unless additional monitoring requirements are followed. The EPA proposes that if a company would like to claim a DRE of 95%, compliance with the monitoring requirements of NSPS OOOOb would need to be followed. These requirements would include continuous measurements of pilot flame presence, net heating value, and flow rate that comply with NSPS OOOOb protocols. The EPA states that if a company would like to claim a DRE of 98%, compliance with the monitoring requirements of 40 CFR 63, Subpart CC (Refinery MACT) would need to be followed. These requirements would include daily observations, continuous measurements of flare tip velocity, net heating value, pilot flame presence, volumetric flow rate, and gas composition that comply with Subpart CC protocols.

While the premise that additional monitoring would allow an operator to claim a higher DRE is generally reasonable, Pioneer has serious concerns with the basis of the proposed default DRE of 92% as described in more detail below.

Pioneer requests that the EPA remove the tiered control efficiency for flares from the final Subpart W rule and allow operators to claim the control efficiency that is most appropriate and justifiable by manufacturer's guarantee or applicable regulatory requirement that the flare is subject to.

The 92% DRE proposed is based on data which includes traditional open-flamed flares and the Enclosed Combustion Devices ("ECDs"). Open-flamed flares have a shorter operating life, have less control or air intake and are more heavily influenced by wind. Data in the EPA referenced research study, Plant, G., et al. 2022, from which the EPA concluded a 92% destruction efficiency, shows ECDs have a destruction efficiency of 90 to 99.9% over the life of the ECDs which is higher than the 92% proposed. Therefore, if a default destruction efficiency must be used, Pioneer recommends the ECDs be evaluated differently than open-flamed flares with regard to a default destruction efficiency since they will be operating at a much higher destruction efficiency over the life of the unit than 92%. If the manufacturer's destruction efficiency cannot be used for the emission calculations, 95% should be allowed due to the data present in Plant, G., et al. 2022.

5.a. Refinery MACT Compliance for 98% DRE is Unacceptable

Pioneer has significant concerns with EPA imposing refinery requirements on the oil and gas industry in order for them to claim the DRE, 98%, that most manufacturers of flares claim they can operate at under normal conditions. Upstream oil and gas operations are completely different from the processes performed and the multiple and variable waste streams controlled at a refinery. For example, the Refinery MACT requires net heating value monitoring, which makes

sense in a complicated system that has variable stream compositions, but the vast majority of applicable vent gas streams at oil and gas sites are consistently above applicable minimum NHV limits. In addition, unlike a refinery, operators do not use inert gases that would reduce the inherently high NHV of a vent gas stream. Thus, there is little risk, and in many cases no risk, that vent gas streams will fall below the minimum NHV at any time, and certainly not great enough risk to warrant NHV monitoring in order to allow for an operator to claim a DRE of 98%.

Second, the use of calorimeters to continuously monitor net heating value in the upstream oil and gas sector is unproven. Production streams, though consistent in composition, are variable in flow rates. These flow rates are often low and/or intermittent vapor control streams. Current calorimeter technology cannot accurately measure the NHV of these low and/or intermittent streams consistently over time and across varying operating conditions. In these applications, calorimeters are unlikely to yield accurate or useful data. In addition to the technical concerns, the Proposal will prompt thousands of calorimeter orders that will overwhelm calorimeter supply vendors, resulting in a supply chain crisis, as operators wait months or longer for order fulfillment.

5.b. Use of Plant et al. Study is Inappropriately Applied and Creates Bias

The Plant et al. study is stated as EPA's basis for the lower proposed flare DRE in this rulemaking, specifically stating in the rule preamble, "*Plant et al. conducted extensive testing in the Eagle Ford, Bakken, and Permian basins and found average combustion efficiencies ranging from less than 92 percent in the Bakken basin to slightly more than 97 percent in the Permian basin.*" [Footnote, there is an error in EPA's statement in the preamble. Flares in the Bakken basin showed an average DRE of 97% in the study, while the Permian flares showed an average DRE of 92%.] We see several issues with EPA's application of this study as the basis for the lower DRE in the proposal.

Firstly, based on review of Plant et al.'s study, the flares selected for the study inherently will give bias results for multiple reasons. To begin, the studied flares weren't selected at random, but rather, they were selected based on specific criteria, one of which is if they had a recent (within the past 7 months) detection in Skytruth, VIIRS-based satellite data, that is only able to identify flares that meet certain heat signature or emission rate criteria based on spectral observations within certain spectral bands. Next, the sample set can't be applied nationwide because the basins observed are focused on associated gas flaring in predominantly oil plays; therefore, is not representative of primarily gas producing plays which operate completely differently. Finally, many operators use ECDs that would never be seen from the VIIRS satellite; therefore, would never be targeted in this study, nor are they traditionally used in oil plays, so their DRE capabilities are not reflected. All of these reasons invalidate the results of this study and render applying the conclusions to the nationwide population of flares and other similar control devices arbitrary and capricious.

