HEARING BEFORE
THE COMMITTEE ON OVERSIGHT AND REFORM OF
THE UNITED STATES HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON THE ENVIRONMENT

September 10, 2019

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Chairman Rouda, Ranking Member Comer, and distinguished members of the Subcommittee, thank you for the opportunity to appear before you today. My name is Denise Rutherford. I am the Senior Vice President for Corporate Affairs at 3M and a member of our Corporate Operations Committee, reporting directly to our Chairman and CEO. In this role, my areas of responsibility include 3M's sustainability initiatives, environmental stewardship, and public policy. I am also responsible for overseeing what we call product stewardship, which means ensuring our products meet or exceed requirements stemming from 3M policies, governmental regulations, and customer policies. The personnel I oversee in this role include 3M scientists who study toxicology, epidemiology, and other disciplines related to the safety of potential and existing products.

At 3M, we are guided by a deep commitment to people, to science, and to the quality and safety of our products. This commitment extends to the topic I'm here to testify about today: industry's use of certain per- and polyfluoroalkyl substances, or PFAS, and the state of scientific knowledge about their effects on people and the environment. At 3M, we have spent decades studying PFAS compounds, and I'm grateful for the opportunity today to share our knowledge with the Committee and to listen to the Committee's concerns on this important topic.

At 3M, we support a collaborative, science-based approach to addressing this issue. We are demonstrating our commitment on several levels. *First*, for our own manufacturing sites, we will continue our remediation efforts in partnership with local communities and regulators. *Second*, for PFAS-based fire-fighting foam, we will continue to work with former customers to ensure the safe handling of our products. When appropriate, we will take back that product from those customers for disposal. *Third*, with respect to broader concerns, we support nationwide science-based regulation, coordinated research, and sharing best practices on detection, measurement, and remediation. We commit to working with stakeholders to develop a comprehensive PFAS strategy, guided by the principles of sound science, responsibility, and transparency.

I. Background

I started in my current role this past April. But I have been a 3M employee – or, as we would say, a "3M-er" – for over 30 years.

Many of my early years were spent on a small farm in Kentucky, and I attended the home town college, Murray State University. I graduated with a bachelor's degree in Chemistry and Mathematics in 1984 and received a master's degree in Chemistry a year later. I then earned my

Ph.D. in Chemistry from Colorado State University, after which I joined 3M as a senior research chemist in 1989. My first job was to study biodegradable materials to address concerns about plastics in landfills.

Over my time at 3M, I moved from a research role into laboratory management, and then into business leadership. My training as a scientist has been vital along the way because of the value it imparts: using the scientific method to discover innovative solutions to significant problems, including validation of this work by other scientists. As a company of scientists and engineers, our work at 3M is guided by the scientific method, a commitment to improving lives, and a culture built upon respect, ethics, and integrity.

That has been 3M's way for over a century. We have grown from our humble beginnings as a small-scale mining venture – Minnesota Mining and Manufacturing – to a Fortune 500 company that employs more than 93,000 people and produces more than 60,000 products that are used in homes, businesses, schools, and hospitals all over the world. We are guided by our core values of customer-focused innovation, responsibility to all stakeholders, respect for others, and adherence to ethical behavior and high integrity globally.

Many of our products are essential to making people's lives better. The innovations of 3M scientists, for example, include countless materials that are vital to medical devices and supplies, personal protective equipment and other safety products, smartphones, computers, cars, aircraft, energy production, manufacturing, and numerous other uses, along with well-known consumer products like Scotch® tape, Post-it® Notes, and Steri-Strip™ wound closures. 3M inventors have been granted over 115,000 patents. Since 2015, our products have helped customers avoid an estimated 41 million metric tons of CO_2 equivalent emissions through use of 3M products from, for example, our films, fluids, and food safety platforms. In short, 3M's innovations, borne of meticulous scientific research, have benefitted and continue to benefit hundreds of millions of people and countless communities around the world.

