S. HRG. 119–346

HEARING ON EXAMINING THE BENEFICIAL USE AND REGULATION OF CHEMICALS

HEARING

BEFORE THE

SUBCOMMITTEE ON CHEMICAL SAFETY, WASTE MANAGEMENT, ENVIRONMENTAL JUSTICE, AND REGULATORY OVERSIGHT

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED NINETEENTH CONGRESS

FIRST SESSION

OCTOBER 23, 2025

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COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED NINETEENTH CONGRESS

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C O N T E N T S

HEARING ON EXAMINING THE BENEFICIAL USE AND REGULATION OF CHEMICALS

THURSDAY, OCTOBER 23, 2025

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CHEMICAL SAFETY, WASTE MANAGEMENT,
ENVIRONMENTAL JUSTICE, AND REGULATORY OVERSIGHT,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:30 a.m. in room 562, Dirksen Senate Office Building, Hon. John R. Curtis (chairman of the subcommittee) presiding.

Present: Senators Curtis, Capito, Merkley, Wicker, Boozman, Husted.

OPENING STATEMENT OF HON. JOHN R. CURTIS, U.S. SENATOR FROM THE STATE OF UTAH

Senator CURTIS. Good morning and welcome to our subcommittee hearing this morning.

I would like to begin by thanking our three witnesses. We will talk a little bit more about you in a minute.

My thanks to the Ranking Member. I am not sure if you have followed the news, but it is kind of a big deal he is here today. He was a little bit busy yesterday, and we are going to test his voice after speaking for almost 24 hours. Ranking Member, thanks for being with us this morning.

Our hearing this morning impacts the regulation on environment for new and existing chemicals, a subject that lies at the intersection of innovation, safety, and U.S. competitiveness.

Today we will hear from both sides of a chemical equation, from the Huntsman Corporation, represented by their chief executive officer, Mr. Peter Huntsman, and Boeing represented by Dr. Gwen Gross, Senior Technical Fellow in Compositions and Chemical Technology and Chief Chemist, and Dr. Tracey J. Woodruff, Ph.D., MPH, UCSF, Professor and Director of Programs on Reproductive Health and the Environment, and Member of the National Academy of Medicine.

I will allow our Ranking Member perhaps to introduce her just a little bit more in the remarks. I will just say a few minutes myself about our other two witnesses.

Mr. Huntsman and Dr. Gross bring critical perspective. Mr. Huntsman leads a company whose core business is the development of new chemicals, that enables the development of safer, more efficient and more effective products in the United States.

Dr. Gross represents a major customer of those materials, an aerospace manufacturer whose ability to incorporate new chemistries into aircraft is essential to maximizing the safety and performance of aircraft and maintaining American competitiveness.

Together, their perspectives embody the essential relationship between chemical manufacturers and their customers, those who depend on chemical innovation to drive American industry forward. Every day, American chemical manufacturers like Huntsman invest billions of dollars in research and development to produce new materials that can reduce emissions, improve safety, and maintain U.S. industrial competitiveness. These new chemicals enable lighter, stronger, and more efficient products to reach the market, from cars to aircraft to medical devices.

However, regulatory delays and ambiguities in the chemical approval process can stifle that innovation, forcing companies to move research overseas or abandon promising materials altogether. That is not good for our workers, our consumers, or the environment.

On the other end of the supply chain are manufacturers like Boeing, companies that rely on those new chemicals to build world-class products that meet our highest safety standards. Dr. Gross and her team work every day to integrate next-generation replacement materials into aircraft, a lengthy approval process, including in this example, EPA, in addition to FAA and Department of Defense.

When the regulations guiding chemical approvals change faster than the relevant agencies can deliver the chemical approvals or certifications, companies like Boeing are caught in a difficult position, hamstrung by a process that may actually prevent safer or more effective replacement chemicals from ever reaching the final products. Those regulatory bottlenecks can ripple across the entire aerospace supply chain, impacting thousands of suppliers and hundreds of thousands of workers.

Our challenge, therefore, is not whether to regulate chemicals. Of course, we must regulate. How do we do so in a way that protects public health and the environment without stifling American innovation? We must ensure that our regulatory system keeps pace with modern science, supports collaboration between EPA and other relevant agencies, and gives both chemical manufacturers and their customers the certainty that they need to invest, produce, and compete globally.

America cannot lead in advanced manufacturing if our innovators do not have a chemical approval process that works.

Thank you for joining us today, and I look forward to hearing from all three of our witnesses. I will yield to the Ranking Member.

OPENING STATEMENT OF HON. JEFF MERKLEY, U.S. SENATOR FROM THE STATE OF OREGON

Senator MERKLEY. Thank you very much, Mr. Chairman, and congratulations on this first hearing of the subcommittee. You are in your first term, so this is your first holding that gavel.

[Sound of gavel; laughter.]

Senator MERKLEY. There we go, all right. It is a pleasure to work with you.

Senator CURTIS. Thank you.

Senator MERKLEY. Today, we are here to discuss how we regulate toxic substances and chemical safety. As public servants, we have a responsibility to ensure that while we work to create good-paying jobs for working families, our highest priority must be protecting public health.

Americans need to be able to trust that the air they breathe, the water they drink and the products they use in their homes or workplaces, their communities, are safe for themselves and their families, and that their long-term health and safety takes priority over short-term profits.

Pollution is not partisan, and addressing it is our shared responsibility. That trust is placed here with this subcommittee and with the agency we oversee, the Environmental Protection Agency. In 2016, I worked with members of this committee to pass 1976 Toxic Substance Control Act, which we know as TSCA. That legislation required the EPA to develop a new framework to evaluate the risks of new and existing chemicals and to regulate chemicals that present an unreasonable risk to human or environmental health. That process was implemented during the first Trump administration.

During that time, an industry-friendly EPA undermined science, delayed action on chemicals like PFAS, missed statutory deadlines for existing and new chemicals, according to the EPA's own inspector general, and prioritized deregulation over public health.

Now, the second Trump administration is picking up where the first left off. It had been stating that it was planning to reconsider a Biden-era ban on chrysotile asbestos. I was struck by this, because basically every developed country in the world has banned asbestos. We banned it, I believe initially in 1988, overturned by a court in 1991 and it really was not until just recently we finally managed to say the effects of asbestos and black lung disease should not exist in the United States.

I was very pleased that there was a public outcry, saying, really? This makes no sense at all. In July, the Trump administration reversed course and said they were not going to try to undo that ban. The ban actually is implemented over many years, so it is not in place yet.

I have argued for a long time that if the rest of the world can do without asbestos, I think we can figure it out as well. America should be a leader, not a follower in protecting its workers and the environment.

I have been concerned over plans of the administration to dismiss the rules that regulate four of the PFAS chemicals under the Safe Drinking Water Act. I am concerned about the restructuring of the Office of Chemical Safety and Pollution Prevention. It is being filled with lobbyists from chemical corporations. There are plants to dismantle the Office of Research and Development, which in my mind would be a big mistake, things that our subcommittee should pay attention to.

At the same time that all that is going on, the Trump administration has released two health reports, the Make American Healthy Again, or MAHA, report, released in May, and the Make Our Children Health Again report, released in September. These

reports lay out the risks associated with plastics and PFAS and pesticide and other proprietary chemicals.

The MAHA report said, "The concentration of microplastics found in America's brain tissue has increased 50 percent between 2016 and 2024." That is something that I have raised before. We held a series of six hearings last year on plastics, the only six hearings that have ever been held on plastics in Congress.

One of the reports that had come forward was based on studying the brains of deceased individuals and finding that information. I was pleased that it was repeated in the MAHA report because what we know about plastics is that they carry endocrine disrupting chemicals that interfere, and I am quoting from the report again, "endocrine disrupting chemicals that interfere with hormonal development and potentially trigger early puberty, especially in girls, and heighten the risk of obesity, infertility, and hormone related cancers."

These reports note that studies from chemical companies are often biased compared to independent studies, and that chemical corporations have often captured our Federal agencies. We have chemicals that do amazing things. We need to be honest with the American public when they affect human health.

TSCA is the best tool our government has to address these chemical risks. Yet interestingly, it is not mentioned in the MAHA report or its follow-on for children.

TSCA is not perfect. It can be improved. Let's work honestly about how we can maximize the good, minimize the harm, and I do not quote President Trump often, but I will today. On May 22d, he said we need to "protect our children, very importantly, keep the dangerous chemicals out of our food supplies, get toxic substances out of our environment, and deliver the American people the facts." I agree completely.

This is not the time to loosen oversight or lower standards. It is time to recommit ourselves to protecting the health of the American public. I look forward to today's discussion.

Senator MERKLEY. At what point would you like to me to follow on comments to introduce?

Senator CURTIS. Let's do that. We will start with Dr. Woodruff, who is our first witness.

Senator MERKLEY. Okay. As Chair Curtis mentioned, Dr. Tracey Woodruff currently serves as Director and Professor for the University of California at San Francisco's Program on Reproductive Health and the Environment. She is also a member of the National Academy of Medicine.

Dr. Woodruff is an expert in chemical and regulatory policy as well as a leading scientist investigating how toxic chemicals can impact public health, with an emphasis on pregnant women and childhood development.

We look forward to hearing from Dr. Woodruff today about the critical role the Federal Government can play to protect our children, to protect our adults, protect our communities from toxic chemicals.

Senator CURTIS. Dr. Woodruff, just before you jump in, let me just say, we will roll from Dr. Woodruff to Mr. Huntsman and then

Dr. Gross. You each have 5 minutes, and we look forward to each of your testimoneys.

STATEMENT OF TRACEY J. WOODRUFF, PH.D., MPH, UCSF PROFESSOR AND DIRECTOR, PROGRAM ON REPRODUCTIVE HEALTH AND THE ENVIRONMENT AND MEMBER OF THE NATIONAL ACADEMY OF MEDICINE

Ms. WOODRUFF. Thank you. Subcommittee Chairman Curtis, Ranking Member Merkley and members of the Subcommittee, thank you for the opportunity to testify. I am Dr. Tracey Woodruff, a professor from the University of California, San Francisco, and director of the Program on Reproductive Health and the Environment, and a member of the National Academy of Medicine.

We conduct research to understand how industrial chemicals and pollutants in the environment impact people's health.

Toxic chemicals take a measurable toll on people's health. Toxic chemicals are widespread in our air, water, food, homes, and workplaces, and consequently, human exposures begin before birth and continue throughout life.

We know these exposures take a measurable toll on the health of children and adults and can increase the risk of cancer, infertility, neurological and cardiovascular disease, low birth weight, birth defects, autism, and ADHD. These conditions are increasing in the U.S. as documented in the recent Make America Healthy Again Report.

Environmental regulations came about from necessity and evidence shows they are enormously effective at improving health, reducing health care costs, increasing life expectancy and productivity. Research finds that reducing air pollution during pregnancy and early childhood leads to higher earnings, improved education, and better health later in life.

OMB documents that annual benefits to the American public from major EPA rules ranged from $194 billion to $687 billion per year; and EPA regulations yield the highest annual benefits for Americans compared to any other Federal agency.

Protecting people from harmful chemicals is something Americans agree on. In a recent nationwide survey, over 90 percent of voters, including Republicans, Democrats and Independents, agreed the government should require they be proven safe before companies are allowed to put them on the market. Eighty-eight percent of voters support the goals of TSCA to protect people from harmful chemicals.

As mentioned in TSCA's first 40 years, EPA struggled to ban harmful chemicals, including asbestos, a known human carcinogen causing hundreds of thousands of deaths. TSCA's failure led Congress to update it in 2016 to ensure EPA could better protect people from harmful chemicals.

One of the goals of TSCA amendments was to provide stronger protections for highly exposed and susceptible populations like pregnant women, children, workers, and people who live in areas where polluting facilities have been sited. However, with the chemical lobby pouring millions of dollars into influencing the regulatory process, we have seen troubling patterns of EPA brushing aside rigorous science showing health risks, ignoring dangerous expo-

sures to half of the exposed population and weakening the rules for scientific assessments.

It is no secret that the chemical industry wants to reduce the public health protections promised by TSCA in exchange for less regulations and more profits. One of their criticisms is that EPA is not approving new chemicals fast enough, yet TSCA requires EPA to assess the safety of new chemicals and prevent potential risks before these chemicals are allowed on the market.

Congress was clear that EPA should not cut corners on the thoroughness of reviews to serve industry demands for rush approvals. Despite this, EPA has granted low-volume exemptions for over 600 PFAS, a class of over 16,000 chemicals so persistent they have been detected in nearly everyone tested.

A new report from NYU estimates the annual health care of PFAS harms in the U.S. from $1 billion to over $60 billion, and they also say the cost of destroying 1 year's worth of PFAS releases exceeds annual global GDP.

Under the guise of supporting innovation, EPA also approved a new chemical for use in jet and boat fuel that has caused cancer risks so high nearly every person who is exposed to this chemical through foreseeable uses is expected to develop cancer. That is unacceptable.

While industry says faster, faster, and uses buzz words like progress and innovation, it is essential that policymakers understand the repercussions of unleashing new toxic chemicals on the population. Once they are out, you can not take them back, and the result is that people can get sick and die.

Instead, we need a stronger TSCA that creates incentives for the industry to develop new chemicals that will not harm health or the environment.

The chemical lobby is also attaching EPA's Office of Research and Development because they do not like science that finds that their chemicals and products are toxic. They are attacking the TSCA risk assessment rule, because they do not want EPA to consider all real-world chemical uses and exposures or the full extent of human health hazards and risks for lethal chemicals, like methylene chloride. They do not want EPA to address cumulative impacts to fence line community residents where rates of cancer and other chronic diseases are exceeding the general population.

As you consider the next steps for TSCA, you should also consider how polluting industries have lied about the harms of their products to you, the public, even to their own employees. Internal industry documents from PFAS manufacturers show the industry knew about PFAS health harms decades before the public.

EPA was established to protect the health of the public and the environment, not to increase corporate profits. I urge you to act in the best interests of the American people, and preserve and strengthen TSCA's mission to protect the public's health.

Thank you.

[The prepared statement of Ms. Woodruff follows:]

Testimony before the Senate Committee on Environment and Public Works Subcommittee on Chemical Safety, Waste Management, Environmental Justice, and Regulatory Oversight

Tracey J. Woodruff, PhD, MPH UCSF Professor and Director, Program on Reproductive Health and the Environment and member of the National Academy of Medicine

October 23, 2025

Subcommittee Chairman Curtis, Ranking Member Merkley, and members of the subcommittee, thank you for the opportunity to testify. I am Dr. Tracey Woodruff, a professor from the University of California, San Francisco, and director of the Program on Reproductive Health and the Environment, and a member of the National Academy of Medicine. We conduct research to understand how industrial chemicals and pollutants in the environment impact people's health.

Toxic chemicals take a measurable toll on people's health.

Toxic chemicals are widespread in our air, water, food, homes, and workplaces, and consequently, human exposures begin before birth and continue throughout the lifespan. We know these exposures take a measurable toll on the health of children and adults and can increase the risk of cancer, infertility, neurological and cardiovascular disease, low birth weight, birth defects, autism, and ADHD.[1,2,3,4,5,6] These conditions are increasing in the US as documented in the recent Make America Healthy Again Report.[7]

Health and economic benefits of environmental regulations

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[1] Woodruff T. J. (2024). Health Effects of Fossil Fuel-Derived Endocrine Disruptors. *The New England journal of medicine*, *390*(10), 922–933. https://doi-org.ucsf.idm.oclc.org/10.1056/NEJMra2300476

[2] Gore, A. C., Chappell, V. A., Fenton, S. E., Flaws, J. A., Nadal, A., Prins, G. S., Toppari, J., & Zoeller, R. T. (2015). EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-Disrupting Chemicals. *Endocrine reviews*, *36*(6), E1–E150. https://doi.org/10.1210/er.2015-1010

[3] DeNicola, N., Lasher, E., BakenRa, A., Joglekar, R., Zhang, J., Hasenburg, A., Gupta, K., Decena, D., Edna, F., Graham, D., Morris, E., Dao, B., & Woodruff, T. (2025). FIGO committee opinion: Environmental drivers of obstetric health and early childhood development. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics*, 10.1002/ijgo.70549. Advance online publication. https://doi.org/10.1002/ijgo.70549

[4] National Academies of Sciences Engi- neering and Medicine. Application of sys- tematic review methods in an overall strat- egy for evaluating low-dose toxicity from endocrine active chemicals. Washington, DC: National Academies Press, 2017.

[5] Lam, J., Lanphear, B. P., Bellinger, D., Axelrad, D. A., McPartland, J., Sutton, P., Davidson, L., Daniels, N., Sen, S., & Woodruff, T. J. (2017). Developmental PBDE Exposure and IQ/ADHD in Childhood: A Systematic Review and Meta-analysis. *Environmental health perspectives*, *125*(8), 086001. https://doi.org/10.1289/EHP1632

[6] Engel, S. M., Patisaul, H. B., Brody, C., Hauser, R., Zota, A. R., Bennet, D. H., Swanson, M., & Whyatt, R. M. (2021). Neurotoxicity of Ortho-Phthalates: Recommendations for Critical Policy Reforms to Protect Brain Development in Children. *American journal of public health*, *111*(4), 687–695. https://doi.org/10.2105/AJPH.2020.306014

[7] The White House. (2025). Make Our Children Healthy Again Assessment. www.whitehouse.gov/wp-content/uploads/2025/05/MAHA-Report-The-White-House.pdf.

Environmental regulations came about from necessity and evidence shows they are enormously effective at improving health, reducing health care costs, increasing life expectancy and productivity. Research finds that reducing air pollution during pregnancy and early childhood leads to higher earnings, improved education, and better health later in life.[8] OMB documents that annual benefits to the American public from major EPA rules ranged from $194 billion to $687 billion per year; [9] almost all from reduced health risks due to lowered air pollutant emissions and chemical exposures. These benefits far outweighed the estimated regulatory costs during that same time period.[10] In fact, EPA regulations yield the highest annual benefits for Americans compared to any other federal agency.

