January 18, 2023

Via Federal eRulemaking Portal

U.S. Environmental Protection Agency
EPA Docket Center
WJC West Building, Room 3334
1301 Constitution Avenue, NW
Washington, DC 20004

Re: Request for Information – Methane Emissions Reduction Program

Environmental Defense Fund (EDF) respectfully submits this comment to the Environmental Protection Agency (EPA) in response to the agency's request for information on the Inflation Reduction Act's (IRA) Methane Emissions Reduction Program (MERP).[1] One of the world's leading international nonprofit organizations, EDF creates transformational solutions to the most serious environmental problems. To do so, EDF links science, economics, law, and innovative private-sector partnerships. With more than 2.5 million members and offices in the United States, China, Mexico, and the European Union, EDF's experts are working in 23 countries and across the U.S. to turn our solutions into action.

EDF joins the full submission of Clean Air Task Force, Sierra Club, Earthjustice, Natural Resources Defense Council, and other signatory groups, and provides this additional response specifically addressing EPA's question 8:

> *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?*

I. Introduction

The IRA is the most comprehensive congressional action to date addressing the climate crisis. This landmark legislation puts the U.S. on a path to achieve the Biden Administration's goal of cutting greenhouse gas emissions in half by 2030 and reaching net zero emissions by 2050. With MERP, Congress acknowledged the major role that the oil and gas industry has played in causing the climate crisis, as well as the need to significantly reduce methane emissions from this sector to reach the Administration's climate goals. Congress thus established a new provision in the Clean Air Act–section 136–which provides EPA with $1.55 billion to reduce methane emissions and establishes a waste emissions charge on methane emissions from applicable oil and gas facilities.[2] Both components of MERP, the appropriations and the waste charge, assign implementation discretion and responsibility to EPA. Whether MERP achieves its full potential

[1] Docket No. EPA-HQ-OAR-2022-0875, https://www.regulations.gov/docket/EPA-HQ-OAR-2022-0875.
[2] 42 U.S.C. § 7436.

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to dramatically reduce oil and gas methane emissions depends directly on the choices EPA makes in its implementation of the program.

To ensure the waste emissions charge is accurately assessed on emissions from applicable facilities, Congress directed EPA to update methane emission reporting requirements under subpart W of the Greenhouse Gas Reporting Program (GHGRP).[3] In revising subpart W to meet this statutory directive, EPA should move toward a site-level reporting and verification framework. To do this, EPA should begin a longer-term process of developing a reporting framework incorporating direct measurement of site-level emissions and a process for continually updating estimates to match observed basin-wide totals. To undertake the required near-term updates, we urge EPA to utilize available empirical data to develop a basin-level emissions factor that ensures the accuracy of emissions reported through the existing framework. As part of this, EPA should also develop a measurement-based alternative reporting option. Using basin-level empirical measurement data to develop an emissions factor can ensure that reported emissions accurately reflect large and abnormal process emissions that are not currently reflected in subpart W. Below, we first explain what type of updates are required by the statutory directive and then explain in more detail our longer-term and near-term recommendations for undertaking the required updates.

II. Statutory Directive to Revise Subpart W

Section 136(h) requires EPA to update subpart W of the GHGRP to ensure that reporting is (1) "based on empirical data," (2) "accurately reflect[s] the total methane emissions and waste emissions from the applicable facilities," and (3) allows owners of the applicable facilities "to submit empirical emissions data, in a manner to be prescribed by [EPA]."[4] EPA must satisfy these components to meet Congress's directive and fulfill the intent and requirements of MERP.

The phrases "empirical data" and "accurately reflect the total" are central and must be given effect by EPA when revising subpart W.[5] The inclusion of this language, along with the well-documented shortcomings of existing subpart W protocols, make clear that Congress did not believe that the current equipment- and component-level emission factor reporting methodology was adequate.[6] Methane emission estimates based on emission factors that numerous field studies have shown are not fully representative of current conditions do not meet the empirical data requirements of the new statutory provision. Further, to "accurately reflect the total methane emissions" from reporting facilities will require reported emissions to closely align with actual observed emissions. This is not currently the case—numerous studies show that EPA's estimates derived through

