



Project Canary PBC
1200 17th St, Floor 23
Denver, CO 80202

October 2, 2023

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

Submitted electronically: Federal eRulemaking Portal at www.regulations.gov.

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

Dear Administrator Regan:

Project Canary, PBC (“Project Canary”), appreciates the Environmental Protection Agency (EPA or “the Agency”) the proposed revisions to the requirements of the Greenhouse Gas Reporting Program (GHGRP) for the petroleum and natural gas systems source category (hereafter referred to as “Subpart W”) to ensure that Subpart W reporting is based on empirical data and accurately reflects the total methane emissions (and waste emissions) from the applicable facilities, and to allow owners and operators of applicable facilities to submit empirical emissions data to demonstrate the extent to which a Methane Waste Emissions Charge is owed under Clean Air Act (CAA) Section 136.¹

However, Project Canary has significant concerns about the Proposed Rule. The Proposed Rule fails to include a framework for review and approval of advanced methane measurement technologies, and the analysis of advanced measurement technologies—particularly, continuous monitoring systems—is insufficient. Congress recognized the critical importance of promoting further innovation and deployment of such technologies when it enacted Section 136 in the Inflation Reduction Act (IRA). Precluding the use of advanced measurement technologies is inconsistent with the Congressional directive to allow operators the option of using “empirical”

¹ Greenhouse Gas Reporting Rule: Revisions and Confidentiality Determinations for Petroleum and Natural Gas Systems, 88 Fed. Reg. 50,282 (Aug 1, 2023) (hereinafter the “Proposed Rule”).

methods to calculate their emissions, potentially making the final rule legally vulnerable. For these reasons, Project Canary 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.

EPA should develop a framework for approval of advanced methane measurement technologies, leveraging the Alternative Test Methods process that it has proposed for the New Source Performance Standards (NSPS) OOOOb and EG OOOOc regulations², with criteria tailored to the objectives of Subpart W and implementation of the Waste Methane Emissions Charge. To that end, our comments recommend performance criteria that EPA should consider. Postponing individualized review and approval of such technologies to future notice-and-comment rulemakings—which could take years—will chill innovation and deployment. We would be pleased to work with the Agency and other stakeholders to develop a robust review framework.

Below please find a summary of our principal comments, information about continuous monitoring, Project Canary’s comments on the Proposed Rule generally and in response to EPA’s Proposed Rule questions.

I. Summary of Principal Comments

- Continuous monitoring can play a vital role in monitoring, detecting, and quantifying methane emissions in the oil and natural gas industry. Both remote sensing and continuous monitoring technologies have their benefits, and both will play a critical role in determining what the true emissions are at a given site. These technologies are improving rapidly and are increasingly deployed throughout the oil and gas industry. Congress recognized the importance of increased deployment in the IRA, appropriating substantial funding to subsidize methane emissions monitoring in the oil and gas sector.
- Congressional emphasis, in Section 136(h) of the IRA, on use of “empirical data” constitutes a mandate to EPA to introduce greater use of direct, facility-specific measurement into the Subpart W rules. With the enactment of the Methane Waste Emissions Charge, it will be critically important to allow each owner or operator of an applicable facility the opportunity to avail itself of technologies that can generate an accurate measurement of the facility’s annual emissions—especially because such facilities will be subject to a charge that is measured on a per-ton basis.
- Congress clearly did not want EPA to levy Methane Waste Emission Charges exclusively on the basis of generalized emission factors. Congress directed EPA to allow owners or operators to rebut the presumptions inherent in emission factors using measured, facility-specific data.
- The EPA proposes to preclude the use of all “top-down” methods for methane quantification—except for the limited purpose of calculating “Other Large Release Events.” The analysis EPA relies on for its general exclusion of top-down methods is incomplete because, among other things, it characterizes all top-down methods as providing only periodic surveying. The Agency failed to fully analyze whether there are advanced methane measurement technologies that could meet its criteria for quantification accuracy, such as continuous emissions monitoring.

² U.S. EPA, *Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources for Existing Sources; Oil and Natural Gas Sector Climate Review*, 87 Fed. Reg. 74,702 (Dec. 6, 2023) (hereinafter “NSPS OOOOb and EG OOOOc proposal”).

- For calculations that require use of emission factors, an owner or operator of an applicable facility would have no means of demonstrating that its actual facility emissions are lower than the generalized estimates reflected in the emission factors. As a result, it could be liable for a Methane Waste Emissions Charge that does not reflect its actual emissions.
- This approach frustrates the Congressional intent to ensure accuracy and fairness in imposition of the charge. It is also inconsistent with Congressional intent to ensure that the Methane Waste Emissions Charge creates an incentive to reduce methane emissions because investment in mitigation could be obscured by the blunt, broad-based application of emission factors.
- As it has proposed in the NSPS OOOOb and EG OOOOc rulemaking, EPA should establish a framework in the Final Subpart W Rule for approval of qualifying advanced methane measurement technologies, including continuous monitoring systems, that owners and operators of applicable facilities may use for compliance with their reporting obligations and for determining their liability for a Methane Waste Emissions Charge. The framework should have performance criteria tailored to advanced methane measurement quantification technology.
- Project Canary encourages the EPA to coordinate both internally and with other agencies on a coherent and consistent approach to integrating advanced technologies across all methane-related rulemakings.

II. About Project Canary

Project Canary, based in Denver, Colorado, is a mission-driven B-Corporation accountable to a triple bottom line of people, planet, and profit. Our goal is to mitigate climate change by enabling the oil and natural gas industry to operate on a cleaner, more efficient, more sustainable basis. Project Canary is a climate technology company with an enterprise emissions data platform that helps companies identify, measure, understand, and act to reduce emissions across the energy value chain. The Company started with methane and has expanded to other greenhouse gases. Project Canary leverages sophisticated software solutions to help companies improve and report on their emissions footprint. We do this by building high-fidelity sensors, ingesting data from various other technologies and sources, characterizing the accuracy of such emissions data, and deploying advanced physics-based AI-powered models to identify leaks and quantify emissions. We continually work to advance and improve our monitoring technologies, which have been in use since 2019 at oil and natural gas facilities across the United States.

III. About Continuous Monitoring Systems

Before we address our specific comments on the Proposed Rule, we offer the following information about continuous monitoring systems.

Continuous monitoring systems play a vital role in monitoring, detecting and quantifying methane emissions in the oil and natural gas industry. There are various types of continuous monitoring systems capable of detecting methane leaks and quantifying a facility's methane emissions. While each system has unique characteristics, some general principles apply to the majority of, if not all, such systems.

A typical continuous monitoring system includes multiple fixed methane sensors placed around the fence line of a facility along with one or more anemometers to measure wind direction and speed. The number of methane

sensors can vary, but generally there are a minimum of three sensors and up to five or more depending on the size and complexity of the facility. Placement of the sensors is based on a detailed analysis of predominant wind directions and specific facility configurations and is designed to maximize the probability of detecting methane emissions from the facility. Continuous monitoring systems work by detecting methane that moves from a given source at the facility to one of the fence line sensors, which then measures the methane concentration in the air. Methane concentrations, along with meteorological data, are then typically uploaded to the cloud where the data can be processed further, providing emissions localization and mass quantification.

