Comments of the
Semiconductor Industry Association (SIA)
To the
Maine Department of Environmental Protection (DEP)
Request for Proposals
On the
Rulemaking on
Currently Unavoidable Uses in PFAS in Products

March 1, 2024

The Semiconductor Industry Association (SIA)[1] appreciates the opportunity to submit a proposal to the Maine Department of Environmental Protection (DEP) on its informal solicitation of proposals[2] for currently unavoidable use (CUU) designations under the state's statute regulating the use of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in products.[3] SIA submits this proposal on behalf of its members,[4] the semiconductor industry, at large, and other manufacturers in the semiconductor supply chain.

SIA Request for Semiconductor Uses to be Deemed "Currently Unavoidable Uses"

Under the auspices of SIA, the Semiconductor PFAS Consortium has published technical papers documenting the industry's use of PFAS in various applications, including information regarding the unique functional properties of particular PFAS in our manufacturing processes, the absence of non-PFAS alternatives in meeting performance requirements, and the technical obstacles and long lead times needed to identify and adopt potential substitute chemicals. Each of these technical papers are available for download at https://www.semiconductors.org/pfas/, and we incorporate these papers into these comments by reference.[5] These papers provide the technical basis for our request for Maine to ensure the definition of "currently unavoidable use" encompasses the following uses of PFAS throughout the entire semiconductor value chain, or to designate as part of this initial rulemaking that the following uses of PFAS in the entire semiconductor value chain as "currently unavoidable uses":[6]

---

[1] 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.

[2] Maine Department of Environmental Protection, *PFAS in Products: Currently Unavoidable Uses*, Jan. 2024. See: https://www.maine.gov/dep/spills/topics/pfas/PFAS-products/cuu.html

[3] *38 M.R.S. §1614*. See: https://legislature.maine.gov/legis/statutes/38/title38sec1614.html

[4] Semiconductor Industry Association, *Members*. See: https://www.semiconductors.org/about/members/

[5] We are happy to provide a zip file of these documents to DEP. Please contact agordon@semiconductors.org if the zip file is requested.

[6] Environmental policy has long-embraced the concept of providing an exemption for critical or essential uses of restricted substances, dating to the treaty to phase out ozone-depleting chemicals. Montreal Protocol on Substances that Deplete the Ozone Layer (1987), https://ozone.unep.org/treaties/montreal-protocol. In addition, the scientific and environmental community has endorsed the application of a critical use exemption to the regulation of PFAS. See The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs), available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4421777/. In the case of PFAS, a similar, broad-based exemption is necessary to ensure there are no disruptions to the semiconductor value chain.

- Manufacturing Processes – PFAS-containing chemicals, gases, and materials used in semiconductor manufacturing, including but not limited to the following applications:
  - Surfactants
  - Photo-acid generators (PAGs)
  - Fluorochemicals used in semiconductor manufacturing plasma-enabled etch and deposition
  - Heat transfer fluids (HTFs)
  - Materials used in semiconductor manufacturing assembly test packaging and substrate processes
  - Wet chemistries
  - Lubricants

- Semiconductor Devices – Semiconductor devices, components, and packages

- Fab Equipment, materials, and infrastructure - Semiconductor manufacturing tools, parts, materials, ancillary equipment, and infrastructure used during semiconductor manufacturing or at semiconductor manufacturing facilities

SIA's comments below include additional background on semiconductor manufacturing and PFAS, as well as more detail on our CUU proposal.

1. Background on Semiconductor Manufacturing and PFAS

Semiconductors form the essential building blocks of modern technology, enabling innovations that make the world smarter, greener, more productive and efficient, and better connected. Semiconductors enable critical technologies and industries that form the foundation of the U.S. economy, including the automotive industry, defense, electronics, communications, data storage and analysis, legal and regulatory infrastructure, scientific (including materials) research, medicine and medical devices, the green energy transition, transportation (including aviation), and much more. 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. Today, the smallest transistor is just 3 nanometers in size – 5 atoms thick and 30,000x thinner than a human hair. The fabrication process can include up to 1,400 process steps, with each process step typically involving the use of a variety of unique, highly sophisticated machines and materials. The supply chain for semiconductor manufacturing is extremely complex, as noted by numerous U.S. government publications.[7]

