

**Comments of the
Semiconductor Industry Association (SIA)
On
Draft PFAS Legislation
Of the
Senate Environment and Public Works (EPW) Committee
July 14, 2023**

The Semiconductor Industry Association (SIA)¹ appreciates the opportunity to comment on the draft PFAS legislation published by Senator Tom Carper (D-Del.) and Senator Shelley Moore Capito (R-W.Va.), Chair and Ranking Member of the Senate Environment and Public Works (EPW) Committee. SIA looks forward to future engagement and partnership with the Committee as it advances its important work.

SIA is generally supportive of the direction of the draft, bipartisan bill released by Senators Carper and Capito. The bill includes numerous components that support a risk-based approach to PFAS management.

Overview of Semiconductor Manufacturing and PFAS

Semiconductors form the building blocks of modern technology, enabling innovations that make the world smarter, greener, more productive and efficient, and better connected. With up to tens of billions of transistors on a single piece of silicon, producing these complex devices requires highly advanced processes and equipment, as well as the use of chemicals, gases, and other materials with specific performance and functional attributes.

PFAS are among the inputs essential to chip manufacturing, used in a wide range of industrial processes and consumer products. Although the semiconductor industry accounts for only a small fraction of the world's total PFAS usage, many uses of specific PFAS are essential to semiconductor manufacturing. PFAS have essential uses in a wide variety of applications because they possess certain critical performance and functional attributes needed to manufacture semiconductors and the sophisticated equipment and infrastructure needed in the process. The carbon-fluorine bonds and structure of PFAS give them unique physical and chemical properties, such as repelling both water and oils, remaining stable

¹ The Semiconductor Industry Association (SIA) is the voice of the semiconductor industry, one of America's top export industries and a key driver of America's economic strength, national security, and global competitiveness. Semiconductors – the tiny chips that enable modern technologies – power incredible products and services that have transformed our lives and our economy. The semiconductor industry directly employs over a quarter of a million workers in the United States, and U.S. semiconductor company sales totaled \$275 billion in 2022. SIA represents 99 percent of the U.S. semiconductor industry by revenue and nearly two-thirds of non-U.S. chip firms. Through this coalition, SIA seeks to strengthen leadership of semiconductor manufacturing, design, and research by working with Congress, the Administration, and key industry stakeholders around the world to encourage policies that fuel innovation, propel business, and drive international competition. Additional information is available at www.semiconductors.org.

SIA is also a member of the Sustainable PFAS Action Network (SPAN), a non-profit organization representing industry stakeholders that responsibly produce and utilize PFAS compounds in a wide range of commercial products. Additional information is available at www.span.org/.

over a wide temperature range, and having low coefficients of friction, making them useful in many industrial and consumer applications, including semiconductor manufacturing.²

There are currently no known substitutes for most of these applications. Identifying, developing, and qualifying suitable substitutes will require new inventions, and if found, the process of introducing substitutes into high volume manufacturing is complex; the process can take over a decade or more. For applications where there are no substitutes, innovation is needed in detection, treatment, and remediation technologies.

SIA welcomes the opportunity to provide comment as an interested stakeholder as EPW considers the draft PFAS legislation.

Overview of SIA PFAS policy principles:

- SIA recognizes the concerns associated with some PFAS, particularly those that are persistent, bioaccumulative, and toxic (PBT), and supports sound, reasonable regulations on PFAS, but governing bodies should avoid regulating the entire class of chemicals.
- Any restrictions impacting the semiconductor industry should provide sufficient time to identify and qualify PFAS substitutes. It is likely that efforts to develop such alternatives will require a significant period of time.
- Any restrictions should maintain the ability of the semiconductor industry to use existing PFAS in critical applications and continue the innovation pipeline through the approval of new chemicals.
- Industry, academia, and government should partner to drive investment into research for the identification of environmentally sound substitutes to PFAS, as well as the development of PFAS detection, treatment, and remediation technologies.
- Any restriction should seek to minimize compliance burdens and have clear definitions and parameters.

SIA comments on Sections 2, 4, 8, and 9 of the draft bill are below.

² In January 2021, SIA facilitated the establishment of the Semiconductor PFAS Consortium, an international group formed to collect the technical data needed to formulate an industry-wide approach and better inform public policy and legislation regarding the semiconductor industry's use of PFAS. The consortium membership is comprised of semiconductor manufacturers and members of the supply chain including chemical, material, and equipment suppliers. To date, the Consortium has published a series of nine technical papers summarizing the uses of PFAS in the semiconductor industry and significant technical challenges to replace these substances in the range of uses in the fabrication process and fab equipment. Additional information is available at www.semiconductors.org/pfas/ Semiconductor PFAS Consortium, *Background on Semiconductor Manufacturing and PFAS*, May 17, 2023.