Mass quantification capabilities differ among continuous monitoring systems. High precision sensors are required to enable accurate and precise mass quantification. Project Canary's quantification model is designed to localize and quantify total site emissions. This includes both small intermittent emissions from sources such as pneumatic devices and fugitive emissions that can persist over long periods of time. Continuous monitoring systems transform raw sensor measurements (e.g., ambient readings, wind speed, and wind direction) into composite data that are more informative and useful to operators, such as if, when, where, and at what rate emissions occurred at the facility. Our system translates concentrations into quantified mass values, calculating true emissions taking into account atmospheric effects such as wind.

The accuracy and precision of a continuous monitoring system depends on input data from the sensors and the mass quantification model. The model quality is critical as the translation of raw data to mass quantification measurement is based on inferences made by the model. For models to accurately capture emissions, they must account for atmospheric conditions, such as wind, obstacles, and emissions sources.

Mass quantification models have evolved significantly in the last several years and will continue to improve rapidly, driven both by regulatory programs and by voluntary corporate greenhouse gas (GHG) reduction commitments and reporting. Project Canary continually tests its quantification model and iterates to make accuracy improvements. This testing has included controlled release testing through multi-release points, third party double-blind experiments, super-emitter rates (>3 mt/hr), operational intermittent (pneumatic) releases, and fugitive intermittent releases. For example, we have improved our most recent model to account for plume rise, which has a significant potential impact in connection with larger emissions events. The next version of our quantification model, which will be released soon, will improve accuracy at more complex facilities such as compressor stations with buildings.

Continuous monitoring systems provide real-time, on-site monitoring, which makes them highly effective for pinpointing emission sources quickly. In contrast, remote sensing technologies such as satellite-based sensors or aerial surveys can cover large areas but lack precision in identifying specific sources and small sources due to higher detection thresholds and can miss intermittent sources of emissions due to their periodic nature. The detection thresholds for remote sensing technologies also vary greatly from continuous monitoring systems. Both remote sensing and continuous monitoring technologies have their benefits, and both will play a critical role in determining what the true emissions are at a given site.

Different types of continuous monitoring systems come with inherent challenges and benefits which necessitate a regulatory framework that allows owners and operators to employ different, complementary technologies to quantify their emissions. Generally, installing and maintaining continuous monitoring systems can be costly for smaller, low-producing facilities. Continuous monitoring systems also require regular maintenance and

calibration to ensure accurate measurements. While continuous monitoring systems are highly effective within the facility boundary where they are installed, they cannot cover entire basins in a cost-efficient manner. Because continuous monitoring systems are typically placed along the fence line of a site and close to the ground, they may not detect high velocity emissions from very high release points such as the top of a large flare stack.

Continuous monitoring systems have seen widespread adoption and increasing use for both regulatory compliance and voluntary emissions reduction frameworks. Through the proposed NSPS OOOOb and associated EG OOOOc, EPA has embraced the value of continuous monitoring systems for leak detection and repair (LDAR) based on site-level emissions quantification. The State of Colorado has gone a step further. In addition to allowing the use of advanced technologies, including continuous monitoring systems, for compliance with their LDAR program, Colorado will now allow for the use of advanced technologies to develop measurement-informed inventories for annual greenhouse gas reporting, as we describe in detail in Section IV.b.5. Also, the European Union is poised to regulate methane emissions associated with imported natural gas. Although these rules have not yet been finalized, Liquefied Natural Gas (LNG) exporters into the Union may be required to report methane emission reduction efforts and may be required to report methane intensity. Continuous emissions monitoring systems will be a valuable provider of this information.

Multiple scientific studies have been published describing the importance of continuous monitoring systems for ensuring a holistic emissions profile. Several of these publications are referenced throughout this comment letter and are also provided in Appendix A.

IV. Comments on the Proposed Rule

a. Section 136 requires EPA to allow owners of applicable facilities to submit facility-specific, observed data for purposes of calculating their exposure to the Methane Waste Emissions Charge.

As the Agency acknowledges, it has issued the Proposed Rule to meet mandates from Congress under Section 136 of the CAA (“Methane Waste Emissions Charge”), which Congress added in Section 60113 of the IRA.³

Section 136 consists of three elements:

- (1) directives to EPA related to its proposed new NSPS OOOOb and EG OOOOc rules;
- (2) the establishment of a Methane Waste Emissions Charge, to be calculated based on annual emissions reported pursuant to Subpart W; and
- (3) the allocation of \$850 million to EPA to distribute for methane mitigation and monitoring by applicable facilities, including financial and technical assistance to owners and operators of such facilities to prepare and submit Subpart W reports needed to implement the Methane Waste Emissions Charge.

In a letter to you of June 13, 2023, fourteen of the senators involved in drafting Section 136, including the Chairman of the Environment & Public Works Committee, described these policies as comprising a “three-legged

³ Section 60113, P. L. 117-169 (amending the CAA to add Section 136).

stool” in which “all three of these elements work together.”⁴ The letter goes on to emphasize that the IRA, “requires EPA to update the existing Greenhouse Gas Reporting Program for oil and gas production—which provides the basis for assessing the emissions charge—to *ensure more accurate quantification* and reporting of methane emissions.”⁵

A key element of this program is the Methane Waste Emissions Charge. The design of the charge relies substantially on Subpart W.

The Methane Waste Emissions Charge applies only to facilities reporting in certain industry segments defined in the Subpart W regulations. Section 136 refers to these facilities as “applicable facilities.”⁶ Section 136 directs EPA to apply the Methane Waste Emissions Charge only to those applicable facilities that have annual Subpart W-reported emissions in excess of particular thresholds.⁷ For applicable facilities with excess emissions, the Methane Waste Emissions Charge is calculated by multiplying a specified dollar amount by each ton of methane emissions in excess of the relevant threshold.⁸ In other words, implementation of the Methane Waste Emissions Charge requires EPA to use the Subpart W framework to quantify annual emission levels for each of the applicable facilities and to calculate any charges on a per-ton basis.

Congress recognized that the current Subpart W framework is not up to this task. The existing Subpart W rules rely heavily on the use of presumptive, activity-based “emission factors” in lieu of facility- or site-specific measurement. Multiple studies have demonstrated the inaccuracy and flaws of the Subpart W emission factors.⁹

Had Congress been satisfied with the current Subpart W methodologies, it would have remained silent on these inadequacies and simply required the use of the existing Subpart W framework. However, Congress explicitly directed EPA to *revise* the Subpart W regulations. Section 136(h) provides:

Not later than 2 years after the date of enactment of this section, the Administrator shall revise the requirements of subpart W of part 98 of title 40, Code of Federal Regulations, to ensure the reporting under such subpart, and calculation of charges under subsections (e) and (f) of this section, ***are based on empirical data***, including data collected pursuant to subsection (a)(4), ***accurately reflect the total methane emissions and waste emissions from the applicable facilities***, and ***allow owners and operators of applicable facilities to submit empirical emissions***

⁴ Letter from Sen. Carper *et al.* to EPA Administrator Regan (June 13, 2023), https://www.epw.senate.gov/public/_cache/files/a/d/add69148-5551-44d1-a723-9712b2356aa6/7528A8ED3B05E497624AE68DABD20E6D.06-15-23-letter-to-regan-methane-final.pdf (last visited Sep. 19, 2023).