Americans want safe products

Protecting people from harmful chemicals is something Americans agree on. In a recent nationwide survey, over 90% of voters – including Republicans, Democrats, and Independents - agreed the federal government should require products be proven safe before companies are allowed to put them on the market, and **88% of voters support the goal of the Toxic Substances Control Act (TSCA) to protect people from harmful chemicals.**[11]

TSCA and its importance to the health of Americans

In TSCA's first 40 years, EPA struggled to ban harmful chemicals, including asbestos, a known human carcinogen that has caused hundreds of thousands of deaths. TSCA's failures led Congress to update it in 2016 to ensure EPA could better protect people from harmful chemicals. One of the goals of the TSCA amendments was to provide stronger protections for highly exposed and susceptible populations like pregnant women, children, workers, and people who live in areas where polluting facilities have been sited.

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[8] Isen, A., Rossin-Slater, M., & Walker, W. R. (2017). Every Breath You Take—Every Dollar You'll Make: The Long-Term Consequences of the Clean Air Act of 1970. Journal of Political Economy, 125(3), 848–902. https://doi.org/10.1086/691465.

[9] Office of Management and Budget. 2017 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act. Table 1-1. https://www.whitehouse.gov/wp-content/uploads/2019/12/2019-CATS-5885-REV_DOC-2017Cost_BenefitReport11_18_2019.docx.pdf. Note: annual benefits estimate reported in 2015 dollars.

[10] Office of Management and Budget. 2017 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act. Table 1-1. https://www.whitehouse.gov/wp-content/uploads/2019/12/2019-CATS-5885-REV_DOC-2017Cost_BenefitReport11_18_2019.docx.pdf. Note: annual benefits estimate reported in 2015 dollars.

[11] PRHE. (2022). Poll: Voters Agree on Need for More Protections from Chemicals. Program on Reproductive Health and the Environment. https://prheucsf.blog/2022/10/11/poll-voters-agree-on-need-for-more-protections-from-chemicals/

However, with the chemical lobby pouring millions of dollars into influencing the regulatory process,[12] we have seen troubling patterns of EPA brushing aside rigorous science that demonstrates health risks, ignoring dangerous exposures to more than half of exposed populations, and weakening rules for scientific assessments to benefit industry at the expense of people's health.

New chemical program – and the cost of getting it wrong

It's no secret that the chemical industry wants to reduce the public health protections promised by TSCA in exchange for less regulation and more profits. One of their criticisms is that EPA is not approving new chemicals fast enough. Yet TSCA requires EPA to assess the safety of new chemicals and **prevent potential risks before these chemicals are allowed on the market.**

Congress was clear that EPA should not cut corners on the thoroughness of reviews to serve industry's demand for rushed approvals. Despite this, EPA has granted low-volume exemptions for over 600 PFAS, a class of over 15,000 chemicals are so persistent that they have been detected in nearly all people tested[13] and on every corner of the planet from rainclouds[14] to the deepest parts of the ocean.[15] A new report from New York University's Institute for Policy Integrity estimates annual health costs of PFAS harms in the U.S. from $1 billion to over $60 billion.[16] The report also cites a study which found that the cost of destroying one year's worth of PFAS releases exceeds annual global GDP.[17] In other words, PFAS contamination is a problem that we cannot effectively clean up.

Under the guise of supporting innovation, EPA also approved a new chemical for use in jet and boat fuel,[18] that has a cancer risk so high that nearly every person who is exposed to this chemical through foreseeable uses is expected to develop cancer. That is unacceptable.

So, while industry says, "faster, faster" and uses buzz words like "progress and innovation," it is essential that policymakers understand the repercussions of unleashing new toxic chemicals on

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[12] OpenSecrets. (n.d.). Federal lobbying: Industries summary (N13, 2021 cycle). https://www.opensecrets.org/industries/indus?ind=N13

[13] CDC. (2024). Fast Facts: PFAS in the U.S. Population. Per- and Polyfluoroalkyl Substances (PFAS) and Your Health. https://www.atsdr.cdc.gov/pfas/data-research/facts-stats/index.html

[14] Cousins, I. T., Johansson, J. H., Salter, M. E., Sha, B., & Scheringer, M. (2022). Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS). Environmental Science & Technology, 56(16), 11172–11179. https://doi.org/10.1021/acs.est.2c02765.

[15] Miranda, D. de A., Leonel, J., Benskin, J. P., Johansson, J., & Hatje, V. (2021). Perfluoroalkyl Substances in the Western Tropical Atlantic Ocean. Environmental Science & Technology, 55(20), 13749–13758. https://doi.org/10.1021/acs.est.1c01794.

[16] Safavi, L., & Howard, P. (2025). Evaluating the Full Cost of PFAS.

[17] Ling, A. L. (2024). Estimated scale of costs to remove PFAS from the environment at current emission rates. Science of The Total Environment, 918, 170647. https://doi.org/10.1016/j.scitotenv.2024.170647.

[18] Lerner, S. (2023). The EPA Faces Questions About Its Approval of a Plastic-Based Fuel With an Astronomical Cancer Risk—ProPublica. https://www.propublica.org/article/chevron-epa-plastic-biofuel-cancer-risk

the population. Once they're out there, you can't take them back, and the result is that people get sick and die. Instead, we need a stronger TSCA that creates incentives for the industry to develop new chemicals that will not harm health or the environment.

EPA science

The chemical lobby is also attacking EPA's Office of Research and Development because they don't like science that finds that their chemicals and products are toxic. They are attacking the TSCA risk evaluation framework rule because they don't want EPA to consider all real-world chemical uses and exposures or the full extent of human health hazards and risks for lethal chemicals like methylene chloride. And they don't want EPA to address the consequences of cumulative impacts, especially to fenceline community residents who are exposed to dozens of harmful chemicals at the same time and have rates of cancer and other chronic diseases that far exceed those in the general population. All because it poses a threat to their bottom line.

Industry lies

As you consider next steps for TSCA, you should also consider how polluting industries have lied about the harms of their products to you, to the American people – and even to their own employees. Internal industry documents from PFAS manufacturers that show the industry knew about PFAS health harms decades before the public.[19] And we uncovered documents showing the chemical industry waged a campaign to hide the health harms of phthalates since the 1970's. These companies have a vested financial interest in minimizing EPA's regulations at the expense of the public interest.

EPA's mission

EPA was established to protect the health of people and the environment – not to increase corporate profits. EPA is funded by taxpayer dollars and should function to protect the public. And Americans agree. Eliminating environmental rules is not popular, except with health-harming industries with a financial interest. I urge you to act in the best interest of the American people and preserve and strengthen TSCA's mission to protect the public's health.

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[19] PRHE. (2023). Makers of PFAS 'forever chemicals' covered up the dangers. Program on Reproductive Health and the Environment. https://prheucsf.blog/2023/06/01/makers-of-pfas-forever-chemicals-covered-up-the-dangers/

Senate Committee on Environment and Public Works
Subcommittee on Chemical Safety, Waste Management, Environmental Justice, and Regulatory Oversight hearing entitled, "*Examining the Beneficial Use and Regulation of Chemicals*"
October 23, 2025
Questions for the Record for Dr. Woodruff

Senator Merkley:

1. **May's Make America Healthy Again report summarizes that a significant portion of public health studies on chemicals are produced by industry and potentially biased. For example, the report states, "the PFAS industry focused on suppressing unfavorable research and distorting public discourse, effectively delaying public awareness of its dangers." Potential financial conflicts of interest are why we need a strong law to protect the public that holds not only industry but Environmental Protection Agency (EPA) itself accountable. If the Toxic Substances Control Act (TSCA) is amended, it is important to strengthen conflict of interest provisions in the law to reduce industry influence over public health decisions.**

   A. **How would you recommend strengthening protections against and transparency around conflicts of interest in TSCA?**

Over the past several decades, corporations have waged aggressive campaigns to delay and undermine health-protective regulations by influencing and attacking scientific assessments that inform the regulatory process.[1,2,3,4,5,6] This includes industry and political influence within the EPA, which has compromised efforts to ensure that the scientific assessments guiding health-protective decision-making are unbiased and do not underestimate risk. For example, EPA has systematically failed to account for financial conflicts of interest (COI), such as study sponsorship or authors with financial ties, when evaluating scientific research that supports TSCA hazard and risk assessments. Additionally, political and financial COIs have not been effectively removed from the scientific process underpinning hazard and risk assessments, with individuals who have a financial stake in EPA decisions often being nominated for or serving on

[1] Sass JB, Castleman B, Wallinga D. Vinyl Chloride: A Case Study of Data Suppression and Misrepresentation. Environ Health Perspect. 2005;113(7):809812. doi:10.1289/ehp.7716
[2] Lerner S, Shaw A. Formaldehyde Increases Your Cancer Risk No Matter Where you Live. ProPublica. December 3, 2024. Accessed December 10, 2024. https:// www.propublica.org/article/formaldehyde-epa-trump-public-health-danger
[3] Lerner S. How Pesticide Companies Corrupted the EPA and Poisoned America. The Intercept. June 30, 2021. Accessed December 10, 2024. https://theintercept. com/2021/06/30/epa-pesticides-exposure-opp/
[4] Lerner S. Leaked Audio Shows Pressure to Overrule Scientists in "Hair-on-Fire" Cases. The Intercept. August 4, 2021. Accessed December 10, 2024. https:// theintercept.com/2021/08/04/epa-hair-on-fire-chemicals-leaked-audio/
[5] Lerner S. Whistleblowers Expose Corruption in EPA Chemical Safety Office. The Intercept. July 2, 2021. Accessed December 10, 2024. https://theintercept. com/2021/07/02/epa-chemical-safety-corruption-whistleblowers/
[6] The White House. (2025). Make Our Children Healthy Again: Assessment.

scientific peer review panels. [7] The result has been weakened chemical regulations, increased exposure to harmful chemicals, and greater risks to the health of families, workers, and communities.

Research has shown that corporate influence over the funding, generation, use, dissemination, and evaluation of scientific evidence and data corrupts the impartiality of the scientific process and biases its findings in favor of outcomes that support industry interests.[8,9,10,11] The National Academies of Sciences, Engineering, and Medicine (NASEM) held a workshop[12] in December 2022 that presented results of decades of research showing that tobacco, pharmaceutical, and other industries influence all aspects of the research process, including the selection of studies to conduct, study methods, data reporting, and data interpretation, resulting in findings and conclusions that favor industry sponsors.[13,14,15] The NASEM also emphasizes that financially conflicted members of government scientific review panels can compromise the impartiality of a panel's advice and that simple disclosure of conflicts does not eliminate the bias of the panel—and in some cases, may even exacerbate it.[16]

The NASEM recommends recognizing industry funding and conflicts of interest (COI) as significant sources of bias in scientific research and accounting for them, as well as eliminating

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[7] UCSF PRHE. Comments from Scientists, Academics and Clinicians on the Draft Risk Evaluation Peer Review by the Science Advisory Committee on Chemicals of Formaldehyde Under TSCA.; 2024. https://www.regulations.gov/comment/EPAHQ-OPPT-2023-0613-0077

[8] Odierna DH, Forsyth SR, White J, Bero LA. The Cycle of Bias in Health Research: A Framework and Toolbox for Critical Appraisal Training. Account Res. 2013;20(2):127-141. doi:10.1080/08989621.2013.768931

[9] Fabbri A, Lai A, Grundy Q, Bero LA. The Influence of Industry Sponsorship on the Research Agenda: A Scoping Review. Am J Public Health. 2018;108(11):e9-e16. doi:10.2105/AJPH.2018.304677

[10] Psaty BM, Prentice RL. Minimizing bias in randomized trials: the importance of blinding. JAMA. 2010;304(7):793-794. doi:10.1001/jama.2010.1161

[11] Psaty BM, Kronmal RA. Reporting mortality findings in trials of rofecoxib for Alzheimer disease or cognitive impairment: a case study based on documents from rofecoxib litigation. JAMA. 2008;299(15):1813-1817. doi:10.1001/ j ama.299.15.1813

[12] National Academies of Sciences, Engineering, and Medicine. Sponsor Influences on the Quality and Independence of Health Research: Proceedings of a Workshop. The National Academies Press; 2023. https://doi.org/10.17226/27056

[13] White J, Bero L. Corporate Manipulation of Research: Strategies Are Similar Across Five Industries. Stanford law and policy review. Published online 2010. Accessed December 10, 2024. https://www.semanticscholar.org/paper/Corporate-Manipulation-of-Research%3A-Strategies-Are-White-Bero/b50e79c1f56855120014d491534104345954c264

[14] Bero L, Anglemyer A, Vesterinen H, Krauth D. The relationship between study sponsorship, risks of bias, and research outcomes in atrazine exposure studies conducted in non-human animals: Systematic review and meta-analysis. Environ Int. 2016;92-93:597-604. doi:10.1016/j.envint.2015.10.011

[15] Lundh A, Lexchin J, Mintzes B, Schroll JB, Bero L. Industry sponsorship and research outcome. Cochrane Database Syst Rev. 2017;2(2):MR000033. doi:10.1002/14651858.MR000033.pub3

[16] Parker L, Bero L. Managing risk from conflicts of interest in guideline development committees. BMJ. 2022;379:e072252. doi:10.1136/bmj-2022-072252

sponsor-associated bias at a structural level through policy reforms.[17,18,19] The NASEM has also recommended in multiple reports that EPA considers funding as a source of bias when evaluating the quality of a study.[20,21] Furthermore, the influence of financial conflicts must be distinguished from non-financial interests, such as personal beliefs and interests, theoretical perspectives, or aspirations for academic advancement, which do not introduce the same systematic biases.[22]

EPA can make these changes today, without the need to amend the language of TSCA. To ensure that Agency decisions uphold the best available science free of political interference and the influence of financially conflicted stakeholders, we specifically recommend that EPA:

1. Assess study funding sources and author financial conflicts of interest when evaluating the quality of studies that support agency assessments and include industry sponsorship as a risk of bias domain that can influence study outcomes.
2. When identifying candidate members for peer review bodies and advisory committees, EPA should 1) define financial conflicts of interest to include industry funding for research, analysis, or advocacy related to products or chemicals under assessment, and 2) ensure all financial conflicts are identified, disclosed, and eliminated early in the process. Government funding for researchers and other non-financial interests, such as personal beliefs and interests, theoretical perspectives, or aspirations for academic advancement, should not be considered financial conflicts of interest as they do not introduce the same systemic biases;[23] and
3. Protect career scientists within agencies from improper pressure to alter their scientific findings.

B. Should EPA be required to disclose the source and scope of scientific data used in making its determinations?

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[17] White J, Bero L. Corporate Manipulation of Research: Strategies Are Similar Across Five Industries. Stanford law and policy review. Published online 2010. Accessed December 10, 2024. https://www.semanticscholar.org/paper/Corporate-Manipulation-of-Research%3A-Strategies-Are-White-Bero/b50e79c1f56855120014d491534104345954c264

[18] Bero L, Anglemyer A, Vesterinen H, Krauth D. The relationship between study sponsorship, risks of bias, and research outcomes in atrazine exposure studies conducted in non-human animals: Systematic review and meta-analysis. Environ Int. 2016;92-93:597-604. doi:10.1016/j.envint.2015.10.011

[19] Lundh A, Lexchin J, Mintzes B, Schroll JB, Bero L. Industry sponsorship and research outcome. Cochrane Database Syst Rev. 2017;2(2):MR000033. doi:10.1002/14651858.MR000033.pub3

[20] National Academies of Sciences, Engineering, and Medicine. Sponsor Influences on the Quality and Independence of Health Research: Proceedings of a Workshop. The National Academies Press; 2023. https://doi.org/10.17226/27056

[21] National Research Council. Review of EPA's Integrated Risk Information System (IRIS) Process. National Academies Press; 2014:79.

[22] Bero L. Addressing Bias and Conflict of Interest Among Biomedical Researchers. JAMA. 2017;317(17):1723-1724. doi:10.1001/jama.2017.3854

[23] Bero L. Addressing Bias and Conflict of Interest Among Biomedical Researchers. JAMA. 2017;317(17):1723-1724. doi:10.1001/jama.2017.3854

EPA should identify and disclose sources of funding for all studies that are considered in chemical evaluations. In the cases where companies are submitting data required under law, such as under the new chemicals program under TSCA, EPA should require study registries for chemical research—a practice that has been well-established in pharmaceutical research—to minimize bias that arises from the selective reporting of results or failure to publish entire studies that do not favor the interests of the study sponsor.[24] The selective reporting of results or entire studies may contribute to publication bias in the body of evidence as only favorable study results could be published, which can skew the available scientific evidence, including data that can support the new chemical review process.[25] Pre-registering chemical studies before publication can help minimize bias from selective outcome reporting and increase the quality and reliability of the scientific evidence evaluating the link between chemical exposures and health harms. The International Committee of Medical Journal Editors (ICMJE) currently requires prospective clinical trial registration to minimize bias and influence from selective outcome reporting. This method should be extended to the TSCA New Chemicals Program, requiring all studies or data submitted by industry for evaluation by U.S EPA as part of the new chemical review process to be pre-registered.[26] Pre-registration would require the chemical company that is testing a chemical to publish all relevant study details that are required to meet a PMN or exemption submission and should include, at a minimum:

- Name of test substances(s)
- Availability of an analytical standard (this should also be provided to EPA as part of the PMN or exemption)
- Study population(s) details, including:
    - Species: If animal, specify animal provider and health status. If in vitro, specify cell/tissue provider.
    - Sex(es)
    - Transgenic strain (if applicable)
    - Age(s)
    - Number of animals/samples evaluated, including number of control and exposed animals/samples
- Exposure Details
    - Route (oral, dermal, inhalation, etc)
    - Pathway (food, drinking water, air, etc)
    - Frequency/Timing
    - Concentration(s)
    - Concentration Unit(s)

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[24] Dickersin K, Rennie D. The evolution of trial registries and their use to assess the clinical trial enterprise. Jama. 2012;307(17):1861-1864.