I am also proud that 3M has a long-standing commitment to environmental sustainability. Our Pollution Prevention Pays program, launched back in 1975, has prevented more than two million tons of pollution, and we have reduced our greenhouse gas footprint by 64 percent since 2002. Looking forward, we have three priority areas when it comes to sustainability:

- Designing solutions that do more with less material, advancing a global circular economy;

- Innovating to decarbonize industry, accelerate global climate solutions, and improve our environmental footprint; and

- Creating a more positive world through science and inspiring people to join us.

We embed sustainability in our products by requiring a statement for all new products that demonstrates how that product drives impact for the greater good. Our existing products – from granules for roofing shingles that help remove smog pollution to making the iconic Post-it® Notes with a plant-based adhesive – clearly reflect this value.

Our focus on sustainability extends to our industry-leading, decades-long commitment to improve technologies and scientific understanding related to PFAS. This commitment includes dedicating significant resources to researching the safety profile of PFAS and our decision in 2000 to phase out production of certain PFAS compounds – PFOS (or perfluorooctane sulfonate) and PFOA (or perfluorooctanoic acid) – as a precautionary measure to help prevent them from further accumulating in the environment and in living organisms. In addition, we have supported and advocated for a collaborative, science-based approach to tackle this issue. My testimony today will address our work in these areas.

II. PFAS Compounds and Human Health

Among the many useful products we manufacture at 3M are products that contain PFAS – a term that refers to several categories and classes of durable compounds that are resistant to oil, water, temperature, chemicals, fire, and electricity. These characteristics have made PFAS compounds important in a very wide range of contexts. Car makers use them to make low-emission vehicles. Electronics manufacturers use them to make semi-conductors, tablets, and smart mobile devices. Power plants use them to reduce emissions. They are important components of medical devices, and hospitals use them in surgical gowns and drapes to prevent infections. Aerospace manufacturers use them to make high-performance civilian and military aircraft components. Technology companies use them to cool data centers through energy recovery and heat transfer, reducing energy use. Those are just a few examples.

In the 1960s, the United States Navy sought the assistance of 3M and others to develop life-saving firefighting foams using PFAS. Aqueous Film Forming Foam (AFFF) was created to address life-threatening challenges facing the military in live combat missions and training exercises. AFFF became widely used within all branches of the military, and 3M and other manufacturers made AFFF to specifications set by the military.

The PFAS compounds made and used by 3M, and industry more broadly, have changed over time. Two historical compounds that have received significant attention are PFOS and PFOA, sometimes referred to as "long chain" compounds. 3M announced a phase out of PFOS and PFOA in 2000, but continues to use other PFAS compounds that have different properties.

We at 3M have studied the potential impacts of PFAS, including PFOS and PFOA, for decades, as have many other outside researchers. Importantly, the weight of scientific evidence has *not* established that PFOS, PFOA, or other PFAS cause adverse human health effects. Public health agencies and independent science review panels, while acknowledging certain possible associations, agree with that basic fact:

- The Agency for Toxic Substances and Disease Registry (ATSDR), in its 2018 draft report on PFAS, has concluded: "The available human studies have identified some potential targets of toxicity; however, cause and effect relationships have not been established for any of the effects, and the effects have not been consistently found in all studies."

- The Australian Expert Health Panel on PFAS has found that "there is mostly limited or no evidence for an association with human disease accompanying these

observed differences" in PFAS exposure, and that "[t]here is no current evidence that supports a large impact on an individual's health" as a result of high levels of PFAS exposure.

- And the Michigan Science Advisory Panel has opined that "causality between a PFAS-chemical and a specific health outcome in humans has not been established in the current scientific literature."

One major group of studies involves 3M's own workforce. Over decades, 3M has monitored the health of its workers who, in the course of their normal job duties, had contact with substantially higher levels of PFOS or PFOA than the general population, yet, taken together, 3M's studies do not show adverse health effects caused by those exposures. These studies, conducted over many years and taken as a whole, provide compelling evidence that exposure to PFOS or PFOA at the much lower levels seen in the general population in the past and today are not causing adverse health effects.