⁵ *Id.* (emphasis added)

⁶ CAA § 136(d) (defining “applicable facility”). Section 136(c) further limits “applicable facilities” to those reporting more than 25,000 mtCO₂e.

⁷ *Id.* at § 136(f) (specifying waste emission thresholds).

⁸ *Id.* at § 136(e) (specifying annual charge amounts).

⁹ See, e.g., Alvarez, R. A. *et al.* Assessment of methane emissions from the US oil and gas supply chain. *Science* 361, 186–188 (2018); Lu X, *et al.* Observation-derived 2010-2019 trends in methane emissions and intensities from US oil and gas fields tied to activity metrics. *Proc. Natl Acad. Sci. USA*. 2023;120:e2217900120. Doi; Rutherford, J. S.; Sherwin, E. *et al.* Closing the methane gap in US oil and natural gas production emissions inventories. *Nature Comm.* 2021 12:4715. DOI: 10.1038 s41467-021-25017-4.: 10.1073/pnas.2217900120.

data, in a manner to be prescribed by the Administrator, to demonstrate the extent to which a charge under subsection (c) is owed.¹⁰

Congress thus directed the Agency to revise the regulations to “ensure” that Subpart W reporting—which forms the basis of calculation of any Methane Waste Emissions Charges—is (1) “based on empirical data” and (2) “accurately reflect[s]” the emissions from applicable facilities.

And Congress went further. It specifically required the Agency to “allow owners and operators of applicable facilities to submit empirical emissions data in a manner to be prescribed by [the EPA] Administrator to demonstrate the extent” to which a charge is owed. In other words, it required EPA to make it possible for a facility owner to use empirical methods to show that its facility’s *actual* emissions are lower than what the emission factors and other conventional Subpart W reporting methods would indicate.

Section 136 does not provide a definition of “empirical,” so it is appropriate to assume that Congress intended the word to have its common dictionary definition, which is “originating in or based on observation or experience.”¹¹ Emission factors do not fit this definition because they are, by definition, generalized and aggregated estimates that apply to all facilities and all activities in various categories. When Subpart W applies an emission factor to a facility, it is not a measurement of the emissions *actually observed at that facility*. Therefore, Congress’ emphasis in Section 136(h) on “empirical data” constitutes a mandate to EPA to introduce greater use of direct, facility-specific measurement into the Subpart W rules.

Further, as noted above, Congress allocated millions of dollars to subsidize this shift. Section 136(a) sets aside \$850 million for EPA for four purposes—one of which is to provide grants, rebates, and loans to owners and operators of applicable facilities to prepare and submit Subpart W reports.¹² And innovative and advanced technologies are eligible for such funds.¹³

Section 136 establishes sensible mandates for the Agency regarding emissions reporting. With the enactment of the Methane Waste Emissions Charge, it will be critically important to allow each owner or operator of an applicable facility the opportunity to avail itself of technologies that can generate an accurate measurement of the facility’s annual emissions—especially because such facilities will be subject to a charge that is measured on a *per-ton* basis. Congress clearly did not want EPA to levy Methane Waste Emission Charges exclusively on the basis of generalized emission factors. Congress directed EPA to allow owners or operators to rebut the presumptions inherent in emission factors using measured, facility-specific data.

The mandate to EPA to allow use of actually-observed data promotes two key objectives. One is fairness. An owner of an “applicable facility” should have the ability to use direct measurement methods to ensure that it has a fair and accurate tax burden—especially since the Methane Waste Emissions Charge is calculated on a highly granular, *per-ton* basis. The second is environmental progress. Congress intended the Methane Waste Emissions Charge to incentivize mitigation of methane emissions. However, a facility owner will not have any incentive to

¹⁰ CAA § 136(h) (emphasis added).

¹¹ Merriam-Webster, On-Line Dictionary, definition of “Empirical,” <https://www.merriam-webster.com/dictionary/empirical>.

¹² CAA § 136(a)(1).

¹³ *Id.* at § 136(c).

invest in mitigating its emissions below presumptive emission factors if it cannot use proven empirical methods to demonstrate that it has lowered its emissions.

As explained in greater detail below, the Proposed Rule is inconsistent with EPA's statutory mandate under Section 136(h) because it broadly prohibits owners and operators from using facility-specific measurements generated by a proven technology—continuous monitoring systems—in lieu of emission factors.

b. The Proposed Rule's treatment of continuous monitoring systems is arbitrary and capricious.

1. The Proposed Rule broadly precludes use of continuous monitoring systems or any other advanced measurement technologies.

The Proposed Rule broadly prohibits an owner or operator of an applicable facility from submitting facility-specific quantification data from continuous monitoring systems or from any other advanced monitoring method to calculate the facility's methane emissions.

The possible exception is the "Other Large Release Events" source category. Even for this limited source category, the Proposed Rule's embrace of advanced measurement technologies is tentative. The preamble to the Proposed Rule only says that the Agency "expect[s]" that under the proposed methodology for Other Large Release Events, data from some advanced measurement technologies could be used to calculate total emissions and/or estimate duration for such events.¹⁴

Under certain limited circumstances, EPA has proposed to allow use of continuous monitoring technology to calculate *carbon dioxide* (CO₂) emissions. Such continuous monitoring technology is a particular type of system, which is placed directly on a stack for purposes of CO₂ emissions monitoring. First, EPA has proposed to allow use of such technologies as part of two of the four permissible CO₂ emissions calculation methods for acid gas removal vents.¹⁵ Second, where a production facility is using a continuous monitor for CO₂ emissions at the outlet of a flare—which EPA describes as a "rare case"¹⁶—the facility is excused from reporting the CO₂ emissions using equation W-2.¹⁷ Finally, the Proposed Rule specifies certain calculation methods for owners or operators using continuous monitoring systems to calculate combustion CO₂ emissions from regenerator firebox/fire tubes.¹⁸ Again, in each of these three cases, EPA allows only the use of a particular type of continuous monitoring technology and only for calculating CO₂ emissions, not for calculating methane emissions.

Otherwise, the Proposed Rule would forbid owners or operators from using any advanced measurement technologies to calculate their annual methane emissions.

¹⁴ Proposed Rule, 88 Fed. Reg. at 50,290.

¹⁵ *Id.* at 50,316.

¹⁶ *Id.* at 50,333.

¹⁷ *Id.* at 50,336.

¹⁸ *Id.* at 50,390.

2. The Proposed Rule fails to sufficiently analyze whether advanced measurement technologies can provide more accurate methane emissions measurement than the measurement methods EPA proposes to approve.

In the Proposed Rule, EPA refers to advanced measurement technologies—satellite monitoring, aerial monitoring, and continuous monitoring systems—under the label of “top-down” methods.¹⁹ Though the Agency acknowledges in both the preamble to the Proposed Rule and in the Technical Support Document (TSD) that “top-down” methods are “very useful in identifying possible large emissions events that are not captured by other reporting obligations,” EPA categorically concludes that they are “not presently able to provide annual emissions data to the degree of accuracy and certainty required by other provisions.”²⁰

The Agency insists that “most” measurements using “top-down” methods are “taken over limited durations” at a facility and at a “single moment in time” that may not be representative of the facility’s annual methane emissions.²¹ EPA also asserts that the data provided by “some” top-down methods is at large spatial scales, with limited ability to disaggregate to the facility- or emission source-level. EPA further finds that “some” of these methods have detection limits that are too high to detect emissions from sources with relatively low emission rates.²² Citing these generalized conclusions, the EPA proposes to preclude use of *all* “top-down” methods for methane quantification—except for the limited purposes of “Other Large Release Events” source methodology.