[25] Misakian AL, Bero LA. Publication bias and research on passive smoking: comparison of published and unpublished studies. Jama. 1998;280(3):250-253.

[26] De Angelis C, Drazen JM, Frizelle FA, et al. Clinical Trial Registration: A Statement from the International Committee of Medical Journal Editors. New England Journal of Medicine. 2004;351(12):1250-1251.

- Health outcomes
    - End points (these should match a predetermined list of required data)
    - Assessment methods: assay information, analytical standards specified

C. If the answer is yes, what can be done to ensure that industry is not unfairly influencing the hazard and risk assessment process?

First, EPA should assess study-funding sources and author financial conflicts of interest when evaluating study quality for hazard and risk assessment and consider industry sponsorship a risk of bias. Industry sponsorship can bias research through various mechanisms, including how a study is designed and conducted, selective reporting of the results, skewed or incomplete analyses of study data, misleading or selective presentation of conclusions, and signaling of preferred outcomes in framing the questions to be investigated.[27,28,29,30] A 2023 NASEM report highlighted the "large body of evidence showing that financial COIs lead to systemic biases in research"[31] and has recommended "funding sources should be considered in the risk-of-bias assessment conducted for systematic reviews that are part of an IRIS assessment."[32] To ensure that EPA assessments account for the possible bias in the evidence base, industry sponsorship and author financial COI should be flagged as a risk of bias that could affect the validity of a study's findings and conclusions. Importantly, including funding as a risk of bias does not mean excluding industry-sponsored studies from EPA's hazard and risk assessment; it only means documenting funding as one of many domains of potential bias and evaluating its impact on the overall quality of the body of evidence.

Second, EPA's peer review bodies and advisory committees must 1) define financial conflicts of interest to include funding from industry or their trade associations for research, analysis, or advocacy on products or chemicals being assessed and 2) ensure all financial conflicts are identified, disclosed, and eliminated early in the process.

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[27] Odierna DH, Forsyth SR, White J, Bero LA. The Cycle of Bias in Health Research: A Framework and Toolbox for Critical Appraisal Training. Account Res. 2013;20(2):127-141. doi:10.1080/08989621.2013.768931

[28] Fabbri A, Lai A, Grundy Q, Bero LA. The Influence of Industry Sponsorship on the Research Agenda: A Scoping Review. Am J Public Health. 2018;108(11):e9-e16. doi:10.2105/AJPH.2018.304677

[29] Psaty BM, Prentice RL. Minimizing bias in randomized trials: the importance of blinding. JAMA. 2010;304(7):793-794. doi:10.1001/jama.2010.1161

[30] Psaty BM, Kronmal RA. Reporting mortality findings in trials of rofecoxib for Alzheimer disease or cognitive impairment: a case study based on documents from rofecoxib litigation. JAMA. 2008;299(15):1813-1817. doi:10.1001/ j ama.299.15.1813

[31] National Academies of Sciences, Engineering, and Medicine. Sponsor Influences on the Quality and Independence of Health Research: Proceedings of a Workshop. The National Academies Press; 2023. https://doi.org/10.17226/27056

[32] National Academies of Sciences, Engineering, and Medicine. Review of EPA's Integrated Risk Information System (IRIS) Process. National Academies Press; 2014. doi:10.17226/18764

Financial ties between scientists serving on peer review bodies or advisory committees and regulated entities that have economic interests that could be harmed by agency scientific findings constitute financial conflicts of interest (COI). The association between the financial COIs of peer reviewers and scientific recommendations that favor the interests of the entities from which they receive financial benefits has been well established.[33,34] Research shows that paradoxically, those members who disclose COI provide more biased advice due to the belief that they have adequately warned recipients of these conflicts or to compensate for the prospect that their advice will likely be disregarded.[35,36] Systematic reviews have established that disclosed financial COI are associated with research outcomes biased towards the sponsor and, therefore, demonstrate why disclosure is not a solution to reducing bias in independent scientific review bodies.[37] Financial COI must, therefore, be identified, disclosed, and those with financial COIs must be disqualified early in the process of identifying candidates for peer review panels and advisory committees.

The Agency's current definition of what constitutes a conflict of interest is too narrow and does not define COI to include receiving financial compensation from companies or their trade associations for performing a range of science-related tasks, including research, preparing and delivering scientific presentations in an EPA proceeding, or providing advice on the interpretation of scientific studies. Where the work performed relates directly to the chemical or product under review by EPA, the financial relationship between the prospective reviewer and the company should be treated as evidence of bias, and the reviewer should be disqualified.

Importantly, conflicts of interest due to financial ties must be distinguished from nonfinancial interest, as these conflicts of interest can create a bias that extends beyond the individual.[38] For example, multiple members of an EPA advisory committee may have financial ties with chemical manufacturers, trade associations or other companies that could financially benefit from the findings of an evaluation or the recommendations of the advisory committee. While in contrast, committee members with a combination of nonfinancial interests such as personal beliefs, theoretical viewpoint, or desire for glory

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[33] Nejstgaard CH, Bero L, Hróbjartsson A, et al. Association between conflicts of interest and favourable recommendations in clinical guidelines, advisory committee reports, opinion pieces, and narrative reviews: systematic review. BMJ. 2020;371:m4234. doi:10.1136/bmj.m4234

[34] Coyne DW. Influence of Industry on Renal Guideline Development. Clin J Am Soc Nephrol. 2007;2(1):3-7. doi:10.2215/CJN.02170606

[35] Loewenstein G, Sah S, Cain DM. The Unintended Consequences of Conflict of Interest Disclosure. JAMA. 2012;307(7):669. doi:10.1001/jama.2012.154

[36] Romain PL. Conflicts of interest in research: looking out for number one means keeping the primary interest front and center. Curr Rev Musculoskelet Med. 2015;8(2):122-127. doi:10.1007/s12178-015-9270-2

[37] Lundh A, Lexchin J, Mintzes B, Schroll JB, Bero L. Industry sponsorship and research outcome. Cochrane Methodology Review Group, ed. Cochrane Database Syst Rev. 2017;2017(2). doi:10.1002/14651858.MR000033.pub3

[38] Bero L. Addressing Bias and Conflict of Interest Among Biomedical Researchers. JAMA. 2017;317(17):1723-1724. doi:10.1001/jama.2017.3854

could influence evaluation in different directions and thus not be an overall systematic bias.

EPA should use the model implemented by IARC in developing Monographs that assess the evidence of carcinogenicity for selecting scientific experts. IARC selects Working Group members based on subject matter expertise, relevant methodologies, and "absence of conflicts of interest."[39] IARC allows 'Invited Specialists' who have critical knowledge and experience but who also have a conflict of interest that warrants exclusion from developing or influencing the evaluations of carcinogenicity. Invited Specialists do not draft any Monograph sections or interpretation of cancer data, and they do not participate in the evaluations. These experts are invited in limited numbers when necessary to assist the Working Group by contributing their unique knowledge and experience to the discussions.[40] This limits any concerns of reduced scientific quality of the Monographs as the best-qualified experts are included, but the monographs and conclusions are developed by independent experts free of any COIs.[41]

Finally, EPA should ensure public disclosure of all Agency meetings with interested industries and their contractors pertaining to specific scientific assessments.

2. At the hearing, the panel discussed the need for certainty in the chemical review process, especially for businesses looking to replace harmful existing chemicals with new, innovative chemicals. However, it is essential that there is no regrettable substitution of chemical substances.

D. Please describe the problem of "regrettable substitutions" as it relates to chemical safety?

Regulators at EPA usually conduct risk assessments of chemicals used in commerce on a chemical-by-chemical basis; while this is a well-established method, it is also time- and resource-intensive, and[42] there are several key problems with the chemical-by-chemical approach to risk assessment. First, there is a tendency to assume that chemicals with insufficient data to estimate either hazard or risk pose no risk, as highlighted by the National

[39] Before a Meeting Invitation Is Extended, Each Potential Participant, Including the IARC Secretariat, Completes the WHO Declaration of Interests Form to Report Financial Interests, Employment and Consulting (Including Remuneration for Serving as an Expert Witness), Individual and Institutional Research Support, and Non-Financial Interests Such as Public Statements and Positions Related to the Subject of the Meeting. IARC Assesses the Declared Interests to Determine Whether There Is a Conflict That Warrants Any Limitation on Participation.

[40] International Agency for Research on Cancer, WHO. IARC Monographs on the Identification of Carcinogenic Hazards to Humans. Preamble.; 2019. https:// monographs.iarc.who.int/wp-content/uploads/2019/07/Preamble-2019.pdf

[41] National Academies of Sciences, Engineering, and Medicine. Sponsor Influences on the Quality and Independence of Health Research: Proceedings of a Workshop. The National Academies Press; 2023. https://doi.org/10.17226/27056

[42] National Research Council: Risk assessment in the federal government: managing the process. 1983.

Academies in the Science and Decisions report.[43] This assumption allows hazardous chemicals to enter or remain in the marketplace unless they are explicitly prohibited by means other than risk assessment.[44] A second problem is that single-chemical risk assessment does not capture real-life exposures to mixtures and the potential increased cumulative risk that result from exposures to multiple chemicals. Consequently, it is likely that the risks associated with multiple chemical exposures are underestimated in EPA's current approach.[45]

Third is the substitution of hazardous chemicals with others that have similar structure and function, but are relatively untested. This often results in a **regrettable substitution**, or a replacement that may be as harmful or more harmful than the original chemical of concern.[46] Some key examples highlighting regrettable substitution include:

1. **Bisphenols:** As health concerns about bisphenol A (BPA) grew, it was often replaced with other bisphenols (e.g., BPS, BPF) that share similar structures and endocrine-disrupting properties but initially had far less testing.
2. **Brominated flame retardants:** Earlier phased-out flame retardants were replaced by newer brominated compounds with similar structures and uses, which later showed comparable or overlapping toxicities, including neurodevelopmental harm (reduced IQ, ADHD, autism spectrum disorders, and other learning and behavioral disorders).

Regrettable substitutions can occur for a number of reasons. First, under the single-chemical paradigm, chemicals lacking adequate hazard or exposure data are often treated as if they pose little or no risk, despite the lack of data. This can lead to their rapid adoption as replacements. Regrettable substitution also occurs because regulation lags behind innovation. Industry can move quickly to introduce new structurally-similar replacements for chemicals of concern; however, environmental health science, regulatory science, and formal risk assessments move slowly, so harm from the replacement chemical is often detected only after widespread exposure occurs in the human population.

From a public-health and regulatory standpoint, regrettable substitutions means that EPA is, in effect, playing "whack-a-mole:" each time one problematic chemical is addressed, another closely related chemical steps into its place, and the exposure and disease burden for the public continues.

E. Would reviewing and regulating chemicals as a class – like brominated flame retardants, PFAS, or Polychlorinated Biphenyls (PCBs) – address the concern of regrettable substitutions?

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[43] National Research Council: Science and decisions: advancing risk assessment. 2009.
[44] Toxic Substances Control Act. 40 CFR 372.65 (c). 1976.
[45] Kortenkamp A, Faust M. Regulate to reduce chemical mixture risk. Science (New York, NY). 2018;361(6399):224–6.
[46] National Academies of Sciences E, Medicine: A Class Approach to Hazard Assessment of Organohalogen Flame Retardants. 2019.

Yes. Class-based chemical review and regulation is one of the best ways to prevent regrettable substitutions. A recent paper we co-authored highlights several ways in which regulating chemical classes like brominated flame retardants, PFAS, and PCBs can help avoid regrettable substitution including:[47]

1) **Closing the "analog loophole"**. If regulation focuses only on a single chemical, manufacturers can easily substitute a close analog (for example, replacing one PFAS with another PFAS that has a slightly different chain length or functional group). Class-based regulation applies similar protections to all members of a defined class, so the regulatory umbrella extends over the entire family of structurally or functionally similar chemicals, not just one "bad actor."
2) **Extrapolating from data-rich to data-poor chemicals.** Class-based review and regulatory approaches support "read across," or methods that use robust data from well-studied members of a chemical class to infer hazards of less-studied members. This reduces the incentive for industry to push untested analogs as substitutes and directly reduces the issue of regrettable substitutes.
3) **Driving innovation towards safer alternatives.** Determining an entire class of chemicals to be harmful to human and/or environmental health can push industry to develop chemical alternatives that do not share similar hazard or functional traits, potentially leading to the development of truly safer alternatives, as long as harmful chemicals from other toxic chemical classes are not chosen as regrettable substitutes.

F. What are the benefits of regulating certain chemicals as a class? Would it provide more certainty to industrial stakeholders?

Class-based chemical regulation offers benefits to a variety of stakeholders, including the public, regulatory agencies, and the chemical industry. For the public, class-based chemical regulation improves health and lowers healthcare costs by reducing exposure to many harmful chemicals at once, instead of phasing out one chemical at a time and delaying health protections against other members of a harmful chemical class. Class-based regulations also minimize regrettable substitutions, as discussed previously, and the assumption that no data equates to no risk, which often leads to the premature approval of dangerous chemicals for use in the marketplace without adequate evaluation of safety. Class-based chemical regulation also increases government efficiency and shortens decision timelines, allowing for more efficient use of agency resources.

For the regulated industry, class-based chemical regulation can provide greater certainty and predictability than the current chemical-by-chemical system, and set clearer regulatory expectations. For example, when EPA defines a class of chemicals to regulate, such as PFAS or

[47] Maffini, M. V., Rayasam, S. D. G., Axelrad, D. A., Birnbaum, L. S., Cooper, C., Franjevic, S., MacRoy, P. M., Nachman, K. E., Patisaul, H. B., Rodgers, K. M., Rossi, M. S., Schettler, T., Solomon, G. M., & Woodruff, T. J. (2023). Advancing the science on chemical classes. Environmental Health, 21(1), 120. https://doi.org/10.1186/s12940-022-00919-y

ortho-phthalates, industry can understand the full scope of chemicals likely to be evaluated or restricted instead of trying to predict which specific analog within a chemical class will be targeted next. A class-based regulatory approach also levels the playing field for industries competing with one another for chemical innovation; when a whole class of chemicals is regulated, all regulated industries face the same constraints and cannot gain short-term advantage by using an unsafe analog that is not yet regulated. This system rewards early adopters of safer chemistry and drives the innovation of truly safer alternatives.

G. What lessons can EPA learn from past bans on classes of chemicals, like PCBs?

To not repeat the mistakes of the past, EPA and Congress should reject industry efforts to speed up chemical reviews and industry pressure to approve toxic chemicals and prioritize health. Banning PCBs successfully removed a toxic class of chemicals from the marketplace, instead of taking years longer for EPA to work through evaluating and regulating each one. This resulted in reduced exposures to the public more quickly. However, because PCBs are persistent chemicals that bioaccumulate in living organisms, they continue to recirculate in the environment even today. Biomonitoring studies show that people are still exposed to PCBs even decades after they have been banned because of their persistence.[48] The case of PCBs illustrates the importance of taking immediate class-based action to remove persistent chemicals from the marketplace, including those that are also bioaccumulative and toxic.

3. EPA's New Approach Methods Work Plan was created to utilize novel tools and methodologies to evaluate the safety of chemicals.

H. What are the challenges and benefits of using New Approach Methods for evaluating the public health impacts of chemicals?

Chemical regulation in the United States relies heavily on animal testing to assess the risk of cancer, reproductive and developmental harm, respiratory and immune effects, and other diseases that may result in decreased quality of life or premature death. This is because animal testing often utilizes mammalian model organisms, such as mice and rats, that are biologically similar to humans and share common disease pathways. Animal testing has been critically important for identifying hazards of chemicals, such as brominated flame retardants and phthalates, long before any studies in humans could be conducted. However, animal experimentation comes with ethical, scientific, and resource challenges, so, scientists have worked to develop alternative methods to test chemicals, called New Approach Methodologies (NAMs).

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[48] Woodruff, T. J., Zota, A. R., & Schwartz, J. M. (2011). Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. Environmental health perspectives, 119(6), 878–885. https://doi.org/10.1289/ehp.1002727

NAMs are chemical toxicity tests that use testing systems like yeast rather than traditional animal testing. They include:

- *In vitro* studies, which use human or animal cells;
- *In chemico* studies, which assess how a chemical interacts with materials without using human or animal cells;
- *In silico* studies, which use computer simulations;
- Non-mammalian animal studies, which use organisms like zebrafish or fruit flies; and
- Other whole organism studies, which use materials like yeast models.

NAMs are advantageous because they are often cheaper and faster than traditional animal testing. Researchers at the University of California San Francisco (UCSF) Program on Reproductive Health and the Environment (PRHE) and other institutions have used NAMs to more quickly identify the reproductive harms of emerging chemicals. NAMs can also be used as effective screening tools to identify chemicals of concern for regulatory decision-making.

While NAMs hold promise, regulatory agencies like the EPA lack science-based frameworks to implement data from NAMs in decision-making, creating a risk that NAMs may be used to prematurely exonerate chemicals for safety. In addition, because the science behind certain NAMs is still evolving, especially for complex health outcomes like neurodevelopmental harm, EPA should be cautious before relying exclusively on these methods to determine that chemicals are safe.

However, EPA is already using NAMs to prematurely replace animal studies. In 2016, Congress amended the TSCA, stating that EPA should "reduce and replace the use of vertebrate animals in the testing of chemical substances or mixtures." However, the law requires such assays to "provide information of equivalent or better scientific quality and relevance that will support regulatory decisions." Many NAMs still have inherent data gaps, meaning that they cannot reliably or comprehensively assess the risks of several important and complex health effects, including developmental neurotoxicity, endocrine toxicity, immunotoxicity, and metabolic toxicity, in a manner comparable to animal tests. These limitations mean that EPA should not completely rely on NAMs to determine chemical safety until they have demonstrated sufficient concordance with animal studies for a range of adverse health effects.

