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On

"Examining the State of Air Quality Monitoring Technology"

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Chairman Carper, Ranking Member Capito, and members of the Committee, thank you for the opportunity to testify on the topic of air quality monitoring technology today. My name is Anne Austin and I am a former principal deputy assistant administrator for the U.S. Environmental Protection Agency's (EPA) Office of Air and Radiation. I also previously served as EPA's Region 6 Administrator and in the State of Texas at the Texas Commission on Environmental Quality and at the Texas General Land Office. Since leaving the public sector I have been a partner at Pillsbury Winthrop Shaw Pittman and now at Austin Legal and Public Affairs, practicing environmental law.

By way of background, the U.S. has experienced dramatic progress in air quality in recent years, and these improvements have taken place across Presidential administrations and hold true for traditional, "criteria" pollutants like ozone and particulate matter, greenhouse gases like CO2 and methane, and hazardous air pollutants like formaldehyde and benzene. As envisioned by Congress, and embedded in the Clean Air Act, this progress is built on a cooperative federalist model between U.S. EPA and its state, local, and tribal partners as well as a backbone of high quality, regulatory-grade monitors.

As a result, the U.S. has among the lowest population-weighted fine particulate matter levels in the world, over five times less than the global average or concentrations in China (and more than 30 percent below levels in France and Germany). According to EPA's most recent trend data (after removing monitors with data quality issues), fine particulate matter in the U.S. has dropped by 42 percent since the year 2000. Regional trends show that this progress has been driven by the Southeast, Ohio Valley, Midwest, and Northeast, with catastrophic wildfire contributions limiting improvements in the Northwest, Southwest, and Mountain West.

Furthermore, over the last two decades, human emissions of nitrogen oxides, a key precursor to particulate matter and ozone, have dropped by over 70 percent from over 25 million tons per year to below 8 million tons.

Lastly, from 2000 to 2021, the United States reduced energy-related carbon dioxide (CO2) emissions by 16 percent while experiencing a 38 percent increase in total energy

production, according to recent data form the U.S. Energy Information Administration (EIA).

It is important to note that as our air quality has improved and national ambient air quality standard have been tightened, the contribution of air pollution from forest fires and international transport have grown in significance. This makes a high-quality monitoring network and the ability of EPA and its state/local partners to provide regulatory relief through Clean Air Act tools like Exceptional Events designations (section 316 of the Clean Air Act), international transport (section 179B), and rural transport areas (Section 182(h)) even more important. Consequently, "nonattainment" designations for areas that cannot meaningfully address the background, fire-related, or international contributions will not address remaining air quality issues in our country.

Which raises the important issue of the current state of technology with respect to air sensors and where low-cost, portable personal air sensors fit into the picture.

As you know, EPA, state, local, and tribal partners have long relied on a robust monitoring network which complies with quality control and quality assurance measures and data quality specifications that conform to the Federal Reference Method (FRM) and Federal Equivalent Method (FER) used for regulatory purposes. These monitors are subject to Section 103 of the Clean Air Act and Title 40, Part 53 of the Code of Federal Regulations. In short, they are carefully tested, calibrated, and maintained because of the important role the data generated from the monitoring network plays in regulatory decision-making at the local, state, tribal, and federal levels.

The appeal of low-cost, portable personal air sensors is readily understood, as they are widely accessible to individuals and interested parties. They are good tools with which to explore one's local environment and learn more about air quality, and perhaps may have a role to play with respect to identifying local air quality issues that may merit further monitoring and analysis by a regulatory agency. However, among other things, the personal air sensors lack quality control and quality assurance measures, have not been subjected to rigorous FRM/FEM testing and analysis, and may have high levels of variability between instruments.

Given their deficiencies, do personal air sensors have a role to play as we strive to improve our air quality across the country? As any attorney would tell you, it depends.

Yes, they may help augment citizen science and may identify local air quality issues that merit greater attention and resources. But it is critical to note the significant limitations of personal air sensors. They are certainly a tool, and have their place in the toolbox, but the technology has not been subjected to the same level of rigorous testing and analysis that the existing monitoring network has stood up to for years, albeit with its own faults.

So no, personal air sensors may not be ready for "prime time" when it comes to being fully incorporated into the Clean Air Act-required network utilized for agency regulatory, attainment, and enforcement decisions. In the interest of time, I would like to refer those interested to the recent GAO report on *Air Quality Sensors: Policy*

Options to Help Address Implementation Challenges (March 2024) which ably lays out the weaknesses and strengths of the technology to date with response to personal air sensors.