This analysis is incomplete. Even accepting for the sake of argument that “some” of the “top-down” methods have the limitations EPA identified, the Agency failed to analyze whether there are other “top-down” methods that nevertheless could meet its criteria for quantification accuracy, such as methods with more refined detection limits. Further, EPA failed to analyze whether “top-down” methods would suffice if, for example, they were combined with Optical Gas Imaging (OGI) surveys or if they were applied with greater frequency, whether it be quarterly, bimonthly or continuously.

These analytical omissions are noteworthy because the Agency’s own NSPS OOOOb and EG OOOOc proposal included a matrix for EPA approval of the use of certain “top-down” methods and other “advanced measurement technologies” in lieu of OGI surveys and Audio Visual Olfactory (AVO) inspections. The matrix criteria are framed in terms of surveying frequency and detection limits.²³ Given the Agency’s granular analysis of the sufficiency of “top-down” methods at particular detection limits and particular surveying frequencies in the NSPS OOOOb and EG OOOOc proposal, EPA’s nearly categorical dismissal of all “top-down” methods in the Proposed Rule is arbitrary and capricious.

¹⁹ *Id.* at 50, 289 (“[W]e reviewed measurement approaches that utilize information from satellite, aerial, and continuous monitoring (‘top-down approaches’) to detect and/or quantify emissions from petroleum and natural gas system for the purposes of subpart W reporting.”).

²⁰ *Id.* at 50,290.

²¹ *Id.* at 52,291.

²² *Id.* (citation omitted).

²³ NSPS OOOOb and EG OOOOc Proposal, 87 Fed. Reg. at 74,740-746.

Furthermore, to address the quantity of leaks undetected by OGI and Method 21 applications, EPA has proposed to provide a method-specific adjustment factor—referred to as the “k factor”—for calculation methods used to quantify emissions from equipment leaks using the leaker method in 40 CFR 98.233(q). EPA fails to explain why Subpart W reporters may not use data from “top-down” methods *at a minimum* to rebut emissions attributable to this proposed k factor. As with other emission factor data, the k factor is a *generalized estimate* that would apply to all relevant sources without regard to the actual volume of leaked emissions from those sources. If a Subpart W reporter is monitoring *actual facility-specific* emissions using an EPA-approved advanced method and detects fewer leaks than the otherwise applicable k factor estimate, it should be able to use data from the former calculation to rebut the latter. We understand the Agency’s attempt to adjust emission factors to make up for emission underestimation, but we fail to see that this could not be better and more equitably addressed by readily available, rapidly improving actual facility-specific emissions data.

3. The Proposed Rule fails to analyze the distinct capabilities of continuous monitoring systems.

The comments made in the preceding sections assume, for the sake of argument, that the Proposed Rule has accurately described the limitations of “top-down” methods. However, as explained in this section, the Proposed Rule’s analysis of “top-down” methods fails to include *any* meaningful analysis of the capabilities of continuous monitoring systems.

What scarce discussion there is about continuous monitoring systems in the Proposed Rule mistakenly conflates continuous monitoring systems with satellite and aerial surveying technologies under the broad rubric of “top-down” methods. The first mention of “top-down” methods in the preamble to the Proposed Rule includes continuous monitoring systems, but the discussion of their capabilities is confined to satellite technologies, aerial technologies, and drones. The TSD for the Proposed Rule is even more insufficient. It expressly limits its analysis of “top-down” methods to these remote, periodic surveying technologies—and omits *any* analysis of continuous monitoring systems. Section 2.2 of the TSD describes its scope of the review as covering “the current and potential future capability of top-down methods for quantifying methane emissions *using remote-sensing approaches from aerial and satellite platforms that observe at various spatial scales depending on the altitude of observation.*”²⁴

Continuous monitoring systems are neither remote nor periodic in their operations. They are installed at the site or facility, and they operate on a *continuous* basis, as described above in Section III. The scholarly literature on methane monitoring recognizes the difference between remote, periodic surveying technologies and continuous monitoring systems.²⁵ And EPA itself recognized this difference in its NSPS OOOOb and EG OOOOc Proposal. The Agency established an approval matrix for continuous monitoring systems that is entirely separate and distinct from the matrix for periodic surveying by satellite and aerial technologies. The omission of any significant analysis of continuous monitoring systems is a significant gap in the technical record for the Proposed Rule.

²⁴ U.S. ENVIRONMENTAL PROTECTION AGENCY, GREENHOUSE GAS REPORTING RULE: TECHNICAL SUPPORT FOR REVISIONS AND CONFIDENTIALITY DETERMINATIONS FOR DATA ELEMENTS UNDER THE GREENHOUSE GAS REPORTING RULE; PROPOSED RULE—PETROLEUM AND NATURAL GAS SYSTEMS, EPA-HQ-OAR-2023-0234; FRL-10246-01- OAR (June 2023) (hereinafter “TSD”), at 6 (emphasis added).

²⁵ Daniels, W., *et al.*, Toward multi-scale measurement-informed methane inventories: reconciling bottom-up site-level inventories with top-down measurements using continuous monitoring systems, *Environ. Sci. Technol.* 2023, 57, 32, 11823-11833 (July 28, 2023), <https://doi.org/10.1021/acs.est.3c01121>.

Furthermore, the rationales offered by the Agency in the Proposed Rule and the TSD for its dismissal of satellite and aerial surveying technologies do not apply to continuous monitoring systems. As noted above, the EPA ruled out use of “top-down” methods for all but “Other Large Release Events” because measurements from such methods are “taken over limited durations” at “large spatial scales” and at high detection limits. By contrast, again, continuous monitoring systems operate continuously on a facility-specific basis. Many continuous monitoring systems are capable of detecting and measuring emissions at low kg levels; in its NSPS OOOOb and EG OOOOc proposal, EPA has proposed to approve continuous monitoring systems capable of detection at a 0.12 kg/hr or 0.16 kg/hr level.

For these reasons, the technical record in the Proposed Rule is insufficient. EPA should undertake a review of continuous monitoring systems and establish an approval matrix for such systems similar to that which the Agency has proposed to establish in the NSPS OOOOb and EG OOOOc Proposal.

4. The Proposed Rule mischaracterizes input received by the Agency from the Methane Emissions Reduction Program Request for Information.

In November 2022, EPA published a Request for Information (RFI) with eight questions about implementation of the Methane Emission Reduction Program (MERP).²⁶ In question number 8 of the RFI, EPA specifically requested input about how the Agency should revise the Subpart W requirements: “The IRA requires EPA to revise the requirements of GHGRP Subpart W to ensure that reporting is based on empirical data and accurately reflects total methane emissions. What revisions should EPA consider related to GHGRP Subpart W?”²⁷

Yet, in the Proposed Rule preamble, EPA does not refer to or cite this input. EPA refers to the RFI only for the limited purpose of demonstrating that it complied with laws and policies requiring the Agency to solicit input from small governments and tribes.²⁸ The Proposed Rule does not discuss the *content* of input received from any commenters.