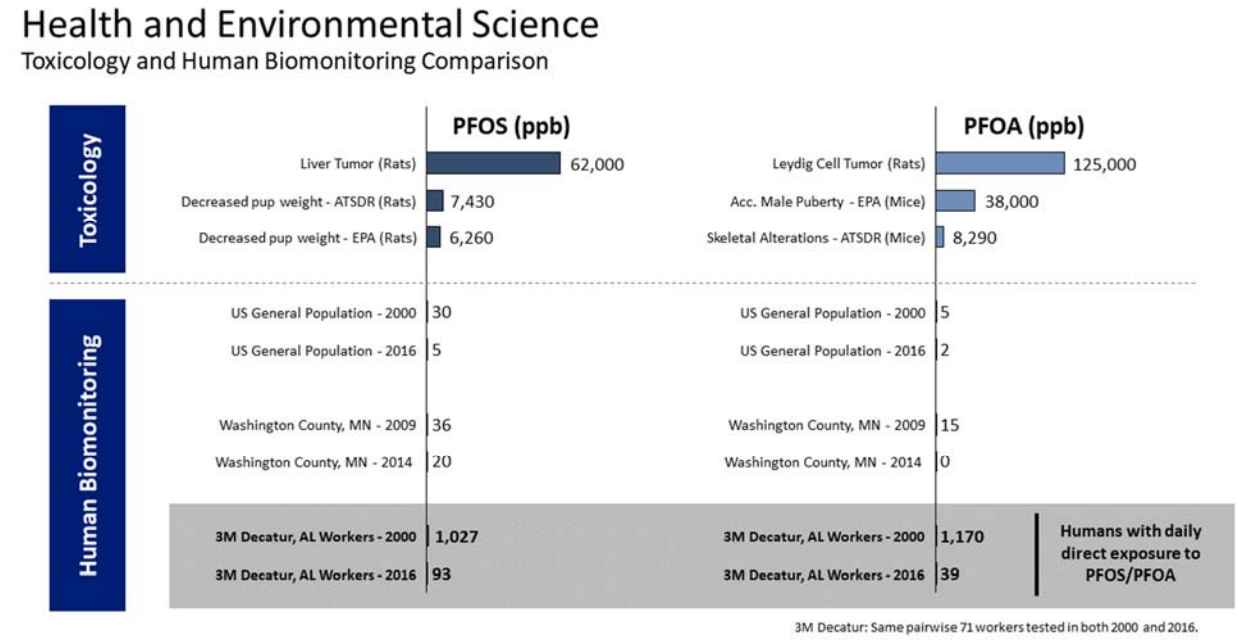
I think it helps to be concrete about that point. For example, in 2000, 3M measured the level of PFOS and PFOA exposure among workers at one of its manufacturing plants. Workers who had daily exposures to chemicals containing PFOS precursors and related substances as part of their jobs had a PFOS average level of 910 parts per billion (ppb) in their blood. The average for the general population in 2000 was 30 ppb. For PFOA, workers with daily exposures had an average level of 1,130 ppb. The general population average was 5 ppb. Again, that the overall weight of evidence fails to show that prolonged exposure at these high levels caused adverse health effects in 3M employees suggests that exposure at the much lower levels, both current and historic, found in the environment does not cause adverse health effects.

Exposure levels are also an important consideration in toxicology studies. In a toxicology study, scientists administer increasing amounts of the tested substance to laboratory animals, until a biological response is observed. A wide variety of substances – including things people consume every day – will cause an adverse response if administered at a sufficiently high dose.

With respect to PFAS, the levels of exposure that laboratory animals received were often many, many times greater than levels typically found in the environment or humans. For example, in male rats with PFOA serum levels of 125,000 ppb, a Leydig cell tumor was observed. That is far in excess of the 5 ppb found in the general population in 2000. Overall, animal studies have not demonstrated that PFAS cause harm to human health at current or historical levels.