Unfortunately, in recent years, EPA has misused NAMs data to weaken regulations on harmful chemicals, which raises concerns about the reliability of agencies to use these new methods to ensure public safety without adequate frameworks in place.

For example, EPA's Office of Pesticide Programs has used NAMs data to reverse long-standing science and policy positions to delay and weaken the regulation of organophosphate pesticides (OPs), a class of pesticides originally developed by the Nazis as chemical warfare agents during World War II. For decades, evidence from human and animal studies has shown that OPs are acutely neurotoxic and harm neurodevelopment in infants and children. However, in the draft risk assessments of three widely-used organophosphate insecticides (acephate, malathion, and

dimethoate), EPA used flawed and underpowered NAMs data to propose eliminating a critical safety factor required by the 1996 Food Quality Protection Act (FQPA) to account for any data gaps in the scientific evidence regarding the developmental neurotoxicity potential of chemicals. This decision undermines decades of epidemiologic and animal evidence demonstrating the neurodevelopmental harm of OPs and puts children at increased risk of autism, ADHD, and lower IQ. This decision also undermines EPA's ability to evaluate OPs as a chemical class, despite the substantial epidemiologic evidence that supports a class-based approach, further reducing the efficiency and efficacy of the risk assessment and regulation of OPs. The NASEM recently published a set of recommendations for using a systematic review-based approach to implement data from NAMs to support health-protective decisionmaking.[49] However, EPA has yet to implement any of these recommendations.

4. In 2016, Congress amended the Toxic Substances Control Act (TSCA) to systematically review chemicals for unreasonable risk to human or environmental health.

I. How has this review gone over the past nine years?

When amending TSCA, Congress was deeply concerned about EPA's slow progress in addressing the large backlog of existing chemicals with widespread exposure and known hazards to health and the environment. To accelerate progress, it included deadlines for completing risk evaluations to determine unreasonable risk and then rulemaking to eliminate these risks. It also rejected any consideration of cost and other economic factors in determining if risks were unreasonable and required rules restricting chemicals presenting such risks to fully protect people, including vulnerable and fenceline communities, from harm. In implementing these mandates, EPA has made meaningful strides in reducing risks for unsafe substances that had long escaped meaningful regulation, such as methylene chloride, trichloroethylene, and asbestos. But EPA has also failed to meet the law's deadlines and addressed fewer chemicals than the law directed. Its risk evaluations have also fallen short of the expectations of the public health community by failing to account for aggregate and cumulative exposures, limiting the use of class-based approaches, understating risks to susceptible populations and employing methodologies that are insufficiently protective and do not embody the best available science. The current Administration is not only failing to address these problems but, in its proposed revisions to the TSCA risk evaluation framework rule, pursuing further departures from the existing law and accepted scientific principles that will undermine public health protection and ignore recommendations of independent experts who have peer reviewed EPA's work.

[49] National Academies of Sciences, Engineering, and Medicine. Building Confidence in New Evidence Streams for Human Health Risk Assessment: Lessons Learned from Laboratory Mammalian Toxicity Tests. National Academies Press; 2023. doi:10.17226/26906

J. Do you have any recommendations for how chemical reviews could be improved with the existing law?

Looking forward, it is critical both to remedy the shortcomings in previous risk evaluations and risk management rules and to reject proposed rollbacks that will further erode TSCA protections against unsafe chemicals. Some areas of concern are as follows:

1. **All Determinations of Unreasonable Risk and Risk Management Rules Should Account for Aggregate and Cumulative Exposure, Consider All Contributors to Risk, and Protect Vulnerable Populations and Fenceline Communities.** These approaches, repeatedly endorsed by EPA's peer reviewers, need to be applied broadly across the TSCA program and not further undermined, as the Trump EPA is in the process of doing in its framework rule proposal.
2. **Final Risk Management Rules and Completed Risk Evaluations Should Not Be Reopened and Weakened.** These rules and risk evaluations have been years in the making and have undergone lengthy public comment periods and peer review. Reopening and revising them would result in multi-year delays in protecting against unsafe substances already determined to present unreasonable risks, erode the current level of protection that these rules and evaluations provide and put communities and workers at risk, and delay work on additional hazardous chemicals in the pipeline.
3. **Environmental Exposures Subject to Other Laws Must not be Excluded from TSCA Evaluations.** To return to the discredited first Trump term approach of exempting environmental releases that contribute to unreasonable risks from evaluation and regulation under TSCA would be a step backward and would likely mean that these releases fall between the cracks of TSCA and other EPA programs and therefore are unaddressed.
4. **Piecemeal Unreasonable Risk Determinations that Do Not Address Whole Chemical Risks Should be Rejected.** Under the Biden EPA's "whole chemical" approach to determining unreasonable risk, EPA takes into account a chemical's entire use and exposure profile when determining whether the risk it presents is unreasonable. TSCA explicitly requires EPA to determine whether chemicals as a whole present an unreasonable risk instead of merely making separate and unrelated determinations for each use. Thus, the whole chemical approach not only maximizes health protection but is the best interpretation of the statutory language. Reviving the narrow use-by-use risk determinations of the first Trump EPA, as the current EPA is proposing in its revisions to the risk evaluation framework rule, would not only limit health protection but be contrary to the law.
5. **EPA Should Not Employ Discredited and Unscientific Approaches that Erode the Standards for Determining Unreasonable Risk and Dismiss Urgent Health Threats as Insignificant.** Industry has challenged the first five risk management rules as turning TSCA into a "zero risk/hazard-based" law, under which all risks, no matter how negligible, are considered "unreasonable." However, the completed evaluations and rules under attack target life-threatening health effects, documented by the best available science, which the Agency has shown are causing substantial harm under the

chemical's ongoing conditions of use and exposure. Any retreat from this approach would divorce TSCA implementation from the intent of the 2016 law.

6. **EPA Should Not Refer Unreasonable Workplace Risks Identified under TSCA to OSHA.** Workers were specifically identified as a vulnerable population in the Lautenberg Act and TSCA's role in worker protection was central to the law's revision in 2016. In its initial risk management rules, EPA required significantly stronger workplace protections than the Occupational Safety and Health Administration (OSHA) had imposed on the same chemicals. However, in pending legal challenges to these rules, industry has argued that EPA should refer unreasonable worker risks to OSHA and forego protecting workers under TSCA. Because OSHA has narrower risk management authority than EPA and its resources are extremely limited, it will either take no action on EPA referrals or provide considerably less protection to workers than TSCA requires, years after TSCA protections would take effect. The Trump EPA should not abandon TSCA's essential role in protecting at risk workers.
7. **The Indefensible Presumption That Workers Have Access to and Consistently Use Personal Protective Equipment (PPE) Should Not be Reinstated.** In legal challenges and elsewhere, industry has urged that, as in the first Trump term, EPA should presume that PPE (respirators and gloves) are effectively reducing workplace exposures and only address exposure levels remaining after accounting for alleged universal PPE use. However, workers often are not provided with properly functioning PPE and even where worn, gloves and respirators often fail to provide necessary exposure reduction because they are the wrong size, are not adequately tested or are worn improperly. Thus, the Biden EPA rejected a universal presumption of PPE use in determining whether workers are subject to unreasonable risks from chemical exposures. Reinstating the misguided Trump PPE policy would be a huge step backward because it would fail to protect many workers who do not or cannot wear PPE and do not receive the exposure protection industry claims it provides.

5. **During the hearing, this Committee expressed bipartisan support for using the best available science to account for exposures to young children, including infants and toddlers.**

    K. **What are the scientific considerations that the Environmental Protection Agency (EPA) should evaluate related to these exposures?**

The methods that agencies like EPA use to evaluate scientific evidence for policy and decision-making have not kept pace with significant advances in our understanding of how chemicals in commerce and environmental pollutants impact human health. Extensive scientific evidence shows that everyday exposures to widely used chemicals and environmental pollutants, including particulate matter, air pollution, and lead, pose significant health risks, particularly to

susceptible populations such as infants, children, and the developing fetus.[50,51] Our research has found that pregnant women and the developing fetus are simultaneously exposed to dozens of toxic chemicals, including phthalates, PFAS, and halogenated flame retardants.[52,53,54] Any scientifically credible risk assessment must account for this understanding of how exposure and susceptibility interact to drive serious health harms in early life stages.

Many authoritative scientific bodies have already recommended adopting updated methods that better reflect how chemical exposures affect younger and more susceptible subpopulations. For chemical risk assessment, this includes accounting for real-world chemical exposure scenarios that occur during early life, including use of aggregate exposure assessment that adds up all exposures to an individual chemical regardless of source, and cumulative risk assessment that assesses combined exposures to multiple chemicals. These approaches also take into account additional susceptibility due to non-chemical stressors such as poverty, racism, food insecurity, and pre-existing disease. Authoritative bodies have also recommended the application of science-based adjustment factors to account for the wide variability in human response to toxic chemical exposures and the uniquely elevated risks faced by infants, children, and the developing fetus. Infants and young children experience greater harm from chemical exposures because their organs and tissues are rapidly developing, they take in more chemicals per pound of body weight due to behaviors like hand-to-mouth activity, and their metabolic systems are less capable of metabolizing and detoxifying hazardous substances compared to adults.[55] The developing fetus is even more sensitive, as even low-level toxic exposures during pregnancy can influence structural development, gene expression, and lifelong disease risk.

To adequately account for the increased susceptibility to chemical exposures during early life, including infancy, childhood, and fetal development, we recommend that EPA incorporate the following in its chemical risk assessment approaches:

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[50] Woodruff TJ. Health Effects of Fossil Fuel-Derived Endocrine Disruptors. N Engl J Med. 2024;390(10):922-933. doi:10.1056/NEJMra2300476

[51] National Academies of Sciences, Engineering, and Medicine. Guidance on PFAS Exposure, Testing, and Clinical Follow-Up. National Academies Press (US); 2022. Accessed November 19, 2024. http://www.ncbi.nlm.nih.gov/books/NBK582439/

[52] Woodruff TJ. Health Effects of Fossil Fuel–Derived Endocrine Disruptors. Solomon CG, Salas RN, eds. N Engl J Med. 2024;390(10):922-933. doi:10.1056/ NEJMra2300476

[53] Di Renzo GC, Conry JA, Blake J, et al. International Federation of Gynecology and Obstetrics opinion on reproductive health impacts of exposure to toxic environmental chemicals. *Int J Gynaecol Obstet* 2015;131:219-225.

[54] Varshavsky JR, Rayasam SDG, Sass JB, et al. Current practice and recommendations for advancing how human variability and susceptibility are considered in chemical risk assessment. Environmental Health. 2023;21(1):133. doi:10.1186/s12940-022-00940-1

[55] US EPA Office of Research and Development. Recommended Use of Body Weight 3/4 as the Default Method in Derivation of the Oral Reference Dose. 2011. Available from: https://www.epa.gov/risk/recommended-use-body-weight-34-default-method-derivation-oral-reference-dose

- Increase the current default human variability uncertainty factor used in risk assessment to at least 42X, as recommended by the WHO, to better account for human variability in response to chemical exposures.[56]
- Apply an additional adjustment factor of at least 10X to account for the enhanced susceptibility to chemical exposures in younger age groups, including children, infants, and the developing fetus. This is necessary because the WHO-estimated 42X adjustment factor for human variability does not account for early life susceptibility, necessitating additional adjustment to capture the full range of variability in responses to chemical exposures at younger ages.[57]
- When necessary, apply an additional adjustment factor of at least 10X to account for additional chemical and non-chemical stressors experienced by residents of fenceline communities and other susceptible subgroups who experience disproportionately high levels of chemical and non- chemical stressors compared to the general population. This includes non-chemical stressors, such as psychosocial stress from income inequality, violence, racism, healthcare inequity, food insecurity, and additive effects of exposure to chemical mixtures.[58]
- Prioritize cumulative risk assessment and/or cumulative impacts assessments that better capture and reflect real-world chemical exposure scenarios during early life.

L. How can the EPA improve its use of the best available science?

Multiple authoritative review bodies and scientists have called for improved scientific approaches to hazard and risk assessment that better account for real-world chemical exposures and risks.[59,60,61,62,63,64,65] These approaches must start with the best methods for

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[56] WHO. Guidance document on evaluating and expressing uncertainty in hazard characterization, 2nd edition. 2017. https://www.inchem.org/documents/ harmproj/harmproj/harmproj11.pdf

[57] WHO. Guidance document on evaluating and expressing uncertainty in hazard characterization, 2nd edition. 2017. https://www.inchem.org/documents/ harmproj/harmproj/harmproj11.pdf

[58] Varshavsky JR, Rayasam SDG, Sass JB, et al. Current practice and recommendations for advancing how human variability and susceptibility are considered in chemical risk assessment. Environ Health. 2023;21:1-20. doi:10.1186/ s12940-022-00940-1

[59] National Research Council. Review of EPA's Integrated Risk Information System (IRIS) Process. National Academies Press; 2014:79.

[60] National Research Council. Science and Decisions: Advancing Risk Assessment. The National Academies Press; 2009. doi:10.17226/12209

[61] National Research Council. Phthalates and Cumulative Risk Assessment: The Tasks Ahead. The National Academies Press; 2008. doi:10.17226/12528

[62] National Academies of Sciences, Engineering, and Medicine. Progress Toward Transforming the Integrated Risk Information System (IRIS) Program: A 2018 Evaluation. The National Academies Press; 2018. doi:10.17226/25086

[63] National Academies of Sciences, Engineering, and Medicine. Application of Systematic Review Methods in an Overall Strategy for Evaluating Low-Dose Toxicity from Endocrine Active Chemicals. The National Academies Press; 2017. doi:10.17226/24758

[64] Trasande L. Updating the Toxic Substances Control Act to Protect Human Health. JAMA. 2016;315(15):1565-1566. doi:10.1001/jama.2016.2037

[65] Rayasam SDG, Koman PD, Axelrad DA, Woodruff TJ, Chartres N. Toxic Substances Control Act (TSCA) Implementation: How the Amended Law Has Failed to Protect Vulnerable Populations from Toxic Chemicals in the United States. Environmental Science & Technology. 2022;56(17):11969-11982. doi:10.1021/acs.est.2c02079

evaluating the scientific evidence— specifically, systematic review methods. Systematic review provides a transparent, consistent framework for evaluating scientific evidence and reducing bias. When applied correctly, systematic review gives a more objective, accurate, and reliable foundation for environmental health assessments, leading to more trustworthy policy decisions that effectively protect public health.[66,67] Currently, federal agencies, including EPA's Office of Chemical Safety and Pollution Prevention that implements TSCA, have failed to fully apply systematic review methods endorsed by leading expert bodies, like the NASEM. The current approach to TSCA systematic review suffers from several critical flaws, including 1) failure to publish a systematic review protocol for each risk evaluation prior to conducting the evaluation, 2) inappropriate methods for study quality evaluation, 3) inappropriate exclusion of studies, 4) failure to adequately define how evidence is integrated from multiple streams to make conclusions about chemical hazards and 5) inadequate documentation of decision-making processes. Established and robust systematic review methods,[68,69,70,71] which include clear protocols for literature searches, study selection, evidence evaluation, and evidence synthesis, should be implemented without delay to ensure robust, defensible, and health-protective chemical evaluations.

EPA must also update its risk assessment methods, which have been identified by multiple authoritative review bodies and scientists as outdated and no longer reflective of the best available science.[72,73] Of particular concern is EPA's reliance on the assumption that risks from chemical exposures are negligible below an assumed "safe" threshold. This flawed approach fails to reflect the best available science on the potential harms from very low-level exposures and does not adequately account for human variability, including increased susceptibility in populations such as infants, children, pregnant people, people with pre-existing health

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[66] Norris SL, Aung MT, Chartres N, Woodruff TJ. Evidence-to-decision frameworks: a review and analysis to inform decision-making for environmental health interventions. Published online May 7, 2021:2021.05.04.21256541. doi:10.1101/2021.05.04.21256541

[67] Chartres N, Joglekar R. Invited Perspective: Why Systematic Reviews, Scoping Reviews, and Evidence-to-Decision Frameworks Are Critical for Transparent, Consistent, Equitable, and Science-Based Decision-Making in Environmental Health. Environmental Health Perspectives. 2024;132(3):031304. doi:10.1289/ EHP14346

[68] National Academies of Sciences, Engineering, and Medicine. The Use of Systematic Review in EPA's Toxic Substances Control Act Risk Evaluations. The National Academies Press; 2021. https://doi.org/10.17226/25952

[69] National Academies of Sciences, Engineering, and Medicine. Progress Toward Transforming the Integrated Risk Information System (IRIS) Program: A 2018 Evaluation. The National Academies Press; 2018. doi:10.17226/25086

[70] National Academies of Sciences, Engineering, and Medicine. Review of EPA's Integrated Risk Information System (IRIS) Process. National Academies Press; 2014. doi:10.17226/18764

[71] National Academies of Sciences, Engineering, and Medicine. Application of Systematic Review Methods in an Overall Strategy for Evaluating Low-Dose Toxicity from Endocrine Active Chemicals. The National Academies Press; 2017. doi:10.17226/24758

[72] Woodruff TJ, Rayasam SDG, Axelrad DA, et al. A science-based agenda for health-protective chemical assessments and decisions: overview and consensus statement. Environmental Health. 2023;21(1):132. doi:10.1186/s12940-022-00930-3

[73] Nielsen GH, Heiger-Bernays WJ, Levy JI, et al. Application of probabilistic methods to address variability and uncertainty in estimating risks for non-cancer health effects. Environmental Health. 2023;21(1):129. doi:10.1186/s12940-02200918-z

conditions, people routinely exposed to multiple chemicals in the environment, and historically marginalized communities.[74,75,76]

Additionally, while many current laws require EPA to regulate chemicals based on findings from risk assessments, the risk assessment process is inherently time-consuming and resource-intensive, susceptible to industry influence, and so technical and opaque that it often excludes the communities and populations most impacted by toxic chemicals. In cases where risk assessment is legally required, EPA must update its scientific methods to more accurately identify the hazards and risks associated with chemicals and industrial pollutants. Where risk assessment cannot provide meaningful and timely information, we urge EPA to move beyond risk-based regulation and utilize strategies like cumulative impact assessment and hazard-based approaches.