The TSD includes a short discussion of responses to the RFI, but it mischaracterizes the input. The TSD correctly notes that three environmental nongovernmental organization (NGO) comments—one of which is from a coalition of 16 NGOs—specifically recommended that EPA integrate both top-down and bottom-up methods into the Subpart W revisions.²⁹ However, the TSD contrasts this recommendation with the recommendations of “one industry organization” that asserts that advanced measurement technologies are “relatively immature.”³⁰ This is an excerpt from comments from the Interstate Natural Gas Association of America (INGAA). A fuller review of INGAA’s comments show that INGAA actually recommended that EPA revise the Subpart W rules to allow greater use of direct measurement methods as those methods improve.³¹ The INGAA comments include the following statements:

²⁶ U.S. ENVIRONMENTAL PROTECTION AGENCY, DOCKET 3: METHANE EMISSIONS REDUCTION PROGRAM [60113] (Nov. 2022).

²⁷ *Id.* at 2.

²⁸ Proposed Rule, 88 Fed. Reg. at 50373 (discussing EPA’s compliance with the Unfunded Mandates Reform Act and Executive Order 13175: Consultation and Coordination With Indian Tribal Governments).

²⁹ TSD, at 18.

³⁰ *Id.*

³¹ Comment Submitted by the Interstate Natural Association of America, <https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0875-0051>.

- *INGAA recommends that EPA provide flexibility in its upcoming revisions to Subpart W to ensure that operators can use site-specific and/or company-specific measurement data to improve methane emissions estimates-e.g., using such data rather than more generic emission factors for estimating source-specific emissions.*
- *It is important to note that INGAA members are continuously looking for new and innovative ways to reduce GHG emissions from transmission & storage (“T&S”) sources. In many cases technological advances that reduce GHG emissions or improve GHG emissions measurement outpace the regulatory process. Accordingly, INGAA strongly encourages EPA to include operators with flexibility [sic] to report emissions associated with affected facilities that accurately reflect implementation of new GHG reduction and measurement technologies when those technologies are supported with defensible data. The ability to rapidly deploy new technology to reduce and measure GHG emissions will become even more important with the anticipated revisions to the GHGRP mandated by the IRA.*
- *Additionally, EPA should consider the need to develop measurement/monitoring infrastructure to support advanced monitoring, including remote monitoring. This issue is critical in light of the changes mandated by the IRA as well as the Methane Rule Supplemental.*

Another industry organization commenter—the American Petroleum Institute (API)—made similar recommendations:

- *We recommend that EPA propose and seek comment on a definition of "empirical data" that recognizes that emissions factors are based on empirical data, and accounts for the current and growing array of technologies and methods that can be used to collect emissions data from the upcoming MERP rulemaking.*
- *The statutory text is unambiguous with regards to the requirement to revise Subpart W to allow operators to use empirical data in their reporting. Thus, using empirical data in Subpart W reporting is an option, not a requirement. As such, we believe that EPA should give operators the option to use empirical data in place of, or alongside, emission factors. Specific facility or equipment testing data may be more accurate than the average emission factors provided by studies, but due to the complex and geographically distributed nature of oil and natural gas operations, we emphasize that emissions factors will continue to be a necessary component of Subpart W reporting.*
- *With respect to the transition to empirical data, based on previous work with advanced technologies and protocols, the GHGRP will continue to need both emission factors for smaller dispersed sources and data from advanced technologies to reach a goal of empirical methane reporting on a national scale.*

- *EPA should recognize potential for some OOOO-approved technologies with quantification capabilities to provide useful insight into a facility's actual GHG emissions.*³²

EPA should revisit the recommendations submitted in response to the MERP RFI and correct its mischaracterization.

5. The Proposed Rule's approach regarding continuous monitoring systems is inconsistent with leading state methane quantification policies.

The approach in the Proposed Rule would put EPA off pace with leading state policies, which are moving toward intensity-based methane requirements and the use of advanced measurement technologies. The State of Colorado finalized a rule in July 2023 that will require owners and operators of certain types of oil and gas facilities to directly measure their methane emissions on a facility-specific basis.³³ The state will use these calculations to derive state-wide emission inventories to assure compliance with the state's GHG intensity (emissions per unit output) thresholds. It is expected that facility owners will use advanced measurement technologies to comply with their direct measurement obligations.

The Colorado rule came about as the result of a comprehensive stakeholder dialogue involving industry, technology providers, and environmental groups. The Environmental Defense Fund issued a statement praising the rule as a "commonsense proposal to directly measure methane emissions in the field."³⁴

Through the implementation of this rule, Colorado is fostering technology advancement and adoption as well as ensuring the operators in the state are utilizing empirical data to reduce their emissions and report the most accurate emissions data available. EPA should partner with Colorado, and other states considering similar approaches, to advance this mutual goal.

c. EPA should allow the use of Agency-approved continuous monitoring systems to address the known limitations of emission factors.

Project Canary acknowledges that the Subpart W program will continue to make use of emission factors for the foreseeable future. We also recognize that the accuracy of many emission factors has improved considerably. However, emission factors continue to have significant limitations, as the Agency has acknowledged with the imposition of the k factor. It is well known that actual emissions vary substantially among basins, between facilities, and at other levels of calculation.

Over the past decade, numerous peer-reviewed studies featuring field measurements of emissions from oil and natural gas facilities have cast doubt on the accuracy of emissions inventories calculated using emission factors.

³² Comment submitted by the American Petroleum Institute, <https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0875-0020>.

³³ Colorado Dep't of Public Health, "Colorado Adopts First-of-its-Kind to Verify Greenhouse Gas Emissions From Certain Oil and Gas Sites" (July 2023), <https://cdphe.colorado.gov/press-release/colorado-adopts-first-of-its-kind-measures-to-verify-greenhouse-gas-emissions-from>.

³⁴ Environmental Defense Fund, "Colorado Adopts Ground-breaking Methane Measurement Rule" (July 2023), <https://www.edf.org/media/colorado-adopts-groundbreaking-methane-measurement-rule>.

Excerpts from several of these prominent studies include the following (in addition and including those studies referenced above in Section IV.a.):

- “Recent studies have emphasized a ~1.5-2x divergence between the EPA GHGI estimates of CH₄ emissions from O&NG and those estimated from field measurements [...] our estimate is ~1.8 times that of the [EPA] GHGI.”³⁵
- “Our facility-based estimate of 2015 supply chain emissions is 13 +/- 2 Tg a⁻¹, equivalent to 2.3% of gross US gas production [...] ~60% higher than the US EPA inventory estimate.”³⁶
- “We estimate a mean US oil/gas methane emission of 14.8 (12.4 to 16.5) Tg a⁻¹ for 2010 to 2019, 70% higher than reported by the United States Environmental Protection Agency.”³⁷

To put these shortcomings into perspective, consider the *Benchmarking Methane and Other GHG Emissions of Oil & Natural Gas Production in the United States Report* by MJBradley, which provides operator-specific methane intensities reported to the EPA under Subpart W.³⁸ Assuming a 0.2% methane intensity threshold for certified natural gas (often called differentiated or low methane intensity), the MJBradley report suggests that over 70% of natural gas production would qualify as certified natural gas with no additional action taken. An abundance of scientific evidence suggests that emissions exceed GHGRP inventories, yet the status quo reporting methodologies would recognize nearly three quarters of U.S. oil/natural gas production as below 0.2% methane intensity.