[3] 40 C.F.R. § 98.230–98.238.
[4] 42 U.S.C. § 7436(h). "Applicable facility" is defined in section 136(d) by cross reference to the facility definitions in subpart W of part 98 of title 40, Code of Federal Regulations. *Id.* § 7436(d).
[5] The statute does not define "empirical data," so the term takes its ordinary meaning, informed by the statutory context. *Kouichi Taniguchi v. Kan Pac. Saipan, Ltd.*, 566 U.S. 560, 566 (2012). "Empirical" means "originating in or based on observation or experience" and "capable of being verified or disproved by observation or experiment." Merriam-Webster, Definition of Empirical, https://www.merriam-webster.com/dictionary/empirical. And "empirical data" or "empirical evidence" means data which "relies on practical experience rather than theories" and is "derived from reliable measurement or observation." Your Dictionary, Empirical Data, https://www.yourdictionary.com/empirical-data; Collins Dictionary, *Empirical Data*, https://www.collinsdictionary.com/us/dictionary/english/empirical-data.
[6] Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 Science 186 (2018), https://science.sciencemag.org/content/361/6398/186 [hereinafter "Alvarez 2018"]; Rutherford et al., *Closing the Methane Gap in US Oil and Natural Gas Production Emissions Inventories*, 12 Nature Comms. 4715 (2021), https://www.nature.com/articles/s41467-021-25017-4#citeas [hereinafter "Rutherford 2021"].

subpart W, and equipment- and component-level emission factor approaches in general, lead to significant underestimates and are therefore not accurate.[7]

In enacting MERP, Congress recognized that existing reporting requirements are inadequate for accurately estimating the emissions that are subject to the waste charge and sought to correct that through section 136(h).[8] Congress included a two-year timeline to ensure that emissions reporting rapidly moves to a more accurate approach in alignment with the timing of the waste charge. Congress also provided substantial funding to EPA under section 136(a), a portion of which can and should be used by the agency "to administer this section [including section 136(h)], prepare inventories, gather empirical data, and track emissions."[9] Consistent with the two-year timeline, EPA should move quickly to finalize the necessary updates in accordance with the dates for proposed and final action contained in the Unified Regulatory Agenda.[10] For the waste charge to be most effectively and accurately implemented, reported emissions should align closely with total observed emissions when the charge is assessed.[11]

While our proposed changes outlined below are necessary to satisfy the congressional directive, updating equipment- and component-level reporting requirements is also important, and we therefore support EPA in finalizing the proposed updates to those provisions.[12] However, the narrow updates included in the June 21, 2022, proposal would not satisfy Congress' directive to ensure the use of accurate and empirical emissions data in reporting. Accordingly, we respectfully urge EPA to build on its existing proposal by issuing an additional proposal to revise subpart W more comprehensively, integrating direct measurement data and the top-down validation methods.[13] Below, we offer recommendations that EPA should take in the longer term and in the near term to ensure reporting is accurate and empirically based.

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[7] Alvarez 2018, *supra* note 6; IEA, *Methane Tracker Database* (Oct. 2021), https://www.iea.org/articles/methane-tracker-database (summary of inventory estimates).

[8] *See, e.g.*, Alvarez 2018, *supra* note 6; Amanda Garris, *Industrial Methane Emissions Are Underreported, Study Finds*, Cornell Chron. (June 6, 2019), https://news.cornell.edu/ stories/2019/06/industrial-methane-emissions-are-underreported-study- finds; International Energy Agency, *Methane Emissions From the Energy Sector Are 70% Higher Than Official Figures* (Feb. 23, 2022), https://www.iea.org/news/methane-emissions-from-the-energy-sector-are-70-higher-than-official-figures; Steven Mufson, *Oil and Gas Companies Under- reported Methane Leaks, New Study Shows*, Wash. Post (June 8, 2022), https://www.washingtonpost.com/climate-environment/2022/06/08/oilgas-methane-house-science-permian/.

[9] 42 U.S.C. § 7436(a)(4) (directing a portion of the $1.55 billion appropriation "to cover all direct and indirect costs required to administer this section, prepare inventories, gather empirical data, and track emissions.").

[10] EPA/OAR, RIN: 2060-AV83, https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202210&RIN=2060-AV83.

[11] *See* Comment Submitted by Kairos Aerospace, at Figure 1 (Sept. 15, 2022), Docket No. EPA-HQ-OAR-2019-0424, https://www.regulations.gov/comment/EPA-HQ-OAR-2019-0424-0176 (showing large discrepancies in anonymized operator methane intensities calculated using GHGRP data versus aerially observed emissions).

[12] *See* Comments submitted by EDF on EPA's proposed Revisions and Confidentiality Determinations for Data Elements Under the Greenhouse Gas Reporting Rule, 87 Fed. Reg. 36,920 (June 21, 2022), available at https://blogs.edf.org/energyexchange/files/2022/10/EDF-GHGRP-Comments-10.6.2022-Final.pdf.