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

[7] The White House, 100-day Supply Chain Review, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth*, June 2021. See: https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf
Government Accountability Office, GAO-22-105923, *Semiconductor Supply Chain Policy: Considerations from Selected Experts for Reducing Risks and Mitigating Shortages*, July 2022. See: https://www.gao.gov/assets/gao-22-105923.pdf
Department of Defense, *Securing Defense-Critical Supply Chains An action plan developed in response to President Biden's Executive Order 14017*, Feb. 2022. See: https://media.defense.gov/2022/Feb/24/2002944158/-1/-1/1/DOD-EO-14017-REPORT-SECURING-DEFENSE-CRITICAL-SUPPLY-CHAINS.PDF

because they possess certain critical performance and functional attributes needed to manufacture semiconductors as well as the sophisticated equipment and infrastructure needed to support the manufacturing process. The carbon-fluorine bonds and structure of PFAS give them unique physical and chemical properties, such as strong electronegativity, low refractive index, good thermal stability, good barrier properties, hydrophobicity, low dielectric current, thermal resistance, chemical resistance, low surface adherence, resistance to grease and stain, anisotrophic etching capability, selective metal oxide removal, reduced shedding, high-temperature thermal stability, low adhesion strength, chemical inertness, low volatility, UV resistance, flame resistance, and low coefficient of friction, among others. This range of critical properties across the many different types of PFAS and applications, are indispensable in many industrial and consumer applications, including semiconductor manufacturing.

The Semiconductor PFAS Consortium[8] has identified over 1000 uses of PFAS in the semiconductor manufacturing process, fabrication plant equipment, end-use devices and assembled packages, and associated supply chain. Each use is essential to producing the final chip. There are currently no known substitutes for the vast majority 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 anywhere from 5 to 25 years, and in many cases will never be possible.

DEP should also take into account the limited potential risk of exposure from uses in the semiconductor industry, the chemical management practices in the semiconductor industry, and the fact that these chemicals are not intended to be released from the finished product under normal conditions of use.

2. Overview of SIA Proposal for CUU

Given the complexity of semiconductors and related systems, DEP must recognize that even just one use of PFAS deemed not to be a CUU could inadvertently prohibit the import of semiconductors into the state and cause all semiconductor manufacturing in Maine to cease operations.

DEP should recognize that Maine has a vibrant semiconductor industry. In 2023 alone, Maine chipmakers, such as Texas Instruments and Diodes Inc., exported over $212 million in semiconductor products. And importantly, Maine manufacturers imported about $15 million worth of semiconductors that are then incorporated as components into other products.[9] Without a CUU for semiconductor products and the products needed to manufacture semiconductors, these totals would drop to zero. Semiconductor fabrication facilities in the state would be forced to cease operations, and all companies would be prohibited from purchasing semiconductors necessary for their products to function. Such a restriction would inevitably drive business and jobs out the state.

[8] 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.
[9] U.S. Census Bureau. HTS codes 8541 and 8542.

In order to avoid these significant adverse socio-economic impacts in Maine's economy and the quality of life of Maine residents, SIA requests that DEP craft a broad, categorical CUU that exempts from the 2030 PFAS restriction the entire semiconductor value chain, including materials, tools, and processes, and when present in end use devices and assembled packages.

As described earlier in this submission, included in a CUU for the semiconductor industry should be a general category of usage that includes all CUUs throughout the semiconductor value chain, including the upstream semiconductor supply chain industries, the semiconductor manufacturing process itself, as well as the final packaged semiconductor devices that are produced. Examples of CUU PFAS applications in each of these three subcategories are as partially listed below and including:

- Manufacturing processes - Uses within the semiconductor manufacturing process, including but not limited to PFAS ingredients within specialty chemicals and fluids, fluoropolymers and other PFAS used in production of high purity water and in containment and transport of high purity water and chemicals, and uses of fluoropolymers and other PFAS in facility systems.

- Semiconductor devices - Uses within the final packaged semiconductor devices, including but not limited to finished semiconductor devices and component parts such as encapsulants, thermal interface materials, adhesives, coatings, substrates, wiring, connections, and circuit boards.

- Fab Equipment, materials, and infrastructure - Uses in upstream semiconductor supply chain industries, including but not limited to uses of fluoropolymers and other PFAS used in high purity chemical production and packaging, fluoropolymers and other PFAS integrated into semiconductor manufacturing equipment, PFAS used to manufacture the semiconductor manufacturing equipment, and the PFAS substances supplied for use in semiconductor manufacturing.

3. Reservation of Rights

Please note that this submission is on behalf of the semiconductor industry as a whole, but is not intended to preclude the possibility that individual companies within the semiconductor sector may have additional or more specific information or CUU requests that they intend to submit. SIA's submission should therefore be understood as being without prejudice to CUU submissions that individual companies may choose to submit.