Given this pattern of inaccuracy, the burden of proof for the Agency to disallow facility-specific measurements methods in favor of emission factors should be high.

In addition, both emission factors and their embedded k factors are backward-looking. They do not take into account, for example, mitigation that will occur in the years ahead through implementation of the NSPS OOOOb, the EG OOOOc regulations and the Methane Waste Emissions Charge. As a result, emission factors will only become increasingly inaccurate over time.

For calculations that require use of emission factors, an owner or operator of an applicable facility would have no means of demonstrating that its actual facility emissions are lower than the applicable factor. As a result, it could be liable for a Methane Waste Emissions Charge that does not reflect its actual emissions. Under the Proposed Rule, the owner or operator may not submit data from any kind of continuous monitoring system to rebut such a calculation—even from a continuous monitoring system approved by EPA as a “best system of emission reduction” under the NSPS OOOOb and EG OOOOc regulations. This approach frustrates the Congressional

³⁵ Rutherford, J. S.; Sherwin, E. et al. Closing the methane gap in US oil and natural gas production emissions inventories. *Nature Comm.* 2021 12:4715. DOI: 10.1038 s41467-021-25017-4.

³⁶ Alvarez, R; Zavala-Araiza, D et al. Assessment of methane emissions from the U.S. oil and gas supply chain. *Science*. 2018 361 186-188. DOI: 10.1126/science.aar7204

³⁷ Lu, X; Jacob D et al. Observation-derived 2010-2019 trends in methane emissions and intensities from US oil and gas fields tied to activity metrics. *PNAS*. 2023 (120)17 10.1073/pnas.2217900120.

³⁸ Benchmarking Methane and Other GHG Emissions of Oil & Natural Gas Production in the United States, Robert LaCount, Tom Curry, Luke Hellgren, Pye Russell. https://www.catf.us/wp-content/uploads/2021/06/OilandGas_BenchmarkingReport_FINAL.pdf

intent to ensure accuracy and fairness in imposition of the charge. It also is inconsistent with Congressional intent to ensure that the Methane Waste Emissions Charge creates an incentive to reduce methane emissions because investment in mitigation could be obscured by the blunt, broad-based application of emission factors.

d. EPA should allow submission of data from Agency-approved advanced measurement technologies, including continuous monitoring systems, to calculate emissions attributable to and/or establish the duration of Other Large Release Events.

The Proposed Rule states that EPA expects that “under the proposed methodology for other large release events in this proposal, data from some top-down approaches, including data derived from equipment leak and fugitive emissions monitoring using advanced screening methods which is conducted under NSPS OOOOb or the applicable Federal plan in 40 CFR part 62, in combination with other empirical data, could be used for reporters to calculate the total emissions from these events and/or estimate duration of such an event.”³⁹

Sources of emissions at oil and gas facilities are often intermittent and of short duration. Multiple studies indicate that actively capturing temporal variability of emissions events is critical to accurately characterizing annual emissions.^{40 41 42} Periodic measurement campaigns to detect “other large release events” have the potential to result in large errors if shorter duration or intermittent events must be assumed to have been emitting for a duration of 182 days. Error increases as the duration of events become shorter, making temporal frequency of these emissions events very important when calculating annual emissions inventories.⁴³

If EPA finalizes the Other Large Release Event source methodology as proposed, such events could account for a large volume of emissions for an applicable facility and therefore have a significant impact on a facility’s exposure to the Methane Waste Emissions Charge. Therefore, it will be especially important for the Agency to fully comply with its Section 136 mandate to ensure that the data used to calculate emissions attributable to such an event are both empirical and accurate—rather than based solely on broad estimates.

Finally, the Agency is proposing to require that Subpart W reporters account for large events detected by advanced measurement technologies deployed by third parties participating in the Super Emitter Response Program under the NSPS OOOOb and EG OOOOc proposed rule.⁴⁴ It would be arbitrary and capricious for the Agency to allow third parties to use an advanced methane measurement technology to calculate the duration

³⁹ Proposed Rule, 88 Fed. Reg. at 50,290.

⁴⁰ Daniels, W., *et al.*, Toward multi-scale measurement-informed methane inventories: reconciling bottom-up site-level inventories with top-down measurements using continuous monitoring systems, *Environ. Sci. Technol.* 2023, 57, 32, 11823-11833 (July 28, 2023), <https://doi.org/10.1021/acs.est.3c01121>.

⁴¹ Schissel, C.; Allen, D. T. Impact of the High-Emission Event Duration and Sampling Frequency on the Uncertainty in Emission Estimates. *Environ. Sci. Technol. Lett.* 2022, 9, 1063– 1067, DOI: 10.1021/acs.estlett.2c00731

⁴² Cusworth, D et al. Intermittency of Large Methane Emitters in the Permian Basin. *Env. Sci. Tech. Lett.* **2021**, 8, 567-573. DOI: 10.1021/acs.estlett.1c00173

⁴³ Schissel, C.; Allen, D. T. Impact of the High-Emission Event Duration and Sampling Frequency on the Uncertainty in Emission Estimates. *Environ. Sci. Technol. Lett.* 2022, 9, 1063– 1067, DOI: 10.1021/acs.estlett.2c00731

⁴⁴ Proposed Rule, 88 Fed. Reg. at 50,290 (“In this proposal, we are proposing to require facilities to consider notifications of potential super-emitter emissions event under the super-emitter provisions of NSPS OOOOb at 40 CFR 60.5371b and calculate associated events when they exceed our proposed thresholds if they are not already accounted for under another source category in subpart W.”)

and quantity of an operator's emissions while prohibiting the operator itself from using an advanced methane measurement technology to rebut that determination.

For these reasons, Project Canary urges the Agency to clarify that owners and operators of applicable facilities are permitted to use EPA-approved advanced measurement technologies—including continuous monitoring systems—to submit data on both the duration and quantity of emissions attributable to such events.

e. EPA should “prescribe a manner” in which owners or operators of applicable facilities may use advanced measurement technologies, including continuous monitoring systems, to calculate their emissions and the extent to which a Methane Waste Emissions Charge is owed.

Section 136(h) 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, including continuous monitoring systems, that owners and operators of applicable facilities may use to submit facility-specific emissions data.

Project Canary strongly urges EPA *not* to rely on the site-by-site Alternative Means of Emission Limitation mechanism or 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 OOOOa regulations. As EPA knows, 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 2024. This time lapse of eight 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. The matrices that EPA has developed for the NSPS OOOOb and EG OOOOc proposal provide a model for such a method-by-method approval framework for Subpart W.

f. The framework for approving advanced measurement technologies should have appropriate criteria and leverage the proposed NSPS OOOOb and EG OOOOc technology-approval framework.

In developing a framework for approval of advanced technologies, including continuous monitoring, for the purpose of emissions quantification, the Agency should use appropriate quantification-related performance criteria.