Instead, it would be worthwhile to refocus our attention, energy, and resources to Clean Air Act programs focused on the most pressing air quality issues, grounded in cooperative federalism and a robust, high-quality regulatory monitoring network.

For one, intergovernmental organizations and state/local/tribal agencies have raised longstanding concerns about the relative lack of resources for building and maintaining a robust monitoring network for criteria pollutants and hazardous air pollutants.

For example, just last week, EPA Administrator Regan announced *$20 billion* in taxpayer-funded grants to non-governmental and financial institutions under the Inflation Reduction Act's National Clean Investment Fund and Clean Communities Investment Accelerator. It is worth comparing these sums to the resources provided for core, high-grade regulatory monitoring networks overseen of state, local, and tribal agencies. In 2024, all state, local, and tribal air quality management grants – of which just a fraction is dedicated for air monitoring - for the entire U.S. were funded at less than $275 million (pg. 1267-1269 of EPA's March 2024 F2025 Congressional Justifications).

In other words, each year, the primary state/local/tribal stewards of our critical air monitors received more than 75 times less federal money than these 20 financial institutions.

Furthermore, in some cases EPA has added monitoring requirements to local, state, and/or tribal entities without providing additional funds to manage and meet these requirements. For example, EPA has required that some state and local agencies implement enhanced monitoring of ozone and its precursors to improve understanding of ozone transport issues but has not provided additional funding to do so.

Second, EPA has also repeatedly proposed to shift federal resources for fine particulate matter monitoring to a different part of the Clean Air Act, which would limit federal funds and potentially divert state/local resources from other priorities. Fortunately, these proposed shifts have resulted in strong objections from intergovernmental organizations like the Environmental Council of the States and have not been implemented.

Third, the reduction of key state/local/tribal expert advisors for EPA air quality programs. For example, the Clean Air Scientific Advisory Committee (CASAC) was established by the Clean Air Act to provide critical advice to EPA on the NAAQS program including related to research efforts required "to appraise the adequacy and basis of exiting, new, or revised" NAAQS, "the relative contribution to air pollution concentrations of natural as well as anthropogenic activity," and 'any adverse public health, welfare, social, economic, or energy effects which may results from various strategies for attainment and maintenance" of the NAAQS, with Congress recognizing

the need for advisors "representing State air pollution control agencies." Through 2020, EPA's 7-member CASAC included four state and local air quality experts. The current CASAC only includes a single member from a state, local, or tribal agency. As a result, EPA is missing key perspectives from experts with particular knowledge around air monitoring and NAAQS implementation.

Fourth, the need to address comparability issues between FRMS and FEMS to mitigate challenges for future PM NAAQS attainment designations. Agencies have struggled mightily, despite limited resources, to maintain FRM monitors to meet collocation requirements and in response to known concerns over significant differences observed in the data collected from collocated FRM and FEM monitors. This fundamental issue highlights the need for EPA to prioritize engagement and feedback from air agencies regarding historical data impacted by instrument bias. Additionally, EPA may want to strongly consider granting air agencies the authority to correct, qualify, or even exclude affected data before it is used to inform attainment designations.

And fifth, to address positive biases identified in the EPA's Air Quality System (AQS). As you may know EPA has a Proposed Update for PM2.5 Data from T640/T640X PM Mass Monitors to retroactively apply the Network Data Alignment equation to all the hourly unaligned T6409 and T640X PM2.5 concentrations in the EPA's Air Quality System (AQS) for data beginning in 2017. As highlighted in AAPCA comments (submitted 3/15/2024), "Approval of the FEM designation for these continuous monitors led to between six and seven eyras of data that needs bias corrected. Releasing the Network Data Alignment equation publicly will allow the agencies that operate these monitors to better review the changes to the data they manage and use to make regulatory decisions, develop SIPs, and inform local communities."

In conclusion, while personal air sensors can be useful tools to better understand our air quality and perhaps even direct regulatory resources to areas of concern, the existing air monitoring network, which we rely upon for regulatory decision-making, deserves our far greater focus, energy, and resources now and in the future.

I thank the committee for the opportunity to provide my testimony and for its valuable time. I appreciate your consideration and remain available to answer your questions.