Moreover, please note that this is an *initial* submission – it is intended to provide key background to DEP on semiconductor uses of PFAS for which alternatives are not "reasonably available" – based on our understanding that DEP's current invitation is a pre-rulemaking request for information that will inform formal regulatory actions. Although we believe that this submission and the documentation that we incorporate by reference here provides more than ample substantiation for a CUU exemption designation by DEP as requested here, we reserve the right to submit additional information, and potentially identify additional CUU application requests, in subsequent formal rulemakings that DEP undertakes.

Finally, we note that, like many other sectors of the manufacturing economy in Maine, we continue to have significant concerns about LD 1503, as amended in 2023 by LD 217, and believe that DEP could take steps to further reduce the under-appreciated burden imposed

under the law on manufacturing facilities and other reporting companies in Maine. In addition to adopting broad CUU designations for the 2030 prohibition, DEP should broadly apply the discretion available under the statute to provide categorical exemptions from the 2025 reporting duty.

We remain hopeful that further legislative improvements to the statute are possible, but in the meantime believe that DEP should exercise its authority through rulemaking to streamline these requirements in a manner that more appropriately balances risks and costs. We focus here only on the CUU designation in response to DEP's request for information on that topic, and look forward to further engagement with DEP as it elaborates its regulatory interpretations of the statute in the coming months.

4. Process concerns

As explained in more detail below, we have particular concerns about (a) the definitions posted on the DEP website, which we have previously raised with DEP in our prior comments on DEP's draft regulations, and (b) the "required" application elements for a CUU application, which have not been properly promulgated. For reasons explained below, therefore, we do not limit our CUU application and exemption substantiation to the narrow definitions or submission elements that DEP identifies on its website, and instead focus more generally on the need for appropriately broad CUU exemptions consistent with the much broader room for agency discretion that is afforded to DEP by statute.

A. Definitions

We have deep substantive concerns with the DEP's posted definition of "essential for health, safety or functioning of society," which DEP proposes to define as:

> *Products or product components that if unavailable would result in a significant increase in negative healthcare outcomes, an inability to mitigate significant risks to human health or the environment, or significantly interrupt the daily functions on which society relies. Products or product components that are Essential for Health, Safety or the Functioning of Society include those that are required by federal or state laws and proposed Rule. Essential for the Functioning of Society includes but is not limited to climate mitigation, critical infrastructure, delivery of medicine, lifesaving equipment, public transport, and construction.*

That definition is excessively narrow and excludes many categories of PFAS uses that are essential to modern society but have no current alternatives. Relying on a narrow, ambiguous and subjective definition of "essential for the health, safety or the functioning of society" – such as the one posted on DEP's website -- will lead to arbitrary and potentially harmful outcomes.

It is not clear why DEP would want to constrain its future authority to consider appropriate exemptions beyond limits imposed by the statute. For example, DEP might determine that a product is essential for "health," in a manner completely consistent with the statute, without requiring a manufacturer to demonstrate that the product is also essential to avoid a "significant increase in negative healthcare outcomes."

And while DEP may have intended the examples of activities or sectors that are "essential for the functioning society" to be illustrative only, the "daily functions on which society relies" depends on myriad activities, products, and processes that are not encompassed in DEP's short

list. We are concerned that the use of these examples in the definition will lead DEP to read its authority as more circumscribed in the future while the statute affords greater discretion to DEP. Activities that are missing from the examples in the definition provided and which Maine residents might well consider essential to the functioning society to include, for example, communication, food production, social interaction, recreation, education, fire protection, search and rescue, law enforcement, research and development, energy production, defense, transportation, etc.

SIA respectfully requests the DEP to instead employ a broad concept of "essential" that is both consistent with the requirements of the statute and flexible enough to accommodate the possibility that broad exemptions may be required to avoid adverse impacts on the functioning of society. We suggest that DEP grant CUU exemptions for both PFAS use applications and end products, and for the supply chain production activities required to produce such PFAS applications or end products, when a manufacturer has submitted documentation that an application, product, or category of products is essential to the health, safety, or the functioning of society and that there are no reasonably available alternative substances or technologies for that use, and that a product shall be deemed to provide benefits to the functioning of society.

This approach would strike an appropriate balance that we believe reflects the legislative intent behind the statute: it would require manufacturers to substantiate assertions that PFAS substitutes are not reasonably available, but would presume that ongoing uses where substitutes are not reasonably available and technologically feasible would be permitted to continue.