We have included below a chart that shows the level of PFOS and PFOA used in certain toxicology studies, along with the blood levels of those compounds in past studies of 3M workers, the general population, and a county containing a 3M site. The chart illustrates quite a significant difference between the levels of PFOS and PFOA that induced a toxicological response in animals, on the one hand, and the levels present in human blood, both historically and today, on the other. The chart includes figures for PFOS and PFOA concentrations in the blood of those 3M workers who were tested in both 2000 and 2016. Again, taken together, the studies conducted over many years involving 3M workers do not show adverse health effects

caused by their exposures to PFOS or PFOA, which were considerably elevated above those of the general population.

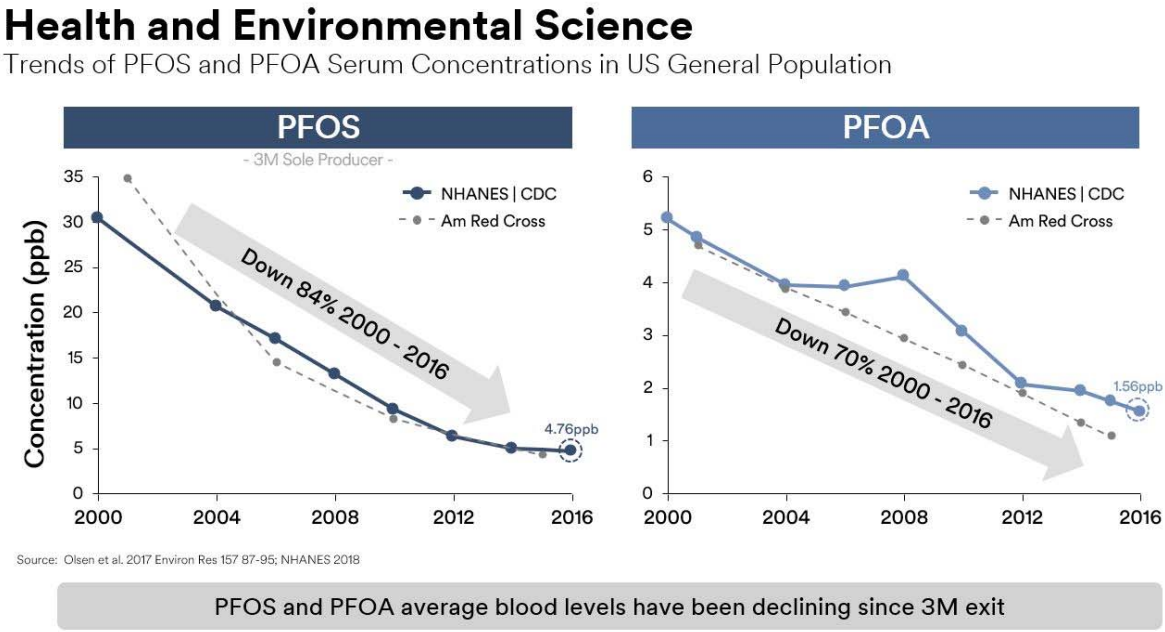


III. 3M's Phase-Out of PFOS and PFOA

In addition to studying the potential effects of PFOS and PFOA, we have worked to improve technologies that have allowed us, over time, to detect the presence of these compounds in the environment and in living organisms at previously undetectable levels – at the parts per billion (ppb) level, which I referenced earlier, and now at the parts per trillion (ppt) level. To put these levels in perspective, one part per billion is equivalent to one second in 30 years or one penny in $10 million. In the 1990s, these new technologies revealed that very small levels of PFOS and PFOA appeared in remote places in the environment and in the general population. We also knew that continued exposure to PFOS and PFOA can result in bioaccumulation – that is, levels can increase over time.

Informed by this evolving knowledge, 3M made the decision to stop manufacturing and using PFOS and PFOA. We announced the phase-out of those compounds in 2000 and have long since completely phased both materials out of our operations. In conjunction with that decision, we also discontinued production of AFFF and PFAS-containing food packaging. After our decision to phase out these compounds and applications, others in the industry eventually followed suit.

Since that time, testing by the Centers for Disease Control (CDC) shows that the levels of PFOS and PFOA in people have declined by at least 70% since 2000. The charts below show this trend.