[13] In other areas where the recently passed Inflation Reduction Act has affected an ongoing rulemaking, EPA has proceeded in similar fashion. *See, e.g.*, David Shepardson, *U.S. EPA to consider tougher emissions rules for heavy trucks* (Sept. 21, 2022), https://www.reuters.com/business/sustainable-business/exclusive-us-epa-consider-tougher-emissions-rules-heavy-trucks-2022-09-21/ (EPA indicated would issue a supplemental proposal to consider the impacts of the IRA on its proposed standards for heavy-duty vehicles and noted that "Congress definitely sent a very strong message backed by significant resources.").

III. Recommended Revisions

In this section, we first explain the urgent need for and importance of comprehensive updates to subpart W that ensure reporting is based on measurement data with top-down verification and reconciliation. We then discuss recommendations for how EPA should undertake these updates by setting forth our longer-term vision, followed by near-term steps that EPA should take before 2024. We encourage EPA to begin making these revisions immediately to ensure that updated reporting requirements are completed within the two-year timeline Congress has mandated.

a. Top-Down Validation and Site-Level Reporting

To ensure that reporting protocols are empirically based and "accurately reflect the total methane emissions and waste emissions from the applicable facilities," we recommend that EPA adopt a top-down validation and site-level reporting framework. EPA's current approach requires reporters to estimate equipment- and component-level emissions based primarily on engineering calculations and default emission factors. These emission estimates provide valuable information to support regulations mitigating emissions and activities such as projecting future emissions. However, they are inaccurate for estimating total emissions from the applicable facilities since a very large portion of total emissions are from abnormal and intermittent conditions that are not captured through equipment- and component-level reporting. Congress understood that the under-reporting that occurs through the existing approach would undermine the effectiveness of MERP, which is why it directed EPA to update subpart W in the same bill. EPA should therefore build from and add to its existing approach in a manner that utilizes two additional types of empirical data: independent emission estimates based on atmospheric observations at the basin or sub-basin level (top-down, basin-wide measurement approaches) and scientifically robust measurements that quantify total emissions from sites (site-level measurement approaches).

Numerous scientific studies across the oil and gas supply chain have shown that emissions are seldom normally distributed, with a small fraction of sites having a disproportionately large contribution to total emissions.[14] Verifying emissions through top-down, basin-wide approaches is therefore necessary to ensure reporting is accurately capturing total emissions from the applicable facilities, as required by the statute. This also means that statistical treatment will need to include sufficient measurement data to accurately account for the characteristics of the "heavy-tailed" emission distribution, meaning that the highest-emitting events are accounted for in default emission estimates.[15] Previous studies have demonstrated how individual site-level measurements can be extrapolated to regional emissions with statistical methods and then reconciled with basin-wide, top-down data to provide insights into key sources of emissions not

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[14] Brandt et al., *Methane Leaks from Natural Gas Systems Follow Extreme Distributions* (2016), https://pubs.acs.org/doi/10.1021/acs.est.6b04303; Gorchov Negron et al., *Airborne Assessment of Methane Emissions from Offshore Platforms in the U.S. Gulf of Mexico* (2020), https://pubs.acs.org/doi/10.1021/acs.est.0c00179; Marchese et al., *Methane Emissions from United States Natural Gas Gathering and Processing* (2015), https://pubs.acs.org/doi/10.1021/acs.est.5b02275; von Fischer et al., *Rapid, Vehicle-Based Identification of Location and Magnitude of Urban Natural Gas Pipeline Leaks* (2017), https://pubs.acs.org/doi/full/10.1021/acs.est.6b06095; Zavala-Araiza et al., *Super-emitters in Natural Gas Infrastructure Are Caused by Abnormal Process Conditions*, 8 Nat. Comms. 14012—1421 (2017), https://www.nature.com/articles/ncomms14012 [hereinafter "Zavala-Araiza 2017"].

[15] EPA's recently proposed updates to subpart W—which preceded the passage of MERP—would revise certain emission factors based on recent studies and create a new category of reported emissions called large release events (those greater than 10 mtCH_4). *See* Revisions and Confidentiality Determinations for Data Elements under the Greenhouse Gas Reporting Rule, 87 Fed. Reg. 36,920 (proposed June 21, 2022). Characterizing and quantifying emissions from large release events is necessary but not sufficient for accurately estimating total emissions.

previously fully captured in estimates.[16] While these methods will not provide information on the precise real-time emissions of a particular site, they do accurately characterize the total emissions of a population of sites and should be the basis for determining total emissions from the applicable facilities.