Moreover, as indicated in the suggested language above, DEP should clarify that uses of PFAS-containing products in manufacturing operations that take place in Maine would be included in the exemption wherever the manufacturing process produces an end product that is itself deemed "essential." In other words, DEP should make it clear that the "essential" designation and related exemptions should apply not only to the end product itself, but to each of the products and processes (and manufacturing equipment used) in the supply chain that are necessary to produce that exempted product. It is reasonable for DEP to make a CUU determination that includes the use of PFAS in a given product as well as all uses of PFAS needed to manufacture such product , so long as there are not reasonably available alternatives.

As DEP may be aware, the European Commission has for many years been working on a potential amendment to the REACH chemical regulatory framework to incorporate an "essential use" standard for justifying exemptions from restrictions on substances of very high concern. The complexity of that concept, and the risks of inadvertent omissions or adverse socio-economic impacts has resulted in numerous delays and drafting challenges. DEP should likewise avoid challenges such an approach can create, and instead adopt a more practical and flexible definitions that exempt broad categories of PFAS uses until DEP has the time and resources to adopt restrictions in a more targeted and carefully prioritized fashion.

B. Required Elements for a CUU Application

We also have concerns that some of the elements that DEP proposes to "require" in submissions (proposals) requesting CUU determinations are inconsistent with the broad approach to CUU exemptions that we believe is allowed under the statute and certainly warranted as a policy matter with respect to the semiconductor sector. Specifically, imposing a putative requirement to include GPC brick categories or HTS codes for each exempted

application of PFAS does not fit with the type of broad categorical CUU determination that will be required to exempt critical PFAS uses that are necessary throughout the value chain that supports the semiconductor manufacturing sector.

Due to the extreme complexity of the semiconductor supply chain and over 1000 applications of PFAS that are necessary to produce a semiconductor, it is impractical and effectively not possible to provide the product-level information on the myriad products in the semiconductor sector (including products that contain semiconductors) that require a CUU exemption.

There is no legal requirement in the statute that would prevent DEP from issuing broad, categorical exemption such as SIA is advocating. DEP may wish to entertain and to issue product-specific CUU determinations, but if DEP elects to do so, it should also consider the resource savings that can be achieved by first issuing broad, categorical CUU determinations and thereby reducing the need (and resource drain imposed by) limiting the CUU determinations to a product-by-product process. Therefore, for the semiconductor sector, DEP should provide a CUU for semiconductors (including semiconductors when PFAS is present in end-use devices and assembled packages); semiconductor manufacturing equipment; semiconductor manufacturing materials; and all products necessary for the manufacturing of semiconductors, semiconductor manufacturing equipment, and semiconductor manufacturing materials.

DEP should also consider adopting a process for reciprocity with other states that promulgate similar regulations on determinations of currently unavoidable uses of PFAS. A CUU of PFAS in one state should be accepted as a CUU by DEP, and DEP should work with its peer agencies in other states to ensure they accept CUUs designated in Maine. This will be valuable for consistency and interstate trade, and reduce the resource burden on both the regulatory committees reviewing the requests, as well as the companies submitting them.

5. **Semiconductor Industry Uses of PFAS: Critical Applications Throughout Value Chain**

The semiconductor industry has invested significantly in identifying PFAS uses in the value chain for semiconductor manufacturing and in semiconductor devices during the past 25 years, in phasing out PFAS use where possible, namely the use of PFOS and PFOA in photolithography,[10] and in regularly evaluating the availability and efficacy of non-PFAS alternative chemicals or alternative processes or materials. The semiconductor industry has reduced its PFC emissions in plasma etch and chamber cleans, despite increasing usage of PFCs over time.[11] Efforts are ongoing to innovate and implement new PFAS abatement and process optimization technologies. Our industry has been a global leader in these efforts.