Section 2 – Definitions

SIA supports EPW’s attempt to set forth a targeted definition of PFAS that focuses on those chemistries that have the potential to contribute contamination or other environmental impacts. A targeted approach allows for stakeholders to concentrate efforts on PFAS that are known or potentially known to be PBT. This will pave the way for sensible and sustainable PFAS management and policy.

There is no consensus definition of PFAS as a class of chemicals. As such, the definition of PFAS vary in different international, federal, and state laws and regulations. A targeted and uniform definition of PFAS would improve the ability of the regulated community to identify its uses of PFAS and implement measures to reduce any risks associated with the use of these substances.

While SIA continues to refine its understanding of a definition that best achieves these goals, we propose at this time that Section 2(4)(A) be amended to read: "Perfluoroalkyl and polyfluoroalkyl substances" means a “a group of synthetic perfluoroalkyl and polyfluoroalkyl substances that contain at least two sequential fully fluorinated carbon atoms or a perfluoroalkylether moiety with two or more fully fluorinated carbon atoms (i.e.– $C_nF_{2n}OC_mF_{2m-}$, n and $m \geq 1$)³, excluding polymers, gases and volatile liquids.”

This proposed definition would include, for example, the following compounds:

- (i) fluorosurfactants;
- (ii) PFOA, PFOS and their salts and precursors; and
- (iii) PFNA, PFHxS, PFBS, and HFPO-DA and their associated salts.

This definition could be further refined as additional data becomes available regarding the chemical profile of substances within this category. SIA welcomes the opportunity to engage in future conversations with EPW and EPA on appropriately defining PFAS.

Section 4 – National Academies study on the uses of PFAS

SIA supports the provision to require the Administrator to seek to enter into an agreement with the National Academies to carry out a study on PFAS, including the benefits and costs of current uses of PFAS, the availability of substitutes, and the reduction of nonessential uses of PFAS. SIA anticipates that such a study would recognize the benefits derived from critical uses of PFAS in various semiconductor applications and the lack of “drop-in substitutes” for most uses of PFAS in semiconductor applications. While opportunities exist for reductions in nonessential uses of PFAS, we anticipate such a study would recognize the need for critical uses exemptions in the semiconductor industry for an extended period of time while research continues on alternatives and detection/treatment methods.

³ The inclusion of perfluoroalkylether moieties with two or more fully fluorinated carbon atoms is consistent with the second structural definition (R–CF₂OCF₂–R’, where R and R’ can either be F, O, or saturated carbons) provided by EPA in its Updates to New Chemicals Regulations Under the Toxic Substances Control Act (TSCA) (88 Fed. Reg. 34114; Docket # EPA-HQ-OPPT-2022-0902), May 26, 2023.

Section 8 – PFAS research and development

SIA supports the proposed research and technology program to develop, evaluate, and demonstrate nonregulatory strategies and technologies for the prevention, detection, reduction, destruction, and verification of emerging contaminants, with a focus on PFAS.

SIA recommends EPW also include research and development of alternatives to PFAS as part of the scope of the program, including alternatives in essential applications in the semiconductor industry. Research into potential substitutes for PFAS is an important component of long-term risk mitigation. As summarized in the papers of the Semiconductor PFAS Consortium, it may take years or decades to invent, develop, and qualify suitable alternatives that meet the necessary performance characteristics of currently used PFAS, including for those uses in semiconductor manufacturing and the manufacturing of semiconductor manufacturing equipment. While other Federal agencies may conduct limited research into such alternatives, EPA should play an active role in this research effort as well to ensure potential substitutes provide an improved environmental, health, and safety profile.

To achieve the important and ambitious goals of the research program, EPW should increase the authorization amount from \$500 million to at least \$1 billion over 5 years.

Section 9 – PFAS technology development prize

SIA supports the creation of incentives to innovate in technology for PFAS identification, prevention, and destruction. In addition to these areas, EPW should expand the scope of the prize competition to innovation in PFAS alternatives.

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SIA appreciates the opportunity to comment on this draft bill, and we look forward to continuing to work with the EPW committee staff in the development of this legislation.