Given the escalating rates of chemical production and use, as well as rising chronic disease trends,[77] it is urgent that EPA:

1. Implement a transparent, consistent, and science- based method of evaluating scientific evidence, using a systematic review method consistent with the best available science that considers all evidence streams for all scientific assessments that impact policy or regulation.
2. Adopt and apply scientific methods consistent with the best available science that better reflect real- world chemical exposures and risks for assessments that impact policy or regulation, including:
    - Methods developed by the World Health Organization (WHO) to quantify risks of non- cancer health effects at all relevant levels of exposure;[78]
    - Science-based adjustment factors to capture the full range of variability in human responses to chemical exposures;[79]
    - Assessing chemical exposures for at least the 99th percentile of the human population to better account for highly exposed individuals;[80] and

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[74] National Research Council. Science and Decisions: Advancing Risk Assessment. The National Academies Press; 2009. doi:10.17226/12209

[75] Woodruff TJ, Rayasam SDG, Axelrad DA, et al. A science-based agenda for health-protective chemical assessments and decisions: overview and consensus statement. Environ Health. 2023;21(S1):132. doi:10.1186/s12940-022-00930-3

[76] McGartland A, Revesz R, Axelrad DA, Dockins C, Sutton P, Woodruff TJ. Estimating the health benefits of environmental regulations. Science. 2017;357(6350):457-458. doi:10.1126/science.aam8204

[77] Woodruff TJ. Health Effects of Fossil Fuel-Derived Endocrine Disruptors. N Engl J Med. 2024;390(10):922-933. doi:10.1056/NEJMra2300476

[78] World Health Organization, International Programme on Chemical Safety. Guidance Document on Evaluating and Expressing Uncertainty in Hazard Characterization. 2nd ed. World Health Organization; 2018. Accessed December 10, 2024. https://iris.who.int/handle/10665/259858

[79] Varshavsky JR, Rayasam SDG, Sass JB, et al. Current practice and recommendations for advancing how human variability and susceptibility are considered in chemical risk assessment. Environmental Health. 2023;21(1):133. doi:10.1186/s12940-022-00940-1

[80] Vandenberg LN, Rayasam SDG, Axelrad DA, et al. Addressing systemic problems with exposure assessments to protect the public's health. Environ Health. 2023;21(Suppl 1):121. doi:10.1186/s12940-022-00917-0

- A consistent approach to account for all foreseeable exposures and for combinations of exposures in chemical assessments, including aggregate exposure assessment and cumulative risk assessment.[81,82,83,84]

3. Regulate classes of chemicals to accelerate the pace of chemical assessments.
    - Prioritize the evaluation of chemical hazard and risk for new and existing chemicals by class—grouped by similar structure, function, and/or health hazards to accelerate the pace of chemical assessments and avoid regrettable substitution.
4. Assure that the data necessary for comprehensive and protective chemical assessments is developed and made available to agencies in a timely manner.
    - Leverage all sources of existing data across agencies and use legal authority to require testing and submission of data and information as needed to fill data gaps and support health protective policies and rulemaking.
    - Continue long-term funding and improvements for best available systems, methods and tools that are critical for environmental health decision-making, including America's Children and the Environment, the Air Toxics Screening Assessment (AirToxScreen), the White House Council on Environmental Quality's Climate and Environmental Justice Screening Tool (CEJST), EPA's EJ Screen, California EPA's CalEnviroScreen, and the CDC Environmental Justice Index.

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[81] Solomon GM, Morello-Frosch R, Zeise L, Faust JB. Cumulative Environmental Impacts: Science and Policy to Protect Communities. Annu Rev Public Health. 2016;37:83-96. doi:10.1146/annurev-publhealth-032315-021807

[82] National Research Council. Phthalates and Cumulative Risk Assessment: The Tasks Ahead. The National Academies Press; 2008. doi:10.17226/12528

[83] Gennings C, Hauser R, Koch H. Report to the U.S. Consumer Product Safety Commission by the CHRONIC HAZARD ADVISORY PANEL ON PHTHALATES AND PHTHALATE ALTERNATIVES. US Consumer Product Safety Commission; 2014:13, 29-33. https://www.cpsc.gov/s3fs-public/CHAP-REPORT-FINAL%20(1). pdf

[84] Ellickson K, Curtis K. The Community Guide to Cumulative Impacts: Using Science and Organizing to Advance Public Health Policy. Union of Concerned Scientists; 2024. doi:10.47923/2024.15622

Senator CURTIS. Mr. Huntsman?

STATEMENT OF PETER HUNTSMAN, PRESIDENT AND CEO, HUNTSMAN CORPORATION

Mr. HUNTSMAN. Chairman Curtis, Ranking Member Merkley, and members of the Subcommittee, it is an honor for me to be here. I am Peter Huntsman, Chief Executive Officer and Chairman of Huntsman Corporation.

American prosperity, security, and power are entirely dependent on a strong, thriving and properly regulated chemical sector. Without it, modern life is not possible. That is not hyperbole. It is a physical, immutable reality.

In the chemical industry, we take atoms and molecules, break them apart, put them back together to create the building blocks of nearly everything in modern society, automobiles and airplanes, batteries and semiconductors, solar panels and wind turbines, clean drinking water, pharmaceuticals and much more.

Innovation in chemistry drives solutions that improve modern life. Realizing these benefits depends on a regulatory system that is efficient, science-based, predictable, and that encourages investment in innovation instead of creating unnecessary delays and uncertainty.

If today we create a chemical that could eliminate greenhouse gas emissions tomorrow, there is no guarantee how long it would take to get approved, even though it would be a breakthrough for the environment and the world. This regulatory uncertainty and delay hold back innovation, make it difficult to invest in technologies we desperately need.

Fifteen to 20 years ago, the vast majority of new chemistry science came from the United States and Europe. Today, we see China, India, Southeast Asian countries and the Middle East region investing billions to not just match our innovation, but to exceed our capabilities. I want to be clear: we do not need to be cutting corners. We do need to have better focus, speed, transparency and reliable standards in order to compete.

If we do not get this right, I fear we will be here in five or 10 years from now in the same situation we find ourselves with critical minerals: dependent on others.

As a chief executive officer I am responsible for making long-term investment decisions that impact thousands of employees, billions in capital, and our ability to compete globally. When regulations like the Toxic Substance Control Act, TSCA, are applied unpredictably and without regard to real world risk, it becomes nearly impossible to plan with confidence when EPA's review process for new chemicals routinely exceeds the 90 day timeline required by law, creating unnecessary delays and uncertainty.

Without a clear sense of when or if a product will be approved, innovation is put on hold, and companies are often forced to consider moving research and development outside the United States just to remain competitive. That is not just a regulatory inefficiency, it is a strategic disadvantage to our Country.

America should be leading the world in developing next generation chemistries that drive economic growth and economic well-being. That kind of leadership depends on a regulatory system that

is science-based, timely, and focused on real-world exposures, not hypothetical hazards. Until we fix it, it is simply impossible for any board of directors to approve building new manufacturing facilities on a product that is unapproved.

We do not need to look far to see the damaging impact of bad policy around natural resources, energy and chemicals and material innovation. The ongoing deindustrialization of Europe is a clear example of what is happening when regulatory burdens, high energy costs and supply constraints drive investment and production elsewhere.

Congress has an opportunity to ensure that does not happen here by improving TSCA with a durable policy solution that will not seesaw depending on who is in office. This type of certainty will not only help manufacturers make investment decisions, but will benefit the general public by encouraging innovation and will bring safer and more sustainable chemistry to the market.

Thank you, and I look forward to your questions.

[The prepared statement of Mr. Huntsman follows:]

Testimony for the Record by Peter R. Huntsman
Chairman, President, and Chief Executive Officer
Huntsman Corporation

United States Senate
Committee on Environment and Public Works
Subcommittee on Chemical Safety, Waste Management, Environmental Justice, and Regulatory Oversight

"Examining the Beneficial Use and Regulation of Chemicals"
October 23, 2025, 10:30 a.m. EST
562 Dirksen Senate Office Building
Washington, D.C. 20510

Why I Am Here Today

Chairman Curtis, Ranking Member Merkley, and members of the Subcommittee, thank you for the opportunity to testify on appropriate regulation of the American chemical industry to support innovation and ensure American prosperity. It is an honor. I take very seriously the First Amendment right to engage directly with elected officials and policymakers of both parties to educate and inform them about how Huntsman Corporation and American chemical manufacturers manage risk, make capital investment decisions, support our employees, and deliver the products that make modern life possible.

The primary reason I am here today is to share my observations on policy, political, business, and cultural forces that will shape the future of the American chemical sector – and with it America's entire economy. If there is one conclusion I want Members of the Committee to come away with from my testimony, it is this:

American prosperity, security and power are entirely dependent on a strong, thriving and properly regulated chemical sector. Without it, modern life is not possible. That is not hyperbole. It is physical, immutable reality.

The Huntsman Story

Through the vision and tenacity of my father, Jon Huntsman, Sr. and with the support of tens of thousands of employees over a half century, Huntsman Corporation today is a New York Stock Exchange (NYSE) traded company headquartered in The Woodlands, Texas, with 2024 revenues of $6 billion, 6,000 employees and operations in nearly 25 countries. My father's life began in 1937 in a Blackfoot, Idaho home with no running water. By the end of his life in 2018, he had donated nearly $1 billion dollars to endow the Huntsman Cancer Institute (HCI) at the University of Utah in Salt Lake City. Today, HCI is the leading cancer hospital in the Mountain West Region and has saved tens of thousands of lives through world leading cancer treatment.

It was a story that can only happen in America.

After dropping out of college, I started my career in 1983 as a truck driver delivering oil across the Intermountain West. In 2000, I became President and CEO and Chairman in 2017. As our company grew from a small California packaging company into a multinational chemical company, I have witnessed boom and bust business cycles, mergers and acquisitions, multiple iterations of "peak oil," the collapse of the Soviet Union, unification of Europe,

the rise of China, the creation of the Internet and the transformational impact of hydraulic fracturing, among others. I have also observed the policy and regulatory environment around the chemical sector ebb and flow across Democrat and Republican Administrations and Congresses. Our company and the chemical industry have played a role in all of it.

Chemical Manufacturing, and Innovation

I want to provide a basic primer on what chemical companies do because chemicals are the building blocks for all American manufacturing. In the most basic form, we take atoms and molecules, break them apart and then put them back together to make the building blocks of virtually everything you see and touch in modern life. Automobiles, airplanes, solar panels, wind blades, smartphones, computers, televisions, residential and commercial buildings, pharmaceuticals, missiles, fighter planes, clothing, soap, shampoo, shoes, clean drinking water and crop fertilizer are all "modern miracles" made possible by chemical manufacturing.

The most utilized starting atoms, or "feedstocks," for chemical manufacturing are hydrocarbons derived from petroleum, natural gas, natural gas liquids and coal, otherwise known as fossil fuels. Without abundant access to these feedstocks, nobody can manufacture chemicals. Without chemicals, virtually all U.S. manufacturing would cease.

The scientists and engineers in the American chemical sector go to work in laboratories across the country and aim to improve existing molecules and develop new ones. When commercially viable, laboratory innovation moves to manufacturing plants and into the marketplace. While abstract to the average person, that molecular innovation ultimately manifests itself in lighter airplanes and cars, longer lasting clothes, stronger building materials, clean drinking water, new medicines and cancer treatments and larger crop yields. Human lives are enriched and lengthened through chemical sector innovation.

How Things Are Made

I am increasingly concerned that many government and business leaders lack an understanding of how "things" are made. In the post-Cold War era of globalization, the United States underwent a low-level form of deindustrialization as the appeal of cheap labor and growth markets in Asia pushed supply chains out of North America. Two examples of this can be seen in the fate of the Pennsylvania steel industry and textiles in North Carolina in the 1990s and 2000s, and there have been countless others. Wall Street became the highest paying sector. It was then followed by Silicon Valley and the tech boom. Quite simply, "making things" went out of vogue because it was done "out of sight and out of mind."

Looking back with the benefit of hindsight, I believe the post-Cold War manufacturing exodus led many policymakers and business leaders to simply forget how things are manufactured at the most basic molecular level or, as we say in the chemical industry, "upstream." This trend is best encapsulated by Apple's famous "Designed in California Assembled in China" label on their products. To most people, the iPhone is a supercomputer we use every few seconds connecting us to the entire world. As a chemical industry leader, I see a device consisting of minerals and elements extracted from the Earth and refined thousands of times over into chemicals, plastic, glass, and materials brought to market via one of the most sophisticated supply chains ever developed. The same is true of millions of other products we use in our daily lives.

Essential to The American Way of Life

One of the biggest threats to American power, security and prosperity is the belief that we can choose not to extract our natural resources and convert them into the materials that enable our citizenry to thrive. Since the beginning of recorded history to the modern-day international system, human beings and nation states have used

natural resources to survive, prosper, trade and project power. This has been an invariable part of human nature and will always be so.

In the current policy, political and business arenas, opposition to natural resource extraction manifests itself in the idea that American society – and the world – can somehow "transition" away from fossil fuels and their derivative materials, including chemicals, and somehow maintain our way of life. Until the advent of new technology or a massive expansion of nuclear power, this is simply untrue and not physically possible. To believe so is both naïve and dangerous. Serious countries and people understand this reality.

Until relatively recently, the notion that we could eliminate fossil fuels while still sustaining modern society was mostly a fringe idea and dismissed by serious leaders in government and industry Over the last two decades, as seemingly well-intentioned policy proposals developed to attempt to manage an ever-changing climate, anti-fossil fuel extraction policy has become normalized in Europe and, more recently, in the United States. Many governments have organized themselves around stopping natural resource extraction in the name of reducing carbon dioxide emissions to "net zero." In the business community, many companies have made "commitments" that may (or may not) come to reality in less than three decades.

European Deindustrialization

The most notable example of the danger of "net zero" government policy is Germany. Through a series of government decisions over two decades and exacerbated by Russia's invasion of Ukraine, Germany has chosen to embark on a once-in-a-century deindustrialization that will have enormous global impacts, including in the United States.

Just a few years ago, it would have been inconceivable that the birthplace of the chemical industry could be deindustrializing. Yet here we are, waiting to see whether one of the most advanced economies and societies in modern history will be able to provide cheap, reliable, and abundant heat and electricity to power its economy. I encourage all U.S. elected officials to study deeply the policy decisions Germany made as it presents a real-life example of how not to organize electricity, manufacturing, natural resource, energy, and industrial policy.

The Chemical Sector Improves Lives and Lowers Emissions

If the goal of government and business is to reduce carbon dioxide emissions across society, U.S. government policy and regulation should be calibrated to *increase* natural resource extraction and chemical manufacturing more efficiently and productively. It is the chemical sector that develops the molecules and the innovations that allow individuals and society collectively to lower their emissions. This is evident in almost every sector across the economy. In the aerospace sector, fossil fuel-derived carbon composite airplanes fly longer distances using less fuel than their aluminum predecessors. Automobiles are constructed using carbon fiber material versus steel in years past. Modern homes include insulation materials that create a building envelope, securing the valuable hot and cold air inside the home. The world population recently reached 8 billion people and, for the most part, everyone has access to food. The mass starvation that we witnessed as recently as the mid-1980's in sub-Saharan Africa is virtually obsolete. This is a new phenomenon in human history and has been made possible only by chemical fertilizer and cold chain storage. Simply stated, a vibrant chemical industry means it is within our ability to lower emissions, grow the economy, and improve lives.

The Chemical Industry Welcomes Strong, Predictable and Risk Based Regulation

The United States has the strongest most effective environmental laws governing clean air and water in the world. It was not always that way and our industry has made mistakes. However, when you compare the environment in the developed world today to even 1980, the progress is staggering. The water in the Potomac River, the air in

Los Angeles and our rivers and streams are all cleaner. This is due to the combination of strong government regulation, corporations being held legally accountable for wrongdoing and because wealthy nations have the financial resources to prioritize the environment. The more prosperous a society becomes, the better it can manage the environment.

Every single day the chemical sector manufactures, handles, stores, transports and sells hazardous materials across the world. To deliver the products that make modern life possible does incur risk. We spend billions of dollars on environmental, health and safety of our employees and in the communities where we operate. Safety is a deeply ingrained value and our license to operate. In my 40 years in the industry, I can state unequivocally that we have greatly improved our safety record. Our safety record demonstrates we constantly strive to learn and improve as a company and industry.

The Environmental Protection Agency (EPA) can effectively protect human health and the environment while supporting American innovation and strengthening the American economy. This was the intent of Congress when it passed the Toxic Substances Control Act (TSCA). It is essential that regulations under TSCA be science-based and risk-based. This requires a balance of hazards and real-world exposure scenarios. EPA must use the most relevant current science information, adhere to scientific standards, and consider safety protocols that are already in place.

We have seen what happens when EPA deviates from this approach. EPA's reviews of new chemicals are taking far longer than the 90-day timeframe required in the law, thereby creating uncertainty in the marketplace. Without a clear understanding of how long it will take to bring a new chemical to market, companies will either not innovate or introduce the product outside of America. This is a clear barrier to innovation.