Secondly, it appears that EPA is using the average total flare effective DRE from the study results as the basis for the 92% assumption, which is not appropriate because it accounts for unlit

flares. The study tested flares across several basins to estimate an average "observed DRE" of 95.2% across the study and an average "total effective DRE" of 91.1%. The study notes that the total effective DRE is calculated based on a combination of observed unlit flare statistics and DRE of lit flares (i.e., observed DRE). Given that EPA is proposing additional monitoring for the pilot flame as part of this proposal, the unlit flare durations would be known and the associated emissions from unlit flares are required to be reported separately under this rule. This is how unlit flares should be considered rather than including them into an average that will erroneously bring it down and significantly alter actual emissions reported from flare that are indeed lit and operating properly.

In summary, the use of 92% as a default DRE based on this study is flawed since the sample set is not representative of the general population and it accounts for unlit flares that are already required to be reported separately.

5.c. Additional concerns with 92% DRE

Moreover, the change in allowable DRE to a default of 92% is also inconsistent with many states' permitting and compliance guidelines. This inconsistency would cause discrepancies in reported emissions across the state and EPA GHG reporting programs. For example, the Texas Commission on Environmental Quality (TCEQ) policy allows up to 98% DRE to be claimed for flares at minor sources with no monitoring, and up to 99% for hydrocarbon molecules with three or fewer carbon atoms. The CDPHE allows facilities to claim a default of 95% DRE on ECDs. The Pennsylvania Department of Environmental Protection (PAEDP) also allows a minimum flare destruction efficiency of 95%. PADEP will accept flare DREs higher than 95% based on manufacturer specifications or stack testing data. Example testing reports can be found here
https://cimarron.com/quado-enclosed-combustors-should-you-claim-95-dre-or-99-dre/
https://www.cleanair.com/measuring-flare-destruction-efficiency-passive-ftir/
https://www.zeeco.com/resources/presentations/destruction-efficiency-of-air-assisted-flares

For the above reasons, we recommend that EPA retain the current flare default DRE of 98% and require facilities to report unlit flare emissions based on the proposed pilot flame monitoring. This is the most appropriate way for the EPA to reach the directive given by Congress in the IRA to incorporate empirical data in emissions estimation and reporting.

6. Potential High Bias Exists in the Default Emission Rate for Properly Functioning Intermittent Pneumatic Controllers

Pioneer concurs with the comments submitted by David Allen, the Norbert Dittrich-Welch Chair in Chemical Engineering, the Director of the Center for Energy and Environmental Resources, and the co-Director of the Energy Emissions Modeling and Data Lab at the University of Texas at Austin, on this rulemaking as follows:

> "The default emission rate for normally operating pneumatic controllers proposed by the EPA (2.82 scf/hr) is based on the work of Zimmerle, et al. (2019) and Luck, et al. (2019), which report emissions from pneumatic controllers in gathering and boosting operations. The study is unique in reporting very long duration measurements from pneumatic

controllers. Measurement durations were typically multiple days, in contrast to measurements in other studies which had typical durations of less than an hour. A total of 40 intermittent vent controllers were sampled and 15 of these measurements were defined as controllers that were properly functioning. As noted by the EPA, Zimmerle, et al. (2019) and Luck, et al. (2019) caution against using the data from their small sample of controllers to develop national emission factors, nevertheless, the EPA argues that these are the best data available for establishing average emission rates for properly functioning intermittent controllers.

While the Zimmerle, et al. (2019) and Luck, et al. (2019) data are the best long duration data currently available for estimating emission factors for intermittent pneumatic controllers at gathering and boosting stations, *the data are not representative of emission rates at production facilities, particularly for properly functioning intermittent controllers.* The emission rates for properly functioning pneumatic controllers are determined by numbers of controller actuations and the volume emitted with each actuation. Gathering and boosting stations handle larger volumes of gas than production sites since they gather gas from multiple production sites. Larger gas volumes are likely to lead to larger numbers of actuations. In addition, the primary function of a gathering and boosting site is compression (boosting). Data on controller emissions at production sites, categorized by the type of equipment that the controller is servicing, is largest for pneumatic controllers associated with compressors. Allen, et al (2015) report a national average of 14.0 scf/hr for controllers (both properly functioning and not properly functioning) associated with compressors, which is approximately three times the average emission rate for controllers in service of other equipment (5.0 scf/hr for both properly functioning and not functioning properly).