Basin-wide top-down approaches can constrain total oil and gas emissions at the regional scale and are readily available for widespread deployment.[17] These approaches have already generated significant empirical data, and when performed routinely, can ensure reporting is accurately capturing all sources of emissions and reflecting emissions changes over time. There are well-established methods of source apportionment (considering methane emissions from non-oil and gas sources) and deploying these will be important to meeting the criteria for accuracy at varying degrees depending on the basin.[18]

Previous scientific studies have also described how site-level data can be statistically aggregated and reconciled with basin-wide top-down estimates.[19] Studies have shown how this multi-scale reconciled data can then be used to assess completeness and improvements to source-level inventories.[20] Discrepancies between bottom-up and top-down estimates provide information about larger uncertainties in terms of magnitude and location of emissions and help identify key sources that require further characterization and attention.[21] This reconciliation is also integral to ensuring subpart W data is updated continually for accuracy, and not systematically skewed as is currently the case. Reconciliation can ensure subpart W data is empirically based and that changes in emissions are rapidly reflected in reporting, unlike the current methods where shifts in emissions are largely not included.

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[16] Alvarez et al., *supra* note 6; Omara et al., *Methane emissions from US low production oil and natural gas well sites*, 13 Nat. Comms. 2085 (2022), https://www.nature.com/articles/s41467-022-29709-3 [hereinafter "Omara 2022"]; Robertson et al., *New Mexico Permian Basin Measured Well Pad Methane Emissions Are a Factor of 5—9 Times Higher than U.S. EPA Estimates*, 54 Env. Sci. Tech. 13926—13934 (2020), https://pubs.acs.org/doi/abs/10.1021/acs.est.0c02927; Zavala-Araiza 2017, *supra* note 14.

[17] Barkley et al., *Quantifying methane emissions from natural gas production in north-eastern Pennsylvania* (2017) https://doi.org/10.5194/acp-17-13941-2017; Lyon et al., *Concurrent Variation in Oil and Gas Methane Emissions and Oil Price During the COVID-19 Pandemic* (2021), https://acp.copernicus.org/articles/21/6605/2021/; Lin et al., *Declining Methane Emissions and Steady, High Leakage Rates Observed over Multiple Years in a Western US oil/gas Production Basin* (2022), https://www.nature.com/articles/s41598-021-01721-5; Karion et al., *Aircraft-Based Estimate of Total Methane Emissions from the Barnett Shale Region* (2015), https://pubs.acs.org/doi/full/10.1021/acs.est.5b00217; Peischl et al., *Quantifying Atmospheric Methane Emissions from the Haynesville, Fayetteville, and Northeastern Marcellus Shale Gas Production Regions* (2015), https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2014JD022697; Shen et al., *Satellite Quantification of Oil and Natural Gas Methane Emissions in the US and Canada Including Contributions from Individual Basins* (2022), https://acp.copernicus.org/articles/22/11203/2022/; Schwietzke et al., *Improved Mechanistic Understanding of Natural Gas Methane Emissions from Spatially Resolved Aircraft Measurements* (2017), https://pubs.acs.org/doi/10.1021/acs.est.7b01810.

[18] EPA will also need to account for non-reporting oil and gas facilities' contribution to total emissions.

[19] Alvarez 2018, *supra* note 6; Zavala-Araiza et al., *Toward a Function Definition of Methane Super-Emitters: Application to Natural Gas Production Sites*, 49 Env. Sci. Tech. 8167 (2015), https://pubs.acs.org/doi/pdf/10.1021/acs.est.5b00133.

[20] Rutherford 2021, *supra* note 6; Zavala-Araiza 2017, *supra* note 14.

[21] Alvarez 2018, *supra* note 6; Neininger et al., *Coal Seam Gas Industry Methane Emissions in the Surat Basin, Australia: Comparing Airborne Measurements with Inventories* (2021), https://royalsocietypublishing.org/doi/10.1098/rsta.2020.0458; Shen et al., *Satellite Quantification of Oil and Natural Gas Methane Emissions in the US and Canada Including Contributions from Individual Basins* (2022), https://acp.copernicus.org/articles/22/11203/2022/.