These performance criteria could address such factors as:

- frequency of measurement
- uncertainty
- emissions source attribution capabilities
- probability of detection under various conditions
- operational limitations
- minimum detection thresholds

In addition, for these systems, the Agency should define how each performance criterion is tested, measured, and demonstrated.

Finally, in the interest of maximizing administrative efficiency, Project Canary urges EPA to leverage the technology-approval framework it has proposed for NSPS OOOOb and EG OOOOc wherever appropriate and possible. We do not support the use of the site-by-site Alternative Means of Emission Limitation (AMEL) mechanism, which has proven to be administratively cumbersome and insufficiently responsive to the rate of technology advancement in this area.

V. Responses to EPA's Specific Solicitation of Comments

Below we identify how points made above are responsive to the Agency's solicitations for comments throughout the Proposed Rule:

- 1. From the Preamble in Section B. Revisions to Add New Emissions Calculation Methodologies or Improve Existing Emissions Calculation Methodology, EPA asks "In addition to the proposed use of top-down data to help identify and quantify super-emitter and other large emissions events, we invite comment on whether there are other appropriate uses of top-down data for the purposes of reporting under Subpart W of the GHGRP, including what types of emissions sources and emission events, what specific top-down methods may be appropriate, especially in terms of spatial scale and minimum detection limits."**

As stated in Section IV above, EPA should not limit the use of advanced measurement technologies to just the "Other Large Release Events" emission source. Advanced measurement technology quantification has been thoroughly tested and is currently deployed throughout the country in both LDAR programs as well as emissions quantification applications. Continuous monitors, for example, can be used to better define start and end times for events under the Other Large Release Event category. All top-down methods are unique and may be more appropriate for certain types of events and emissions quantification.

By allowing all sources of emissions to be informed by measurement-based and quantified emissions values, EPA will incentivize the investment in and adoption of advanced emissions detection technologies. In addition to these technologies providing the basis for a more accurate and robust GHG emissions inventory, they will also help to drive down emissions and will result in more precise payments to the Treasury with respect to the Methane Waste Emissions Charge.

- 2. From the Preamble in Section B. Revisions to Add New Emissions Calculation Methodologies or Improve Existing Emissions Calculation Methodology, EPA asks, “We invite comment on whether there are top-down approaches that could be used to estimate annual emission for any source categories under Subpart W or for facility-level emissions, what level of accuracy should be required for such use and whether the development of standards (either by EPA or third-party organizations) could help inform this determination. We also invite comment on how frequently measurements would need to be conducted to be considered reliable or representative of annual emissions for reporting purposes.”**

Advanced measurement technologies, including continuous monitoring systems, should be allowed to estimate annual emissions for source categories and/or facility-level emissions under Subpart W. EPA should create a framework for approval of such technologies leveraging the NSPS OOOOb and EG OOOOc proposal. In adapting this framework for the purpose of emissions quantification, rather than just detection, the Agency should use appropriate performance criteria. As noted in Section IV.5.f., these performance criteria should include frequency of measurement, uncertainty, emissions source attribution capabilities, probability of detection under various conditions, operational limitations, and minimum detection thresholds. The Agency should define “continuous” and should specify how it wants each performance criterion tested, measured, and demonstrated.

Continuous monitors are also well suited for conducting site-level quantified emissions estimates. Continuous monitoring technologies have very granular temporal resolution, and when combined with robust and technically sound quantification methodologies, can provide site-specific, accurate emissions values for a facility. This data can be reconciled with bottoms-up inventories and other top-down methodologies, to more accurately inform the GHG emissions inventory. Reconciliation protocols, such as OGMP2.0 and GTI Veritas, can serve as models for EPA to develop a specific Subpart W protocol for reconciliation of bottoms-up and top-down inventories. Colorado is also evaluating these models.

- 3. From the Preamble in Section B. Revisions to Add New Emissions Calculation Methodologies or Improve Existing Emissions Calculation Methodology, EPA asks, “We invite comment on how to best combine top-down data with bottom-up methods in a way that avoids double counting of emissions. For example, top-down data may be used to refine emission estimates for particular sources or for the facility. We also seek comment on the best methods to estimate duration of events measured using top-down measurements and extrapolation to annual emissions. We also invite comment on the associated modeling necessary to incorporate top-down data and the associated uncertainties for calculating facility-level emissions. We also request comment on how to account for the types of limitations described in this section**

Multi-scale measurements, including the use of continuous monitoring systems, are important for creating accurate measurement-informed emissions inventories. A recent 11-month, peer reviewed, methane measurement study used continuous monitoring systems to validate snapshot measurements from aerial technologies to determine how they relate to the temporal emission profile of given sites and to create a measurement-informed site-level inventory that can be validated with aerial measurements to update calculated conventional inventories. This study demonstrates that multi-scale

advanced measurement technologies can be used to accurately reconcile emissions in a way that results in an accurate annual emissions inventory without double counting emissions. Reconciliation protocols, such as OGMP2.0 and GTI Veritas, can serve as models for EPA to develop a specific Subpart W protocol for reconciliation of bottoms-up and top-down inventories. Colorado is also evaluating these models.

- 4. From the Preamble in Section P. Equipment Leak Surveys, Subsection of Undetected Leak Factor for Leaker Emission Estimation Methods, EPA asks, “We are seeking comment on the application of this factor to scale detected leak emissions. Specifically, we are seeking additional data that either support the application of this factor and the appropriate method-specific value for this factor, or support for why the proposed factor should not be applied to equipment leak estimates.”**

The study used to generate the undetected leak factor, or k factor, was performed specifically for OGI, Method 21 at 500 ppm and Method 21 at 1000 ppm. Under the NSPS OOOOb and EG OOOOc final regulation, many operators will likely be utilizing more accurate EPA-approved advanced technology methodologies, including continuous monitoring systems, to satisfy their fugitive emissions facility requirements. Applying a k factor to leaks detected through the use of these technologies will result in inaccurate accounting of emissions.

The study used to generate the undetected leak factor, or k factor, was also performed on only 67 oil and gas sites in the Permian, Anadarko, Gulf Coast and San Juan basins. This is not representative of emissions from all operators across all basins in the U.S. Operators use varying methods of fugitive emissions control and abatement. By requiring the k factor regardless of where or how a site is operated, EPA is disincentivizing continuous improvement and fugitive emissions reduction investment.

- 5. From the Preamble in Section 6. Amendments Related to Oil and Natural Gas Standards and Emissions Guidelines in 40 CFR Part 60, EPA asks, “We request comment on these proposed amendments and whether there are other provisions or reporting requirements relative to NSPS OOOOb or EG OOOOc that we should consider for revisions to the requirements under Subpart W.”**

In the Proposed Rule Preamble, EPA states: "This proposal would limit the burden for subpart W facilities with affected sources that would also be required to comply with the proposed NSPS OOOOb or a State or Federal Plan in part 62 implementing EG OOOOc by allowing them to use data derived from the implementation of the NSPS OOOOb to calculate emissions for the GHGRP rather than requiring the use of different monitoring methods." Within the proposed NSPS OOOOb and EG OOOOc, EPA has created a framework for the use of approved advanced measurement technologies, including continuous monitoring systems, to satisfy the LDAR requirements within fugitive affected facility provisions. Many of these technologies are capable of accurately quantifying emissions in addition to detecting them. EPA should establish a framework to approve qualifying advanced technologies for quantification of emissions within this Proposed Rule and is arguably obligated to do so by the statutory requirements of the IRA.