Likewise, TSCA evaluations of existing chemicals have taken an overly conservative approach, not based on real world risks. This has led to unnecessary bans and highly restrictive regulations that are well outside the range of the rest of the world. This approach risks the availability of critical chemistries that are needed to power our economy and keep America safe.

To demonstrate the effect of unpredictable regulation, I would use the example of Huntsman's aerospace adhesives business. We have decades of experience in developing and marketing high performance adhesives which are widely used in aircraft interiors and structures, both civil and military. In recent years, many of these regulatory changes have stemmed from overstated or overly conservative risk assessments, driving repeated reclassifications that force unnecessary reformulation and retesting. Today, we spend as much time reformulating existing products as developing new ones, due to constant changes in chemical classifications. When products are reformulated, they often then need to undergo rigorous, costly testing by our aerospace customers to ensure their performance on aircraft. This process often takes longer to complete than the time window available to implement chemical classification changes. In some cases, where the regulatory burden is too high, products can be withdrawn, leaving a gap in the market and no obvious replacements. The constant need to address regulatory changes reduces the time and investment available for innovation and creates significant uncertainties for aerospace companies whose aircraft production lifecycles last decades.

For example, a UV absorber is an additive that protects aircraft parts from damage caused by UV and sunlight. This product was recently placed on Annex A of the Stockholm Convention. As a result, European regulators have effectively banned its use by 2030. In the U.S., the absorber is not currently regulated because we have not ratified the Convention. However, since both the chemical and aerospace industries operate globally, we must eliminate its use worldwide and undertake costly reformulation and testing to meet aerospace requirements. A downstream impact of this regulation is that the recycling industry no longer accepts end-of-life aircraft parts that may contain this additive, as they cannot verify whether concentrations are below one part per million. As a result, these parts are not being recycled and are instead accumulating in the environment — adding unnecessary complexity, cost, and creating unintended consequences for the industry's efforts toward circularity.

Congress has the opportunity between now and next year to fix these problems and provide durability through a provision built into the Lautenberg Amendments to review the law after 10 years. There is bipartisan recognition on this Committee that the EPA has done a poor job getting new, safe, environmentally sound chemistries into commerce. Congress can review the Lautenberg Amendments in targeted provisions to ensure EPA is meeting its statutory deadlines by approving new chemistries for their intended purposes or "conditions of use" in the language of the statute. Congress can ensure existing chemical regulations are based on risk and actual exposure rather than theoretical assumptions.

Such a policy solution won't see-saw depending on who is in office. This type of certainty will not only help manufacturers make investment decisions but will benefit the general public by encouraging innovation that will bring safer and more sustainable chemicals to the market.

Looking Ahead

I am highly optimistic about the future. The United States, with its combination of freedom, capitalism, scientific inquiry, deep capital markets, legal protection, and entrepreneurial spirit, possesses the power to solve humanity's problems. As the geopolitical tides churn and countries reassess their priorities in a more dangerous world, regionalized supply chains will take precedence.

Government policy around natural resources, self-sufficiency and manufacturing have returned to the forefront of policymaking. Industrial policy, regulatory decisions and capital expenditures made today by government and business leaders will impact America and the world for generations to come. We don't need to look far to see the damaging impact of bad public policy around natural resources, energy, electricity, chemicals, and material innovation.

History shows that such policy decisions determine the fate of nations and societies.

I look forward to your questions.

Senator CURTIS. Thank you.
Dr. Gross?

STATEMENT OF GWEN GROSS, PH.D., SENIOR TECHNICAL FELLOW, THE BOEING COMPANY

Ms. GROSS. Good morning, Chairman Curtis, Ranking Member Merkley, and members of the subcommittee. Thank you for the opportunity to testify.

I am Dr. Gwen Gross, a Senior Technical Fellow at Boeing for Composites and Chemical Technology. Boeing proudly develops, manufactures, and services commercial airplanes, defense products, and space systems.

Safety and quality are at the core of everything we do. Boeing is committed to complying with environmental laws and regulations, and creating economic opportunities and driving industry innovation.

I serve as a chief chemist within Boeing's Advanced Research and Development organization. I am an expert in the formulation and production of critical aerospace materials. I have worked the complete life cycle of materials integration from idea to implementation, and I act as an intermediary between Boeing and our suppliers.

Boeing is a downstream user of chemicals. We do not manufacture the chemical formulations that we use. Instead, as we develop new and innovative aerospace products, we rely on our chemical suppliers to develop those new chemicals that meet our stringent performance requirements.

Suppliers are responsible for obtaining those regulatory approvals for new chemicals or new uses. Any delays that they experience in obtaining approvals delays the aerospace innovations that Boeing is working to advance.

Boeing uses chemical materials in a variety of ways in its products, including composites, sealants, adhesives and coatings. The aerospace industry faces unique challenges when it comes to chemical material use and replacement due to complex FAA certification requirements and military specifications that govern our products and services.

To produce and sell a commercial aircraft, Boeing must obtain type certification from the FAA by demonstrating that the aircraft design, including all of its component parts, meets all applicable FAA regulations. It can take 10 years or more to design, build, test and receive type certification for an aircraft model or new replacement parts.

This certification process, which is integral to aviation safety, includes consideration of the performance of the chemicals used in that design. Boeing must show that materials are suitable and durable.

In practice, that means polymeric material, like the carbon fiber composite used for wings, needs to be able to cycle from a sweltering Phoenix runway in July to subzero temperatures at 30,000 feet just minutes later. It must maintain structural performance while doing this multiple times a day, potentially for decades.

If regulatory changes impacting chemical material use or replacement, or changes in the marketplace happen too fast, aerospace

companies may not have sufficient time to find viable alternatives and to demonstrate that they satisfy those regulatory requirements. For example, finding a replacement for a chemical used in the formulation of a polymer composite system can be a challenging and lengthy process.

I began working on a new candidate for a next generation carbon fiber composite material when my daughter was 2 years old. Boeing is just now finishing the qualification of that material, and my daughter is now 18.

Aerospace manufacturers are also impacted by delays in new chemical reviews and new chemical restrictions. One example is the replacement of the fire suppression chemicals used on board aircraft. Boeing devoted 20 years and considerable resources to developing alternatives to the industry standard agent halon. It is an ozone-depleting substance that is widely used on aircraft due to its unique performance attributes, and it has proven difficult to replace.

Working with our suppliers, a replacement was approved approximately 8 years ago by the EPA and FAA for use in handheld fire extinguishers onboard aircraft. Boeing is considering it for cargo compartment use but regulatory uncertainty remains.

Boeing has also seen challenges when evaluating new chemicals under TSCA research and development exemptions. It is not uncommon for a new promising formulation to be removed from consideration early in our technology development process due to uncertainty about when and if an R&D chemical would be approved by the EPA.

If there is a risk that the decision will not be made in time to meet our internal milestones for certification, our researchers may choose an existing chemical instead. Unfortunately, this could limit new technologies that may provide significant performance improvements, such as new lightweight materials. Regulatory changes to reduce this uncertainty would be helpful.

In closing, thank you again for the opportunity to speak with you today. I look forward to your questions.

[The prepared statement of Ms. Gross follows:]

Written Testimony of Dr. Gwen Gross, Ph.D.,
Senior Technical Fellow, The Boeing Company
U.S. Senate Committee on Environment and Public Works
Subcommittee on Chemical Safety, Waste Management, Environmental Justice, and Regulatory Oversight
October 23, 2025

Good morning, Chairman Capito, Ranking Member Whitehouse, Chairman Curtis, Ranking Member Merkley, and members of the Subcommittee. Thank you for the opportunity to testify.

I am Dr. Gwen Gross, a Senior Technical Fellow at Boeing for Composites and Chemical Technology. Prior to joining Boeing, I completed my doctoral studies at the Center for Process Analytical Chemistry at the University of Washington.

I serve as a chief chemist within Boeing's advanced research and development organization. I am an expert in formulation and production of aerospace critical organic materials. I have worked the complete lifecycle of materials integration from idea to implementation, and as an intermediary between Boeing and our suppliers.

Boeing proudly develops, manufactures, and services commercial airplanes, defense products, and space systems. As the largest manufacturing exporter in America, Boeing supports more than a million American jobs, contributes $97 billion annually to the U.S. economy, and partners with nearly 10,000 businesses across all 50 states. Approximately eighty percent of Boeing's supply chain spending and eighty-five percent of its workforce are based in the United States, while approximately eighty percent of our commercial aircraft production is exported to international customers.

Safety and quality are at the core of everything we do. Boeing is committed to complying with environmental laws and regulations and continually improving our environmental, health, and safety systems, while also creating economic opportunities and driving industry innovation.

Boeing is a downstream user of chemicals. We do not manufacture the chemical formulations that we use. Instead, as we develop new, innovative aerospace products and services, we rely on our chemical suppliers to develop and bring forward new chemical technologies that may meet our stringent performance requirements. Those suppliers are responsible for obtaining Toxic Substances Control Act (TSCA) approvals for new chemicals or new chemical uses, and any delays they experience in obtaining those approvals, delay the aerospace innovations that Boeing is working every day to advance

Once promising candidate chemical products are offered, we thoroughly evaluate them to ensure they will meet our performance requirements, as well as those of the Federal Aviation Administration (FAA) and military specifications, and can be safely incorporated into our manufacturing processes and product design. Boeing uses chemical materials in a variety of ways in its products, including composites, sealants, adhesives, and specialty coatings.

The aerospace industry faces unique challenges when it comes to chemical material use and replacement due to complex FAA certification requirements and military specifications that govern our products and services. The FAA's rigorous and lengthy certification process is integral to aviation safety. This process includes consideration of the performance of the chemicals used in a commercial aircraft's design, including its component parts.

Let me provide an example of what this means for the chemical materials used in commercial airplanes. Appropriately, Boeing must demonstrate that materials are both suitable for the application they are being used in and that they are also durable, including under the environmental conditions where they will be used. In practice, that means polymeric materials, like the carbon fiber composite materials used for wings, that sit in the hot sun on the runway in Phoenix, Arizona in July, must be capable of equal performance at 30,000 feet in sub-freezing temperatures. And it must be able to go through that cycle under such variable conditions multiple times a day for potentially decades.

Finding a replacement for a chemical used in the formulation of such a resilient composite system can be a challenging and lengthy process that includes identification, testing, and qualification of alternative formulations developed by our suppliers. Even when this is complete, Boeing must then comply with necessary FAA regulations for drawing changes, first part qualifications, part certification testing, and performance metrics before that new composite formulation can be incorporated into an airplane that will be delivered to an airline. All of this is incredibly time consuming. For example, I began working on a new candidate for a next generation carbon fiber composite material when my daughter was two years old. Boeing is just now finishing the qualification on that material and my daughter is now eighteen.

As a result, if regulatory changes impacting chemical material use and replacement or changes in the chemical marketplace happen too fast, aerospace companies may not have sufficient time to find viable replacements and to demonstrate that they satisfy all of our regulatory and contractual requirements. It is important that the Environmental Protection Agency's (EPA) chemical management framework take into account this complex and lengthy process, which includes FAA requirements that are integral to aviation safety.

Aerospace manufacturers are also impacted by delays in new chemical reviews and restrictions on new chemicals. A recent example is the replacement of fire suppression chemicals used onboard aircraft. Fire suppression is critical to safety of flight, and Boeing has devoted considerable time and resources to developing alternatives to the industry standard agent, halon. Halon is an ozone depleting substance that remains in wide use in the industry due to its unique performance attributes that have proven difficult to replicate. In low concentrations, halon is very effective at extinguishing a variety of fire types, including liquids and electronics. In addition, it is acceptable for use in occupied spaces, and safe to use on sensitive aerospace equipment.

Boeing worked closely for over 20 years with our suppliers to develop the halon replacement 2-bromo-3,3,3-trifluoro-1-propene (2-BTP) for use as a fire extinguishing agent for use onboard aircraft. As a new chemical, 2-BTP received EPA approvals under TSCA as well as its Significant New Alternatives Policy Program as a replacement for an ozone depleting substance.

Approximately eight years ago, the FAA certified it for handheld extinguisher use in aircraft cabins and the flight deck where it is deployed globally today. However, the approvals limited its use in other aircraft applications, such as in cargo holds. Notwithstanding the findings that this halon replacement compound was found to be acceptable for use around passengers and crew, it is still not yet approved for cargo.

Boeing has also experienced challenges when evaluating new chemicals under the TSCA exemption for research and development (R&D). Boeing supports that exemption because it allows Boeing to evaluate novel chemical materials early in their development cycle to determine suitability for new aircraft applications needed for our future aircraft. However, reliance on the R&D exemption introduces regulatory uncertainty into Boeing's technology development process, which operates on a multi-year timeline to ensure that once mature, a new chemical technology will meet both performance and certification requirements.

If there is uncertainty whether an R&D chemical will be approved by EPA in time to meet internal milestones for certification of a future aircraft, then our researchers may choose to exclude that candidate chemical early in the development process and choose one that is already approved by EPA. This reduces risk to the certification schedule for our future aircraft, but at the cost of potentially significant improvements to that aircraft model's performance. The impact of these decisions can be far reaching.

For example, not utilizing a new R&D epoxy resin for a composite material could result in an alternative material being selected at the cost of additional weight being added to the aircraft's certified design. Over the decades long lifetime of that airplane, even small weight increases can result in significant increases in fuel consumption, emissions, and operating costs for our customers. As a result, the uncertainty in the timing of EPA authorizing R&D chemicals for full scale production has long-term consequences. Boeing would welcome regulatory changes to give aircraft manufacturers more certainty early in our development process that R&D exempt chemicals will obtain timely EPA decisions for use in aerospace production.

In closing, thank you again for the opportunity to speak with you about how the current regulatory environment for chemicals impacts the aerospace industry. I look forward to your questions.

Senator CURTIS. Thank you, to all three.

I will begin with questions for the first few minutes. I would like to start with you, Mr. Huntsman. Dr. Woodruff appropriately pointed out that if we move too quickly with reviews, that is not good. Yet you and I both know that during the last administration, EPA met their statutory responsibility exactly zero percent of the time for chemical approvals.

I am curious, from your perspective, if we had a better process, if we had a process that yielded the right result, how do you feel like that could better impact public health, innovation, and at the same time rein in our bad actors?

Mr. HUNTSMAN. Thank you very much. I appreciate the comments made by both of the other witnesses that are before us here today.

I am not sure that there is a whole lot of disagreement here. We do need to have a well-regulated environment. The vast majority of new chemistry development is developing to replace past formulations and past applications to make things lighter and stronger.

The reason why Boeing is able to make planes that can fly nearly half way around the world non-stop is because they are lighter, they are more fuel efficient, they are safer, better built, lower maintenance than they were just 15 or 20 years ago. This is all about innovation and about speed.

As we see this around the world, I do not mean to pick on Boeing, I think they are a great company, but I imagine one of their biggest competition next generation is going to be Comac, the Chinese manufacturer. Now, we do not need to be cutting corners to become like the Chinese in this area, but we do need to be aware that we need to be able to compete on a playing field where we can create the chemistry, we can go through the regulatory process and make sure that it is thorough in order to compete on a global basis.

The United States has the highest standards in chemical manufacturing, not chemical approval. We need to keep this. We need to keep innovating with that. As we do that, we will continue to provide the jobs and the economic well-being and the environmental stewardship that we all want.

Senator CURTIS. Excellent. Along those lines, you do business internationally, so you are familiar with the regulations in Europe. What missteps has Europe taken that might stifle innovation here in the United States if we are not careful?

Mr. HUNTSMAN. Well, I think about 70 percent, 65 percent of our sales are international. We meet not only U.S. standards but we meet standards all over the world.

A lot of this has to do with what I am seeing more and more, particularly in Europe more so than in the U.S., is a lot of these environmental standards are politically driven. They are not science driven. You will see particular companies that will retaliate against a particular company or against a particular application, seemingly purely for political purposes because a facility was to shut down or vacate that country.

I think the worst of all worlds is when we start to see politics interfere with sound science.

Senator CURTIS. I am going to paraphrase your words, and you tell me if I am wrong. As far as the U.S. regulatory environment

that makes sure that you are protecting public health and not cutting corners, you are okay with bring it on.

Can it be a bit more predictable and produce an outcome quicker? Is that fair?

Mr. HUNTSMAN. I think that is very fair.

Senator CURTIS. Thank you.

Dr. Gross, thank you for being with us. Could you share how those transitions that—well, let me go back. You have had a front-row seat to the shifting regulatory landscape through your work both at the EPA and FAA across multiple administrations. Could you share how those transitions impacted your work at Boeing, particularly in relation to chemical approvals?

Ms. GROSS. Thank you for the question, Senator.

Boeing uses a standardized development process with internal milestones, very similar to what NASA uses in terms of technology readiness levels. That duration of development that we have very often spans multiple administrations, multiple regulatory changes.

In each of those steps that we go through, through that gated process, we take an assessment of the current regulatory landscape. Whatever it happens to be, as that matures, we have to address it at the time.

The challenge that a company like Boeing has where we have these very long development timelines is that at the beginning of a project and at the middle of a project we may see those changes come up from the regulatory environment, from the changes in administration.

It is not something I can give an example of particularly for a current issue. It is something that we account for and deal with in our day-to-day operations.

Senator CURTIS. How did the approach to reviewing new chemicals evolve over time? What lessons should we draw from those shifts to create a more durable, consistent regulatory framework?

Ms. GROSS. Thank you for the question, Senator. Part of the challenge, like I mentioned in my testimony, for companies like Boeing, is that we do not hold the responsibility for the application for a new chemical or for the extended use. We rely on our supply base.

It almost becomes this game of telephone. Sometimes the visibility of where a chemical is in the process or if there is a bottleneck or a hangup, it is not always visible to us in our own development cycle. That mismatch between what is going on from a regulatory standpoint and our development cycle is where we end up making those hard decisions about not to move forward, say, with a new innovative chemical.

That is where that increased visibility or increased understanding of the process would definitely help downstream users like Boeing.