Below we outline an approach that EPA can take to update subpart W and meet the congressional directive of section 136(h). To do this, we recommend that EPA develop site-level emission factors by major production basin using measurement data and then create a process for reconciling top-down and bottom-up data to continually refine the site-level factors. In the near term, by August 2024, we recommend that EPA develop an empirical basin-level emissions factor approach to align reported emissions with observed emissions and an optional measurement-based reporting pathway for operators.

b. Longer Term: Site-Level Reporting Framework

We recommend that EPA begin a longer-term process of developing a site-level reporting framework that incorporates site-level and top-down measurement data and includes a reconciliation process. To undertake this, we outline a three-step process. First, EPA should compile representative site-level measurement data by major production basin. Second, EPA should work with other relevant federal agencies to develop and improve independent, routine, top-down estimates of total emissions by major production basin. And third, EPA should reconcile the two data sets to generate default site-level emission estimates to be used by reporters for the purposes of implementing MERP. EPA should also define protocols for operators that choose to collect and submit their own measurement data as an alternative to the site-level defaults.

This multifaceted approach will ensure subpart W reporting is accurate by both ensuring that site-level measurements are reconciled to match total regional emissions and by capturing changes in emissions over time. As the industry reduces emissions, those reductions will be reflected in the GHGRP, which is not currently the case with respect to certain kinds of emission reductions. Such an approach will also incentivize the use of more empirical data generated through improved methane monitoring and the use of advanced technologies. We recommend that EPA undertake these longer-term updates by following this three-step process:

1. **Oversee the collection of site-level measurement-based estimates**. This measurement data must be stratified randomly within regions, industry segments, operator ownership, and types of sites to ensure representativeness. The number of samples should be sufficient to fully characterize—in the aggregate—the populations of emission sources. EPA may rely on data from external researchers but must define what population-level empirical data it will accept. EPA should then use the site-level measurement data to develop probabilistic, population-based models that characterize the entire emission distribution and extrapolate data to aggregate regional emissions.[22]

2. **Independently quantify total oil and gas emissions at the basin/sub-basin level**. Building from existing estimates, EPA should work with other federal agencies (e.g., NOAA) to perform, coordinate, and oversee routine top-down measurements covering most oil-and-gas-producing regions that account for the overwhelming majority of production.[23] These top-down approaches should be based on a set of peer-reviewed, scientifically robust methods including aircraft,[24]

[22] *See, e.g.*, Omara 2022, *supra* note 16; Omara et al., *Methane Emissions from Natural Gas Production Sites in the United States: Data Synthesis and National Estimate*, 52 Env. Sci. Tech. 12915 (2018), https://pubs.acs.org/doi/10.1021/acs.est.8b03535.

[23] Top-down estimates would have independent utility beyond subpart W, including for the improvement of the Greenhouse Gas Inventory (GHGI).

[24] *See, e.g.*, Karion et al., *supra* note 17; Peischl et al., *supra* note 17; Schwietzke et al., *supra* note 17.

towers,[25] and satellites.[26] Top-down approaches should also incorporate updated attribution methods[27] that allow for separating emissions between oil and gas and other methane sources.

3. **Reconcile the site-level data from Step 1 with the quantified top-down, basin/sub-basin level data from Step 2**. EPA should determine the discrepancy between aggregated site-level data and top-down, basin-level estimates. EPA should then reconcile the data sets to update the site-level emission factors used by reporters. Operators may still submit their own site-level measurement-based data—subject to specific requirements about data quality and previous validation of measurement methods—to prove their company-level facility-based emissions are different than the population average.[28]

By adopting these recommendations, EPA can implement MERP's directive to ensure subpart W reporting is empirically based, accurate, and allows operators to submit measurement data. EPA has a near-term opportunity to ensure representative site-level data, including through additional collection of information and leveraging existing, high-quality emissions data. Our recommendations here also have implications for EPA's equipment- and component-level estimates. For purposes such as rulemakings that require source-level data, EPA could eventually reconcile the empirical estimates of total emissions derived through the process outlined above with source-level estimates.[29]

c. Near Term: Basin-Level Emissions Factor

By the 2024 statutory deadline, we urge EPA to add a new empirical component to the subpart W reporting framework for applicable facilities that would serve as the basis for assessing the waste emissions charge accurately. To do this, EPA should immediately begin updates to incorporate top-down validation that ensure accurate reporting protocols are in place quickly due to the imminence of the waste charge. We recommend that this be achieved through a basin-level emissions factor approach where reported emissions are aggregated at the site level, extrapolated to consider non-reporting facilities, and scaled to align with top-down, empirical measurement data. This approach would require EPA to compile data to develop empirical estimates of total emissions and then derive basin-level emissions factors that align reported emissions from applicable facilities with the basin-level estimates. In addition, EPA should set forth a

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[25] *See, e.g.*, Monteiro et al., *Methane, carbon dioxide, hydrogen sulfide, and isotopic ratios of methane observations from the Permian Basin tower network* (2022), https://essd.copernicus.org/articles/14/2401/2022/.