The matrices that EPA has developed for the NSPS OOOOb and EG OOOOc proposal provide a model for a technology approval framework within Subpart W. In adapting this framework for the purpose of emissions quantification, rather than just detection, the Agency should use appropriate performance criteria. These performance criteria should include frequency of measurement, uncertainty, emissions source attribution capabilities, probability of detection under various conditions, operational limitations, and minimum detection thresholds. In addition, for these systems, the Agency should define how each performance criterion is tested, measured, and demonstrated.

VI. Conclusion

We would be remiss if we did not add the broader point that Project Canary encourages the EPA to work with the rest of the Administration to support consistent, whole-of-government integration of advanced measurement technologies and incentives across other methane-related rulemakings by incorporating the NSPS OOOOb and EG OOOOc Alternative Test Method approval approach including:

- The PHMSA (Pipeline and Hazardous Materials Safety Administration) Pipeline Safety: Gas Pipeline Leak Detection and Repair Proposed Rule⁴⁵ which contemplates a similar measurement methodology approval approach.
- In the BLM (Bureau of Land Management) proposed rule on Waste Prevention, Production Subject to Royalties, and Resource Conservation⁴⁶, BLM proposes to incorporate “relevant advances in technology” as a factor for “reasonable measures to prevent waste.” However, the proposed rule does not facilitate the adoption of advanced methane detection technologies for use at oil and gas operations on federal lands. The BLM should align its Final Rule with the EPA’s proposed NSPS OOOOb and EG OOOOc approval process, allowing methodologies approved by EPA to fulfill BLM’s “reasonable measures.”
- The Department of Energy’s differentiated natural gas Best Practices Framework initiative could also rely on EPA-approved measurement methodologies as a reliable source to ensure monitoring is best practice for purposes of verification, auditing, or buyer certainty for purchases of differentiated natural gas.
- Although the final SEC rulemaking is undergoing changes, as we understand it, it would also be advisable for the Administration to rely on EPA-approved measurement methodologies for corporate reporting as it can, again, provide a reliable source of assurance that methane measurement is best practice.
- It is also advisable for the Administration to adopt EPA-approved methane detection and quantification methodologies as best practice in the Federal Acquisition Regulation for Disclosure of Greenhouse Gas Emissions and Climate-Related Financial Risk⁴⁷ and the Federal Acquisition Regulation for Sustainable Procurement proposed rule.⁴⁸

It is important to encourage continued investment in the development of new methane measurement technologies and other innovations that may make these technologies more efficient, accessible, and affordable. We urge a technology-neutral approach in federal and state policies—laws and regulations should not dictate

⁴⁵ Docket No. PHMSA-2021-0039, RIN 2137-AF51. <https://www.regulations.gov/document/PHMSA-2021-0039-2101>.

⁴⁶ BLM-2022-0003-0001. <https://www.regulations.gov/document/BLM-2022-0003-0001>.

⁴⁷ FAR Case 2021-015. <https://www.regulations.gov/document/FAR-2021-0015-0037>.

⁴⁸ FAR Case 2022-006, 88 Federal Register 51672 (August 3, 2023). <https://www.regulations.gov/document/FAR-2022-0006-0001>.

which technologies can be utilized. Instead, these policies should focus on quantifiable outcomes—specifically, a robust understanding of actual, on-the-ground emissions. This allows for the quick identification and remediation of emission sources and will encourage the adoption of more efficient and accurate technology as it is created.

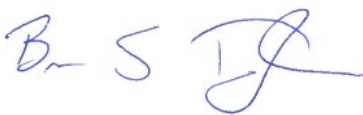
By allowing sources of emissions to be informed by measurement-based and quantified emissions values, EPA will incentivize the investment in and adoption of advanced emissions detection technologies. In addition to these technologies providing the basis for a more accurate and robust GHG emissions inventory, they will also help to drive down emissions because operators are more likely to invest in emissions mitigation if they have confidence the resulting reductions will be reflected in their reported inventories. An accurate GHG emissions inventory also will result in more precise payments to the Treasury with respect to the methane fee. Through the use of EPA-approved measurement technologies in lieu of emission factors that are known to both under- and over-estimate emissions, operators are more likely to pay exactly what is owed regarding their emissions. Disincentivizing the adoption of advanced technologies would defeat the Agency's goals in this proposal and frustrate Congressional intent.

* * * *

If finalized with improvements we respectfully offer here, the Final Rule offers an outstanding opportunity for the nation to invest in a long-lasting methane monitoring infrastructure to enable oil and gas production, processing, and transmission with minimum associated methane emissions. We sincerely appreciate your consideration of our comments on the proposed rule and would be pleased to work with the Agency and other stakeholders to develop a robust review framework.

Should you have any questions, please feel free to reach out to me at brian.taylor@projectcanary.com. We look forward to continuing to work with you and your staff on this important rulemaking.

Sincerely,



Brian S. Taylor
Vice President, Environmental Solutions
Project Canary, PBC

APPENDIX A: REFERENCED PEER-REVIEWED ARTICLES

Alvarez, R. A. *et al.* Assessment of methane emissions from the US oil and gas supply chain. *Science* 361, 186–188 (2018)

Cusworth, D *et al.* Intermittency of Large Methane Emitters in the Permian Basin. *Env. Sci. Tech. Lett.* **2021**, 8, 567-573. DOI: 10.1021/acs.estlett.1c00173

Daniels, W., *et al.*, Toward multi-scale measurement-informed methane inventories: reconciling bottom-up site-level inventories with top-down measurements using continuous monitoring systems, *Environ. Sci. Technol.* 2023, 57, 32, 11823-111833 (July 28, 2023), <https://doi.org/10.1021/acs.est.3c01121>.

Lu, X; Jacob D *et al.* Observation-derived 2010-2019 trends in methane emissions and intensities from US oil and gas fields tied to activity metrics. *PNAS.* **2023** (120)17 10.1073/pnas.2217900120

Rutherford, J. S.; Sherwin, E. *et al.* Closing the methane gap in US oil and natural gas production emissions inventories. *Nature Comm.* **2021** 12:4715. DOI: 10.1038 s41467-021-25017-4.

Schissel, C.; Allen, D. T. Impact of the High-Emission Event Duration and Sampling Frequency on the Uncertainty in Emission Estimates. *Environ. Sci. Technol. Lett.* **2022**, 9, 1063– 1067, DOI: 10.1021/acs.estlett.2c00731

Sherwin, E. *et al.* Closing the methane gap in US oil and natural gas production emissions inventories. *Nature Comm.* 2021 12:4715. DOI: 10.1038 s41467-021-25017-4.: 10.1073/pnas.2217900120.

Wang *et al.* Multiscale Methane Measurements at Oil and Gas Facilities Reveal Necessary Frameworks for Improved Emissions Accounting. *Environ. Sci & Tech.* **2022** 56 (20), 14742-14752. DOI: 10.1021/acs.est.2c06211.