Senator CURTIS. Thank you very much.

I yield to the Ranking Member for 5 minutes for his questions.

Senator MERKLEY. Thank you very much, Mr. Chairman.

Dr. Woodruff, in your testimony you note that there is a new chemical for jet and boat fuel that has a cancer risk so high that nearly every person who is exposed to the chemical for foreseeable

uses is expected to develop cancer. That is a pretty powerful statement.

Can you, in very quick summary, because I have several questions, how did such a chemical, if it has that kind of risk, get approved?

Ms. WOODRUFF. Sometimes it gets through the process because EPA has had some type of political interference, which was documented in the previous administration.

Senator MERKLEY. It has some kind of—?

Ms. WOODRUFF. Political interference. It is not clear who detected the people who are making the decisions.

Senator MERKLEY. My colleague accurately noted that it is very rare to meet the timelines that we have in TSCA. My understanding is, there are two main reasons for that. One is vast understaffing for the number of chemicals to be reviewed. I just want to make that point because to the degree that we can properly staff EPA, it would help address that issue.

The second main reason is because the studies that are submitted are often incomplete and it has to go back to the industry to say, well, you can not approve it until you actually get the study before us.

Do I have a correct understanding of that, or is there other reasons that are more significant?

Ms. WOODRUFF. Yes, that is correct. Submitters, meaning manufacturers, are responsible for most of the length of the review of the new chemical. For example, there were 230 valid cases submitted between October 2022 and October 2023. Half, 85 of these cases, as of February 2025, over half of them are still waiting for more data from the submitter, or to sign the TSCA Section 5 order.

Some of them are actually toxic, so they are actually negotiating with the EPA and then 29 of the cases, they are disagreeing with what EPA is finding.

Generally, and I also want to say that a lot of chemicals are getting through the process and are being approved. EPA has approved thousands of new chemicals under amended TSCA, 3,600 over the last 8 years.

What we are seeing is both, we need more people in there, submitters need to submit all the information, and the EPA is doing its job when it has the resources and information.

Senator MERKLEY. I do have a lot of concerns about many of the EPA employees that have either been fired or put on furlough. We may be losing a huge, vast brain trust to be able to evaluate chemicals. The problem could get worse if we do not get this addressed.

I wanted to turn to the plastics. We know that plastics have incredible qualities. They are used in everything everywhere. We also now have a better understanding of how they break down to micro and nano plastics and end up in our bodies. They have a series of impacts.

Can you just share some highlights of your research on the risks involved, of the plastics themselves or the additives that are put in to make the plastics suitable for different purposes?

Ms. WOODRUFF. Right. Our research using high quality, the best quality evidence reviews, has found that microplastics are suspected to increase the risk of effects on the gut, respiratory effects

and also effects on reproductive health, particularly affecting sperm quality, and could be increasing the risk of colon and lung cancer.

That is just from microplastics. What we know about many of the additives that are in plastics and microplastics, that is phthalates, bisphenols, PFAS, flame retardants, there are like 16,000 chemicals that are used in plastics. We have good information on less than 5 percent of them.

Let's just talk about phthalates. Phthalates can increase the risk of adverse effects on male reproductive health, like lower testosterone and sperm count, which can lead to infertility, can increase the risk of pre-term birth, metabolic disorders like diabetes. This is according to the best available science, including high quality systematic reviews conducted by both EPA's Office of Research and Development and the National Academy of Sciences.

We also know similarly that bisphenols can affect female reproductive toxicity as well as it can increase the risk of neurodevelopmental toxicity. That is just for those few chemicals. There are many more that are in plastics.

Senator MERKLEY. I think this is an area where we have to spend a lot more attention, because it has received relatively little. Since the 1950's, plastics started being used as a coating on our cups for hot liquids. We have a huge exposure through that and through plastic bottles.

I was stunned by our plastics testimony in the last cycle of the amount of plastic that the average American now has the equivalent, I think it was described as equal to a plastic spoon in your brain, which is shocking.

I did want to ask you about the Office of Research and Development. There are efforts to dissolve that. Is ORD important to keep? If so, why?

Ms. WOODRUFF. ORD, the work that the scientists in ORD do affects and really protects every person who lives in the United States. ORD does the essential research that allows us to understand what the toxicity of chemicals are.

They also are there when there is a spill or a terrorist event. For example, when there was anthrax here in the Capitol, ORD scientists were the ones who figured out how to clean it up. They also were there on the ground in East Palestine. They also identified the toxicity of many of these toxic substances that we now know are affecting people's health.

They also developed the methods by which we figure out whether there are toxic chemicals in the environment. For example, ORD scientists were the ones who figured out that a facility was dumping a PFAS chemical into the drinking water supply of a residence in North Carolina. Once they measured that and identified it and worked with the State, they were able to stop that.

To dismantle that allows both less best available science or less high quality science, less unbiased science as well as less ability to respond to the many different types of environmental needs that arise, consistently or episodically, in the United States.

Senator MERKLEY. Thank you so much.

Senator CURTIS. Thank you, Ranking Member.

I note the arrival of our Chair of the full committee, and she has deferred to our other members to let them go first. Senator Wicker, I yield 5 minutes to you.

Senator WICKER. I really do appreciate that.

Dr. Woodruff, my colleague and friend, Senator Merkley, thinks I should not be drinking water out of a plastic bottle. I note that I am drinking water today out of a glass pitcher but regrettably, Senator Boozman, his water is out of plastic.

[Laughter.]

Senator WICKER. Should I quit drinking water out of a plastic bottle?

Ms. WOODRUFF. Well, I do not think you should quit drinking water.

Senator WICKER. Out of a plastic bottle?

Ms. WOODRUFF. Out of a plastic bottle; well, first of all, there are plastic chemicals and microplastics in a water bottle. Currently, I mean, it is your choice, but I have my own reusable water bottle. It is up to you.

If you want to lower your levels of plastics and microplastics, that is one source that you could stop.

Senator WICKER. Thank you for that testimony.

Mr. Chairman, I would ask unanimous consent at this point to add into the record a document entitled Chemistry Creates, America Competes, concerning some of the great benefits of chemicals.

Senator CURTIS. Without objection, so ordered.

[The referenced information follows:]

National Defense

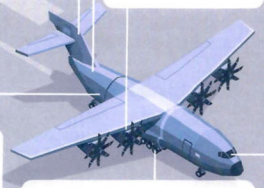
CHEMISTR
CREATES
AMERICA
COMPETE

Chemistry Critical to National Priorities

U.S. chemical producers provide chemistry needed to achieve national priorities, including the manufacturing of computer chips and automobiles, energy development, rebuilding the country's infrastructure, and supporting healthcare and biotechnology. Pro-growth, science-based policies are needed to ensure we can produce more of these critical chemistries here at home and help make America the world's manufacturing superpower. For more information visit: **chemistrycreates.org**

Case Study: Aerospace and National Defense

U.S. chemical manufacturers produce materials used in military uniforms including protective Kevlar gear, safety helmets, shields; radar and satellite communications systems, lithium-ion batteries for portable communication equipment, automatic weapons, and GPS; missiles, satellites, and unmanned air vehicles (UAV); and in military and commercial aircraft just to name a few.



Trichlorethylene
TCE is used to produce the fluorocarbons HCFC-142b which is used for the production of polyvinylidene fluoride (PVDF).
- PVDF is used in military aircraft for seals and gaskets for corrosion resistance, as well as lithium-ion batteries for portable communication equipment, automatic weapons, and GPS.

Acrylonitrile
Acrylonitrile is used in the production of carbon fibers.
- Carbon fiber is used in military; in missiles, satellites, and unmanned air vehicles (UAV); and in military marine/boating.

1-Bromopropane
The primary uses of 1-BP by the DoD are as a solvent, and degreaser and an ingredient in adhesives, coatings, and aerosols.
- Examples of shops and operations that may use 1-BP include flight-line and equipment maintenance, engine cleaning/plating, electroplating and fire protective services.
- 1-BP is also used as a case mount sealant in small- and medium-caliber munition cartridges.

Methylene chloride
Methylene chloride is used as a solvent in the interfacial polymerization process of bisphenol A and phosgene to produce polycarbonate resin.
- Polycarbonate is used in military applications: safety helmets, shields, consoles, panels, light covers, and reflectors.

Formaldehyde
- Formaldehyde is needed to make munitions and ballistics.
- Military uniforms and gear are made with formaldehyde-based resins.

1,3-Butadiene
- 1,3-Butadiene is used to make polymers that support defense applications, including military apparel and gear.

Styrene
Styrene is used to make composite products, also known as fiber-reinforced polymer composites (FRP).
- Composite products based on styrene, also known as fiber-reinforced polymer composites (FRP); are used in military and commercial aircraft.

PFAS
A variety of high-tech applications of PFAS are found in the military: radar systems, satellite communications systems, lithium batteries, zinc batteries, circuit boards, explosives, propellants, and munitions.

N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylene diamine (6-PPD)
A common rubber antiozonant (stabilizing additive), with major application in vehicle tires.

4,4'-Methylene bis (2-Chloraniline)
It is used as a curing agent in polyurethane production.
- Polyurethane Products for military & defense include: Helmet liners, interior uniform pads, chest protector systems, leg & knee padding, seals and shock absorber bearings, rifle & shotgun recoil buffers, arm & limb pads, rugged military boot soles.

Benzene
Benzene is used to make nylon fibers. Nylon fibers are used in the military for tents and apparel.

Naphthalene
Naphthalene is used to make phthalic anhydride which is used to make polyvinyl chloride--PVC--resins. In the military, PVC is used in electrical insulation and boot soles.

Vinyl chloride
Vinyl chloride is used for PVC production. PVC is used in military applications such as electrical insulation, and boot soles.

Ethylene oxide
Many important intermediate chemicals are derived from ethylene oxide, including polyester resins, PET polymer, ethoxylates, and ethanolamines
- Military uniforms are made of polyester. Most military camouflage uniforms use fabric made from polyester.
- Also tarps that cover weapons and protect them from weather conditions, (2) tent material used for protecting deployed army and marine soldiers and for constructing rapid deployment medical facilities, and (3) vehicle and aircraft storage sites also may use this material.
- Ready-to-eat meals that are contained in a retort pouch.

N-Methylpyrrolidone
NMP is a solvent used in the production of para-aramid fibers, used to make protective vests (Kevlar).

Benzamine (analine)
- Aniline is used to make p-Phenylenediamine (PPD), which is used to make Kevlar, which is used for military body armor.

Acetaldehyde
- Acetaldehyde is used to make pentaerythritol, which is a chemical intermediate used in the production of explosives.

Bisphenol A
BPA is used to make polycarbonate and polyvinyl butyral (PVB).
- Polycarbonate is used in military applications such as safety helmets, shields, consoles, panels, light covers, and reflectors.
- PVB is used to make laminated glass that is bullet proof for small arms fire. Many military vehicles employ PVB glass. Authorized and issued by the U.S. Marine Corps, U.S. Army, U.S. Air Force, and NATO, ESS Profile NVG Military Goggles with interchangeable Lenses was developed with input from elite U.S. Special Forces units and is the most widely used military/tactical goggle globally.

Ethylbenzene
Ethylbenzene is used to make polystyrene, expandable polystyrene, ABS resin, SB latex, and SB rubber.
- Military grade SBR rubber is used for rubber gaskets and seals, and watertight and airtight closures.
- The current material that is used to manufacture the T158LL tank track pads is a carbon-black-filled Styrene-Butadiene Rubber (SBR).

Senator WICKER. Thank you very much.

Now, Mr. Huntsman, you have said there is much agreement in the panel here. Is it fair to say that your position is that without a regime that allows the reasonable manufacture of chemicals, such as the ones you have, we would not be able to defend our Country militarily? Also, we would not be able to produce certain items and certain products that actually take us off of using more dangerous products that Americans and humans have used earlier.

Is that part of your position? Is that a good restatement of your position?

Mr. HUNTSMAN. I think that is absolutely correct. Again, I think the vast majority of what is said here, we would agree. The esteemed Dr. Woodruff here with her drinking container, I notice you have a plastic cap that goes on the top of that. Without that plastic, I am not sure that you would be able to have the lightweight flexibility and so forth.

Look, it is a balance in so many of these areas and so many of these things that we do. When it comes to defense, when it comes to mechanization, computerization, aerospace, automobile movement, any source of armor, it simply would not exist without petrochemicals, none of it.

Senator WICKER. I spend a lot more of my committee time in another building, on the Armed Services Committee. We know what a dangerous world we are in. Actually, I have been saying all year this is the most dangerous period we have had since World War II. It is not just Iran with their nukes, it is China, it is Russia and this crazy guy that runs North Korea.

When there are delays and the statutory deadlines are missed for approval of certain of your applications, that harms national defense, does it not?

Mr. HUNTSMAN. Absolutely, it does. We are working on some applications, for example, that will be going into some of the surface, some of the technology that has come from the aerospace industry on hypersonic missiles, for example. Delays in those will obviously build a hypersonic missile without the skin, without the coating on those missiles and without the components to be able to withstand the heat and friction and so forth, and the weight that is needed on those applications.

Absolutely, it all is intertwined with the supply chain.

Senator WICKER. By the same token, when there is an invention by your company of something that actually takes us away from a more harmful substance, and that is delayed by a statutory deadline being missed, the public is harmed by that, is it not?

Mr. HUNTSMAN. I am a father of eight children, I have got 20 grandchildren. I do not want to see any chemicals in anybody's drinking water any more than anybody else does. I care a great deal. I have worked in chemical plants in my career. Nobody wants to be exposed to any of these products.

Yes, as I said earlier, the vast majority of new chemistries that we produce are to replace older chemistries or to advance science or to advance the environmental stewardship and so forth. It is good business, aside from just being on a humanitarian front.

Senator WICKER. Mr. Huntsman, I was just presented with my ninth grandchild, and people have remarked about that. I must say, your testimony takes my breath away.

[Laughter.]

Mr. HUNTSMAN. Takes my wife's away as well.

[Laughter.]

Senator WICKER. Congratulations.

Senator CURTIS. Thank you.

I would like to now yield to the Chairman of the Ag Committee, and I will note, just to show the importance of this hearing, to my right are three chairs of different committees. It shows the importance of this committee. Thank you for joining us.

I yield to the Senator from Arkansas.

Senator BOOZMAN. Thank you very much. This has been tough on the committee today; I got here and I could not get my seat back. I think you did that on purpose to shame me. Then Senator Wicker humiliated me for my plastic cup.

[Laughter.]

Senator BOOZMAN. Rightfully so. Thank you all for being here. This is important. I guess the crux is delays. Are the delays that we have had in the past, where we are not meeting any of the statutory guidelines, that is concerning.

Mr. Huntsman, what does that do as far as the consumer, as we come out with new products and stuff that are put into other products to make things better, more efficient, however we use them, what does that have to do with the cost when you have excessive time, sometimes years and years, to develop these products?

Mr. HUNTSMAN. Senator, there is certainly a cost. We are seeing more and more that we are abdicating our lead in chemistry to foreign players. The United States is not the only market, nor is it the majority of the market of consumerism around the world.

When new standards are set, oftentimes not nearly as stringent as what we have here in the United States, as new standards are set and new products are going into the marketplace, that do not meet the stringent quality controls and environmental controls the United States imposes, I think that the rest of the world that should be following our lead oftentimes suffers.

Product capabilities, whether it is the plastic that is going into a drinking, bottled water and so forth, they are not under, necessarily under U.S. standards. A lot of this is not just about U.S. delays, but it is also about U.S. innovation, U.S. standards and global standards. At one time we pretty much dominated, and we are losing that.

Senator BOOZMAN. Dr. Woodruff, you mentioned the jet fuel. That was approved in the last administration, is that correct?

Ms. WOODRUFF. Yes.

Senator BOOZMAN. I just want to be clear that we have had these problem for years. I know you have had a great career, a very interesting career, and I guess worked in a couple of administrations.

Ms. WOODRUFF. Yes, and I would say that corporate influence on how EPA makes decisions has been somewhat of a theme across the administrations, as was noted in the Make America Healthy Assessment. The first report, which noted that both, there is a consistent revolving door between EPA and Federal agencies and

chemical industry and their front groups as well as extensive lobbying.

Unfortunately, we do need a solution to remove that type of corporate influence and decisionmaking in order to improve and result in the best available science and sound science that can protect the public's health as well as drive innovation.

Senator BOOZMAN. Well, they are not doing too good of a job on the lobbying front if none of the products are approved on time.

Ms. WOODRUFF. EPA has been approving about a new chemical a week. Or are you talking about the existing chemicals program? I'm sorry.

Senator BOOZMAN. My understanding is that the statutory component was not met, presently met.

Ms. WOODRUFF. Under the existing chemicals program? Yes. That has been delayed. In part because, there are a couple of reasons. One is there is exceedingly pushback from the chemical industry. Two, EPA does not have enough resources to staff that office.

Three, I think that, and this is something that we have been on the record about, I think there are ways that they could upgrade to best available science and improve their efficiency at the same time, which we have also been making public comments about.

These are all opportunities for Congress to weigh in and make sure that EPA is doing the best available science, which the National Academy of Sciences actually provided a number of different reports to recommend how EPA could do that. That combination would really help them meet their statutory deadlines.

Senator BOOZMAN. My understanding is that we did give them authority to hire new people, additional people in 2022, and so far I do not think anybody has been hired.

Ms. WOODRUFF. Well, I can not speak to their hiring process.

Senator BOOZMAN. Well, you were part of the system.

Ms. WOODRUFF. I was part of the system, but I left in 2007, just to be clear.

Senator BOOZMAN. There were not any problems then?

Ms. WOODRUFF. Well, no, I am not saying there were not any problems. That is why TSCA was amended in 2016.

Senator BOOZMAN. No chemicals that have proved to be toxic or whatever were not approve during that time?