[26] *See, e.g.*, Shen et al., *Unravelling a large methane emission discrepancy in Mexico using satellite observations* (2021), https://www.sciencedirect.com/science/article/pii/S0034425721001796?via%3Dihub.

[27] Smith et al., *Airborne Ethane Observations in the Barnett Shale: Quantification of Ethane Flux and Attribution of Methane Emissions* (2015), https://pubs.acs.org/doi/full/10.1021/acs.est.5b00219.

[28] Company-submitted data must be considered when the general basin-level emission factor is calculated to ensure that there is alignment with the top-down estimates and basin-level accuracy is maintained. In other words, if emission factors for one group of facilities goes down the factors for other facilities must adjust to ensure the site-level estimates still match the top-down measurements, thereby meeting the accuracy requirement. EPA will also need to consider non-reporting facilities whose emissions are less than 25,000 MT CO2e annually.

[29] To do this, EPA could compare estimates of total basin-level emissions based on the current approach of engineering calculations and source-level emission factors to empirically derived estimates. It could then use the empirically derived estimates described in (1) to (3) as the official value for total emissions and assign the difference in emission estimates to a generic source category (e.g., uncategorized). And finally, EPA could assess which source estimates are the likely cause of discrepancies using statistical methods and basin-level comparisons and update source-level methods to increase their accuracy.

measurement-based reporting option for operators, drawing from Oil and Gas Methane Partnership (OGMP) 2.0 reporting protocols and data, as well as data gathered through regulatory leak detection and repair surveys. We recommend that EPA begin these updates immediately by following a three-step process.

First, EPA should compile basin-level total emission estimates for all major production basins based on empirical measurement data. Much of this data is already available from satellite inversions, aircraft measurements, and tall tower observations that have occurred in the San Juan, Uintah, Permian, Appalachian, Barnett, Denver-Julesburg, Fayetteville, and Haynesville basins. For basins where comprehensive data is unavailable, EPA can develop nationally representative averages using statistical methods and extrapolating from the other existing data sets. EPA may also consider gathering additional data for major production basins where it is currently lacking, such as the Anadarko and Bakken basins, through aerial measurement campaigns. EPA can and should work with other federal agencies (e.g., the National Oceanic and Atmospheric Administration), state agencies (e.g., the Colorado Department of Public Health and Environment), and academic institutions to do so. With data from all major basins, EPA should then conduct source apportionment using data from the GHGRP and GHGI to isolate the oil and gas sector's contribution to the total basin-level emissions.

Second, once total estimates are established, EPA should develop a basin-level emissions factor for each basin to bring reported emissions into alignment with total observed emissions, thereby ensuring the accuracy of "the total methane emissions and waste emissions from the applicable facilities." The basin-level emissions factor would be derived from the difference between reported component- and equipment-level estimates and the top-down, basin-level estimates.[30] To calculate this factor, EPA must also consider emissions from smaller facilities not currently required to report to the GHGRP. Applying this factor would ensure reported emissions are scaled to match the empirical basin-level estimates; each operator's reported emissions would be adjusted by the ratio. The facility-level totals after applying the basin-level emissions factor would then be used to assess the fee.

Third, in accordance with the statutory requirement to "allow owners and operators of applicable facilities to submit empirical emissions data, in a manner to be prescribed by the Administrator," EPA should develop an optional measurement-based reporting framework. Operators using this framework would do so in lieu of applying the basin-level emissions factor to their reported equipment- and component-level emissions. This would incentivize greater amounts of direct measurement within the program and lead to improved understanding of where the gap between reported and measured emissions exists. Importantly, this must be a rigorous framework that requires measuring operator's sites using approved technologies and methods. We also believe that EPA has opportunities to harmonize this type of optional measurement-based approach with regulatory leak survey requirements and could also collect data that operators are gathering to submit to OGMP 2.0, Levels 4 and 5.

[30] *See, e.g.*, Colorado Air Pollution Control Division, Draft Regulation 22 Docket, available here: https://drive.google.com/drive/folders/12oNqci9GSst-GEe8rMyOfbQyweuRlX06.

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EDF thanks EPA for its consideration of these comments. Please do not hesitate to contact us with any questions.

Respectfully submitted,

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