Potential alternatives for the default emission rate for production sites

There are multiple alternatives for estimating a default emission rate for normally operating pneumatic controllers.

1. One approach would be to use the emission factor for properly functioning intermittent pneumatic controllers developed by the American Petroleum Institute (API, 2019). This data set sampled 164 properly functioning intermittent controllers of which 44 had actuations during the measurement period. This is a much larger data set than the Zimmerle, et al. (2019) and Luck, et al. (2019) data set, and the controllers in the API study were almost exclusively on production sites. *The emission factor derived in the API study is 0.28 scf/hr, an order of magnitude lower than EPA's proposed value.*

2. Another alternative would be to base the emission factor for properly functioning intermittent controllers on the data of Allen, et al. (2015). Allen, et al. (2015) found an average emission rate for all pneumatic controllers of 5.5 scf whole gas/hr and attributed 95% of the emissions to malfunctioning controllers. This means that properly functioning controllers had an emission rate of 0.28 scf of whole gas per hour, a rate nearly identical to the results from the API study. This estimated emission rate for properly functioning controllers was dominated by a relatively large number of measurements for which a sampling time of 15 minutes did not lead to an

observed actuation or otherwise measurable emission (241 devices out of the 377 devices of all types with measurements). This is consistent with actuation frequencies observed in the API study, which had actuations observed in 44 out of 164 properly functioning controllers. Recognizing that controllers with no emissions during the observation period (typically 15 minutes) might not have zero emissions over a longer time period, Allen et al. (2015) conducted an analysis to establish an upper bound on the emission rate for properly operating controllers. The analysis used estimated actuation frequencies and observed volumes emitted per actuation. In the Supporting Information (Section S5), the analysis concludes that "Overall, the study average emission rate for controllers would be expected to increase by 2%-6% if the measurement period had been extended indefinitely. This estimate is based on data for controllers in separator level control service, the most common type of service observed in the study, and a type of service that is likely to result in regular actuations." Taking a mid-point value from this analysis would result in a 4% increase in the study average of 5.5 scf/hr of whole gas (4.9 scf/hr of methane), which would lead to an emission rate increase of 0.2 scf/h, attributed to properly functioning controllers. *This would suggest an emission rate upper bound of 0.5 scf/hr for all properly functioning controllers, including high and low bleed controllers. For the observed volume per actuation (0.3 scf/actuation), this upper bound suggests an average of approximately 2 actuations per hour.* In contrast, EPA's proposed emission rate for properly operating pneumatic controllers of 2.82 scf/hr suggests an actuation frequency of ~10/hr. An average actuation frequency of ~10/hr implies that virtually every controller sampled for 15 minutes would have an actuation, which is not consistent with either the API (2019) or Allen, et al. (2015) measurements at production sites.

Other approaches are possible, but use of the average emission rate for properly operating pneumatic controllers from gathering and boosting sites is not appropriate for production sites. The proposed default emission factor for properly functioning intermittent controllers (2.82 scf/hr) is likely to over-estimate emissions from these devices at production sites and could have a significant impact on total estimated emissions from the natural gas and petroleum production sectors. ***A default emission factor of 0.3 scf/hr is recommended for properly functioning intermittent pneumatic controllers."***

7. Crankcase Venting Calculation Recommendation

In the calculation for crankcase venting, the methane emissions factor should be the average concentration of methane in the exhaust stream, and not related to the inlet gas stream concentration as proposed.

Further, direct measurement of methane concentration in the crankcase vent stream via a bag and grab sample should be allowed to reduce this factor. The vent gas in the crankcase is made up of partially combusted and un-combusted products so their methodology proposed may be too conservative. Direct measurement should be allowed for all sources in the proposed rule to satisfy the intent of the IRA.

The proposed rule states that crankcase venting "does not include ingestive systems that vent blow-by into the engine where it is returned to the combustion process". Pioneer recommends that EPA include language that also allows this vent stream to be routed to another closed vent system or unrelated process stream in order to provide operators more flexibility.

8. <u>Drilling Mud Degassing Calculation Recommendation</u>

The Calculation Method #1 that EPA is proposing to quantify drilling mud degassing applies an emission rate derived from a representative well in the same sub-basin and at the "same approximate total depth." Pioneer request clarification on how to determine the "same approximate total depth." ***Pioneer recommends clarifying language stating that it should be determined based on similar producing formation or zone rather based solely on a physical depth.***

Pioneer appreciates the opportunity to comment on this rulemaking and EPA's consideration of this letter. Please contact me if you have any questions or require additional information.

Thank you,

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