I guess the point I am making is this has been going on for a long time. It is something that we need to work together to fix.

It is not fair. There are bad actors, certainly. There is a lot of other stuff that is, the vast majority is good actors trying to work through the system. When there is delay after delay after delay, it does drive the cost, and it makes it very difficult.

Ms. WOODRUFF. Right, it definitely drives the cost of people continuing to be exposed to toxic chemicals. I totally agree. We need faster action to protect people from exposures.

Senator BOOZMAN. Well, and then too, if you have got a good product that is going to help the people of America, sometimes the world, then it needs to be done in a timely fashion.

Ms. WOODRUFF. Yes.

Senator BOOZMAN. Right now, that is not happening.

Ms. WOODRUFF. Sometimes the chemical, many times the chemical industry still needs to submit more data, or sign pieces of paper.

Senator BOOZMAN. Thank you.

Senator CURTIS. Thank you.

The Chair recognizes the Chair of the full committee, the great Senator from West Virginia.

Senator CAPITO. Thank you, Senator Curtis. Thank you for having this hearing.

Mr. Huntsman, I am going to start with you. Kind of along the lines that we actually were on when the confirmation hearing for the Assistant Administrator of the EPA Chemical Office, I raised concern both about the pace but also the predictability of a new chemicals process. I think speed, you know, we have talked about speed, that clearly matters. Predictability matters as well, especially when you are making large investments or trying to move science forward.

When the EPA consistently imposes restrictions that go well beyond what is required in other nations, it can raise some questions. We are seeing innovative chemicals approved in countries, and you mentioned this, with robust safety programs like the European Union or Japan, but they face burdensome restrictions here. It can not be commercialized in the United States.

From your perspective as a global manufacturer, when the U.S. imposes more restrictive conditions than Europe or other major markets, it takes longer to do it, how does that affect where you choose to invest and to make your new chemical developments?

Mr. HUNTSMAN. Well, today, we have some 450, to the best of my knowledge, about 450 products that are in the pipeline waiting approval right now under TSCA. About 10 percent of those are expected to be approved within the 90 day time period.

About 40 percent of those will go longer than 1 year. Some of those will go sometimes up to two to 3 years. You take some of these same formulations and downstream applications and so forth to a country like China, and they will put a high priority, well, they will get it done within a 90 day time period, the government will give you incentives to build, innovate, and to invest locally.

Literally, the time that you can get approved in the United States, you can be up and manufacturing that product in another country. Again, I mentioned earlier, therein lies the new standards of that finished application. Whether it is in aerospace, or whether it is drinking water bottles and so forth, that, it is an international race that we are in right now, a competition that is real.

Senator CAPITO. To clarify, it is not an international race to the bottom in terms of safety and innovation. It is really the opposite, innovation can, and many times I think the goal is more safety in developing new chemicals. Would you agree with that?

Mr. HUNTSMAN. Absolutely. The scrutiny that we are under today in new chemical development, forget for just a second about the issues around government approvals, but the trial attorneys and the multi-hundred billion dollar industry that exists on suing the chemical industry when it gets it wrong is such an enormous incentive.

When we come up with new products today, I believe that in my 40 years in this industry versus where we were 10 years, 20 years, 30 years, it is like everything else in our economy. It is cleaner, it is more innovative, it is better, it is more thorough. Our scientific data and analysis is better today than it has ever been.

No, it is not a race to the bottom. It is a race on speed, and it is a race on how quickly you can innovate and get to the next phase.

Senator CAPITO. I think that is part of what Senator Boozman was referring to. Several years ago we did make it certain so that the Chemicals Office could hire more people, could go off scale, could do it quicker than the normal bureaucratic malaise of trying to get people hired into the EPA.

It has not been successful, but that was part of the goal that we had because they felt like they were understaffed.

Dr. Gross, let me ask you a question on obsolescence of new chemicals. Have you ever seen where innovation moved so fast but materials developed, maybe outdated in 5 years, have you ever seen instances where the chemical approval process took so long that a new beneficial chemical effectively became obsolete before it could be used in the United States?

Ms. GROSS. Thank you for the question, Senator. I am actually going to take that and maybe turn on it a little bit. Our experience is actually a little bit different. When you talk material obsolescence, one of our biggest challenges is, and I will use an example, for flame retardants. We have had regulations that we need to comply with against flame retardants where we have had to go in, reformulate material systems, requalify them, go through that whole certification process to get to the end and have new regulations pop up where we have to repeat that again, because the substitute flame retardant we picked is now newly regulated. We just go in and we iterate.

Being in that iterative process is sometimes—it takes up a lot of our resources that we could instead be using to look at more innovative, newer chemicals instead. It is not necessarily that timeframe, but it is so fast in terms of new changes, that is where we struggle, obsolescence versus new choices.

It is a little different than your question, but that is where we have experienced it.

Senator CAPITO. Thank you.

I will have to say, as Chair of the full committee, and with our subcommittee chair here, I have over the years expressed and had great concerns over PFAS in our drinking water. It is something that we try to reach an agreement on. I did with former Chair Carper last year, tried to get a bipartisan bill to help with this issue. My State has been affected by this.

Just for all of you, it can be very helpful to helping us get a bipartisan agreement here, because this problem is not going away. It has not been addressed, I do not think, as aggressively as I think that we can and should.

I am publicly pledging, as I have many times in the past, to work to make sure that your 20 grandchildren and my 9 grandchildren can have that safe drinking water that they deserve. Thank you.

Senator CURTIS. Thank you, Chair.

Senator CAPITO. How many do you have?
Senator CURTIS. I have 18.
[Laughter.]
Senator CAPITO. Yes.
Senator CURTIS. It is in the water.
[Laughter.]
Senator CURTIS. I would like to yield to my colleague from Ohio, Senator Husted.

Senator HUSTED. Mr. Chairman, thanks for helping with the demographic challenges of our Nation. Appreciate that.

Senator Merkley, you look more well rested than I saw you the other night. Good to see you this morning.

Thanks for all of you for coming today. I know that when you are in business, time is money. The longer it takes to get something approved, the less likely you are to do it. As a matter of fact, if you can not rely on the American system to do it, many manufacturers might choose to develop in China or India or other places in which I think all of you would agree the environmental standards are lower than what they are in this Country.

I know that chemistry has provided us so many advances. We tend to focus on the things that go wrong, but there are so many examples about how our lives are better, it has improved human flourishing and quality of life. I see it in my State, in Ohio, where I know Mr. Huntsman has some companies that are also working on it.

I will give you an example, tires. Akron, Ohio, is the rubber capital of the world. Over the years, tire manufacturers have tried to make tires more durable, as we have cars that are heavier due to batteries and things like that, how do you build tires that are more durable, but also you build those chemical bonds so strong to make them more durable then how do you break them down? How do you recycle them? Then you have these dual goals sometimes.

Innovation is, it is an incredibly important thing to get those approvals so that you can try new ways of accomplishing things, but do it in a manner which allows you to do it in a timeframe that will be viable for you as a business.

Mr. Huntsman, I just want you to reflect on the time is money concept, how speed to market is important, how doing it in an environmentally responsible fashion is important, and how do you think that, have you seen, experienced circumstances in which people do things in other countries because it is easier to do it there than it is in America, and that is to the detriment of the American economy and the American consumer?

Mr. HUNTSMAN. Yes. I mean, all of that is true. I think that it is a question, when I see what is going on, in the last month, I have had the opportunity to visit many of our facilities and leaders throughout Europea and also in China. It is really not a question of speed, though that is very important. It is question of priority.

The EPA has a budget of what, $11 billion, $12 billion? How much of that is about innovation? Do we prioritize our latest chemistries to replace yesterday's problems? Do we prioritize those things around national defense and so forth?

The standards around TSCA were set 10 years ago almost. Yet it probably was negotiated 15 years ago, many of these processes.

This ought to be a live piece of legislation that continuously is bringing on new standards, better standards, quicker standards, better prioritization, because I tell you, the world is not sitting still on these sorts of things. They want what we have. They are innovating, they are getting cleaner. The world, from a CO2 emitting basis, is getting more innovative and cleaner.

It is up to you, you are the ones that fund it and direct it and so forth, to be able to see that we have a piece of legislation here that continues to innovate, move and progress as quickly as industry does.

Senator HUSTED. Dr. Woodruff, what Mr. Huntsman said seems pretty reasonable, that the EPA should focus on, their resources, on trying to improve, set priorities to improve the way that we are approving approvals for chemicals, other things. Is what he said unreasonable?

Ms. WOODRUFF. I think that regulation is an innovation driver. I agree that we need the best available science and that EPA should be well resourced in order to help create the regulations that set the bar. EPA should not be deciding what the innovations are. They should set the bar and then the industry innovates, because that is the right set of rules. EPA is not a manufacturer.

I just want to say, look at methylene chloride. Methylene chloride, the industry is still fighting to implement the rules around methylene chloride, which we know kills people, and there is a substitute, a substitute that is less toxic.

I feel like EPA is hamstrung by the industry saying yes, we want innovation but do not get rid of these toxic chemicals that we are already using. I agree with you and I think that if the industry is acting fairly, we can create innovation, like in the Clean Air Act, where we had the catalytic converter, cleaner air, no lead in gasoline. The Clean Air Act is a model for TSCA.

Senator HUSTED. Yes. Mr. Chairman, in conclusion, America does innovation in an environmentally responsible way better than any country that we compete with, particularly the ones where these things happen, in India and China. A prioritization toward progress on the speed in which we get these things accomplished is very, very important.

Thank you.

Senator CURTIS. Thank you, Senator.

With the Ranking Member's blessing, I would like to extend a second round to both of us just for a couple more questions. I would like to start, Mr. Huntsman, I could tell from your action you wanted to respond to that comment. Do you want to make any reaction?

Mr. HUNTSMAN. No, I do not. We do not produce methylene chloride, nor do we handle it.

I think that we can not let the instances of problems, and there have been in this industry, they need to be cleaned up, they need to be focused on, and so forth. We need to be able to work together. We need to be able to move things along and it is just—I mean, I have heard about asbestos. I do not know anybody out here other than maybe a few people in this administration that are advocating that we keep—nobody uses asbestos anymore in chemical applications. I am not even sure where that comes from.

We need to stay focused and we need to stay focused on the vast, vast majority of what we produce, what we do, how we innovate and how we apply things to society.

Senator CURTIS. Good.

I might circle back here, but I would like to go to Dr. Gross just really quickly. In your opening testimony, you talked about this conundrum of being able to use a suppressant, if I used the right word, in the cabin of an airplane where passengers are, but that same suppressant is not approved for the luggage department. Did I catch that right?

Ms. GROSS. Yes, Senator, you caught that correctly. We worked very hard to develop this new chemical with one of our suppliers. We got it approved for use in handheld fire suppressants and would like to extend that into the cargo hold area. For whatever reason, that approval has not come, the extended use approval has not come through yet.

Senator CURTIS. Yes, and to be clear, it is not an FAA restriction holding you back, it is an EPA restriction holding you back?

Ms. GROSS. My understanding is that, but I am not an expert in that area. I can have someone followup.

Senator CURTIS. Since this is beat up on EPA day, we will go with that assumption.

[Laughter.]

Senator CURTIS. Again, I will reiterate that is one of those where I mentioned the clarity of where things fall in the process to consumers like Boeing, this would be a great example of where that would have benefited us.

Senator CURTIS. Yes. I would also like to just address something that has been brought up several times, it should be a super-bipartisan issue, and that is just resources within EPA. This has been something I have been tracking from my time in the House, I will go back to the previous administration when I would challenge them on this zero approval, which is within statutory timeframes. The previous administrator would point to staffing as well.

I kind of tend to think, this points to the priority issue, because the money was appropriated for staff, they were not hired. It just feels to me like we need to, and I told Administrator Zeldin I will be as tough on him as I was on his predecessor, in making this a priority. It feels to me a little bit of a false choice that we have to choose between safety, that we have to choose between public health and innovation and speed.

To my colleague to my left, who I also believe to be very, very genuine on this issue, I would love to two of us dig into this, you heard the Chair's commitment from herself, and see if we can prioritize and move away from the false narrative that this is one or the other.

I will just say, Dr. Woodruff, I do not know you well, but I will say, I love your passion. This world moves well on people who have a passion. Mr. Huntsman, I actually know you fairly well, and I do truly know you to be somebody that wants to leave this earth as a better place for those 20 grandkids. Dr. Gross, I believe you feel the same way.

I think we have had a lot of cross sections in this hearing, and if not careful, it kind of breaks down into good guys, bad guys. I

will just end my remarks with say, look, let's move forward with this commitment to protect the public, to inform the public, to get our best product out there, to certainly not let other countries allow chemicals that we would not approve to come to the marketplace to beat us.

I will continue to remind the EPA that this needs to be a priority and that we have to put the resources in place to make this happen.

With that, I will yield to the Ranking Member.

Senator MERKLEY. Thank you, Mr. Chair.

I want to turn to PFAS. I find it frustrating that PFAS comes up so often. It is such an extensive family of chemicals. We keep hearing how it has significant impacts on human health but it is kind of everywhere.

I think about simple things like, does a frying pan with that nonstick surface have PFAS, and should I still be using it? I do not recommend this, but nightly microwaving of frozen dinners, is the container they are in sprayed with PFAS, and should I be eating that?

I wanted to ask, Dr. Woodruff, and I want to note that the MAHA report calls out the fact that "the PFAS industry focused on suppressing unfavorable research and to starting public discourse, delaying public awareness of its dangers."

Is this something we should be able to tackle, at least for people to know where it is? If it is having that much impact on human health, how we can eliminate it from things that have that direct contact with humans through our food and our packaging and so forth?

Ms. WOODRUFF. You are right, PFAS, they are everywhere. They are persistent chemicals. They are measured in everyone around the globe. We know that they can increase the risk of numerous health impacts, including cardiovascular impacts, certain cancers, increased low birthweight, which can increase the risk of infant mortality, make it that you are less responsive to vaccines.

Your point is very well taken. We are not talking, that there are a lot of uses of PFAS that we do not need to have PFAS in. The most effective and efficient solution is to look toward removing or banning the whole class of PFAS and to move toward substitutes that are not persistent.

The report from NYU for the Institute for Policy Integrity noted that narrowly targeting regulations encourages substitutions of banned PFAS with structurally similar but unregulated compounds, meaning that you can get replacements. It is best to address the whole class.

Then I think your point about what we have found from internal industry documents is that the industry knew that PFAS was toxic in the 1970's, decades before the public knew that, including their own employees who were exposed to PFAS and gave birth to babies who had structural birth defects, that they already knew were observed in animal studies.

I think the solution to this particular issue is to ensure that, of course, we do not want anyone to lie or mislead the public. There are some steps that can be taken to ensure that we have the highest quality scienced that is free from bias, including some rec-

ommendations that we have made about removing corporate influence on the science process, making sure that studies that are going to be done for the new chemicals program could be, those studies could be preregistered so we know what the industry is going to do and can evaluate and make sure that everything is compliant with that. Then removing financial conflicts of interest from the review bodies.

This is also recommended in the Gold Standard Science Executive Order to remove conflicts of interest and in the Make America Health reports.

Senator MERKLEY. When someone installs new carpeting and it is the stain-resistant carpeting, is that treated with PFAS?

Ms. WOODRUFF. Some of them, yes.

Senator MERKLEY. Then, if I had a grandchild, which I do not——

Ms. WOODRUFF. Me either.

[Laughter.]

Senator MERKLEY. If my children, when they were small or crawling around before they were walking and their little noses were right on the carpet, are they consuming PFAS through the fibers like almost from the start of life?

Ms. WOODRUFF. Yes, unfortunately, this is an area that we really need EPA to do a better job on, which is accounting for the fact that when kids are, like you have these little toddlers, they are so cute, they are crawling around, but they are also collecting, they are also lower to the ground and then putting their hands in their mouth, to feel things out.

If there are toxic chemicals like PFAS in the carpet or a lot of toxic chemicals love to hang out in dust, they are getting higher exposures to those chemicals that are in the carpet, in the materials, in the dust. It has been well documented that that is true. We see this with flame retardant chemicals.

In California, they did a study where little toddlers had the same levels of PBDE flame retardant chemicals as people who worked in occupational settings. EPA can account for this in their risk evaluations. That does not always happen.

Senator MERKLEY. Thank you.

Mr. Chairman, this area, the products where humans have the most exposure, would be an area I would love to work with you on.

Senator CURTIS. Thank you. I will take you up on that. From my days in the House, I remember this kind of, I will say argument, and I would like to also acknowledge that some of our heart valves use PFAS, for which there is no substitute, which makes it difficult if you say, we are just going to attack all of PFAS.

It seems to me that somehow we have to get a little bit more granular with this conversation, and throw in, and I do not know, but there is probably some element of safety from fires and children whose lives are not lost because of the chemicals as well and somehow factoring that in as well to these decisions.

I will meet you on that. We will have that conversation.

I am going to volunteer Mr. Huntsman to come meet with us as well, and Dr. Woodruff, we will invite you and Dr. Gross. We will bore down into some of these topics.

Mr. HUNTSMAN. I will even loan a couple of grandchildren to Senator Merkley.

Senator CURTIS. I was actually going to try to beat you to that, because those of us with 18 or 20 know there is one or two that we will send over there.

[Laughter.]

Senator MERKLEY. Send them right over.

Senator CURTIS. Thank you all very much.

With no further questions, I would like to thank the witnesses and all my colleagues for your participation in today's hearing, especially my colleague, the Ranking Member. It is actually no small thing that he is with us today.

Senators who wish to submit written questions for the record will have until 5 p.m., Thursday, November 6th to do so. The witnesses' responses to those questions are due back to the committee no later than 5 p.m. on Thursday, November 20th, and will be submitted for the record.

With that, this hearing is adjourned.

[Whereupon, at 11:47 a.m., the hearing was adjourned.]

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