This trend can be seen in 3M workers as well. Recall that in 2000, 3M measured the level of PFOS and PFOA in employees at one of our plants. In 2016, we tested again. For workers tested in both 2000 and again in 2016, the average level of PFOS in their blood dropped from 1,027 ppb to 93 ppb. For PFOA in workers tested in both 2000 and 2016, the numbers declined from 1,170 ppb to 39 ppb. In this period, in the general population, the measured level of PFOS fell from 30 ppb to 5 ppb; PFOA levels dropped from 5 ppb to 2 ppb.

What these figures show is that current levels of PFOS and PFOA – in both our workers and the general population – generally are much, much lower than the historical levels of exposure.

PFAS remain necessary components of many modern-day products. Today, 3M manufactures "short-chain" PFAS compounds incorporating 3- and 4-carbon perfluorinated molecules, as well as fluoropolymers. These compounds are used by a broad range of customers and industries worldwide. For example, they enable products that directly reduce greenhouse gas emissions from power plants, that allow for energy recovery and heat transfer in cooling systems at data centers, that can replace halon fire systems with systems that result in far lower greenhouse gas emissions, and that optimize battery performance in electric vehicles.

IV. The Way Forward

At 3M, we have been a leader in inventing advanced materials that serve important societal needs, while also working to ensure that our products are safe and do not harm the environment. Our responsibility to understand and take actions in response to concerns about PFAS is one we take seriously, and we support a collaborative, science-based approach to address them. Specifically, we support:

1. **Ongoing Remediation at 3M Manufacturing Sites.** We commit to continuing remediation, in partnership with federal, state, and local authorities, at our manufacturing sites where we produced or disposed of PFAS. We believe this is an important responsibility as a manufacturer and to the communities where we live and operate.

2. **Ensuring Appropriate AFFF Disposal.** 3M ceased producing and selling AFFF more than a decade ago. We will continue to work with our former customers to ensure that unused 3M AFFF containing PFOS is properly handled. When appropriate, we will take back that product from those former customers.

3. **Nationwide Science-Based Regulation.** Science-based regulation is an urgent priority. We support the U.S. EPA's PFAS Action Plan and Congress' efforts to set expedited and defined timelines for EPA to decide whether to set a nationwide Maximum Contaminant Level (MCL) under the Safe Drinking Water Act for PFOS, PFOA, and other PFAS. We support regulation grounded in sound science, and 3M is committed to being a responsible participant in this discussion.

4. **Sharing Best Practices on Detection, Measurement, and Remediation**. We will establish a clearinghouse to share best practices and technology for detecting, measuring, and, where appropriate, remediating PFAS. We will share analytical standards with other researchers for materials we produced.

5. **Coordinated Research Into PFAS.** We believe a respected, established, and independent scientific body should be called on to conduct a comprehensive review of the existing science on PFAS, inform the public of its findings, and set an agenda for further research to address further questions. As a science-based company, we commit to support further research on the important questions raised by this Committee and others.

V. Conclusion

At 3M, we are committed to applying science to help solve some of the biggest global challenges. A thoughtful, scientific approach drives our innovation and product stewardship decisions. We have studied PFAS extensively, and we have acted to address concerns about the potential for accumulation of certain PFAS compounds. As a society, we can work together to realize the benefits that PFAS compounds can offer – including responding to pressing societal challenges such as climate change by reducing greenhouse gas emissions at power plants and optimizing electric vehicle battery performance – in the most responsible way possible.

We believe that only by convening all relevant stakeholders – from industry, government, technical, and other subject matter experts – can our country develop a comprehensive PFAS strategy. 3M is committed to working with Congress and continuing to work closely with concerned parties to develop a path forward, guided by the principles of sound science, responsibility, and transparency. As a society, we should be optimistic that, by bringing multiple parties and viewpoints together, we can facilitate a broader, more inclusive dialogue to make meaningful progress toward a comprehensive PFAS strategy.

Thank you again for this opportunity to appear before you. I am pleased now to answer any questions you might have.