These efforts have been increased substantially during the past 3 years in anticipation of the EU "universal PFAS" restriction proposal under REACH. In preparation for the public consultation that took place last year on that proposal, the semiconductor industry established a substantial industry-wide collaboration platform that made deep investments across the sector. That process documented PFAS uses in our value chain, identified the unique functionality and

[10] World Semiconductor Council, Joint Statement of the 21st Meeting of the World Semiconductor Council (WSC), May 2017, at pages 24-26 (Annex A). See: https://www.semiconductorcouncil.org/wp-content/uploads/2017/05/21st-WSC-Joint-Statement-May-2017-Kyoto-Final1.pdf

[11] Semiconductor PFAS Consortium, PFAS-Containing Fluorochemicals Used in Semiconductor Manufacturing Plasma-Enabled Etch and Deposition, June 2023, at page 6. See: https://www.semiconductors.org/wp-content/uploads/2023/06/FINAL-Plasma-Etch-and-Deposition-White-Paper.pdf

performance attributes that various PFAS chemicals and fluorinated polymers conferred that made them essential to semiconductor production, and evaluated the availability of alternative substances, materials, or processes. This work culminated in over 700 pages of technical reports and substantiation, broken down by broad sub-categories of uses and applications within our sector. These materials, when considered in their totality and incorporated to this submission by reference, constitute more than ample substantiation for our request that DEP designate all current and future PFAS uses within the semiconductor value chain as CUU applications that are exempt from the 2030 prohibition. All of this information has been made publicly available for download at semiconductors.org/PFAS.[12]

In brief, these papers demonstrate that many different PFAS are used in chemical formulations, components of manufacturing process tools, facilities infrastructure, and packaging used to make the semiconductor devices that are integral to the modern world. The current semiconductor state of the art is critically reliant on the use of PFAS compounds due to the particular properties that these substances provide. The technical papers identify the many functional attributes possessed by certain PFAS in meeting the rigorous performance requirements of fabricating semiconductors. Given their unique properties, it will be extremely difficult, and impossible in most instances, to find viable alternatives, without substantially impeding or reversing the technologies that the modern world currently relies on. In some cases, PFAS with a higher risk-profile may be replaced by PFAS with an improved environmental and health profile – a necessary, stepwise progress trajectory. There are also environmental impacts with not using PFAS, such as the potential for decrease in yield and therefore cause an increase in chemical, water, energy consumption, and waste generation.

The papers address the following individual topics:

1. Background on Semiconductor Manufacturing and PFAS
2. PFAS-Containing Surfactants Used in Semiconductor Manufacturing
3. PFOS and PFOA Conversion to Short-Chain PFAS-Containing Materials Used in Semiconductor Manufacturing
4. PFAS-Containing Photo-Acid Generators Used in Semiconductor Manufacturing
5. PFAS-Containing Fluorochemicals Used in Semiconductor Manufacturing Plasma-Enabled Etch and Deposition
6. PFAS-Containing Heat Transfer Fluids Used in Semiconductor Manufacturing
7. PFAS-Containing Materials Used in Semiconductor Manufacturing Assembly Test Packaging and Substrate Processes
8. PFAS-Containing Wet Chemistries Used in Semiconductor Manufacturing
9. PFAS-Containing Lubricants Used in Semiconductor Manufacturing
10. PFAS-Containing Articles Used in Semiconductor Manufacturing

Additionally, a peer-reviewed journal article published by Professor Chris Ober and colleagues at Cornell University summarizes the uses of fluorinated materials in the lithography process and concludes: “The addition of small quantities of fluorinated materials enables patterning capabilities that are otherwise not possible to achieve, and this leads to superior device performance. The compact size of the fluorine atom and its strong electron withdrawing characteristics make it stand out in the periodic table and gives fluorocarbon materials unique properties, unmatched by other chemical compounds.”[13]

[12] Semiconductor PFAS Consortium, Semiconductor Industry Association. See: semiconductors.org/PFAS

[13] Christopher K. Ober, Florian Käfer, Jingyuan Deng, “The essential use of fluorochemicals in lithographic patterning and semiconductor processing,” J. Micro/Nanopattern. Mater. Metrol. 21(1), 010901 (2022), doi: 10.1117/1.JMM.21.1.010901, available at http://dx.doi.org/10.1117/1.JMM.21.1.010901

As a result of this industry-wide collaboration research effort, we have identified more than 60 distinct categories of critical PFAS uses throughout the semiconductor value chain (with many different sub-applications and specific PFAS chemistries used within each of these general use categories). A general description of those uses is found in the Table A.49 appearing in the industry's submission made during the EU REACH PFAS consultation.[14]
The contents of this table correlate directly with the information that is likely to be required by DEP when final rules are codified for its PFAS in products notification requirements. For instance, a brief description of the type of products (DEP requirement #1) is provided in the column labeled "Element"; a description of the intended use (DEP requirement #2) is provided in the column labeled "Use Category"; a description how the specific uses are essential to the function of the product (DEP requirement #3) is provided in the columns labeled "Sub-use" and "Properties"; and finally, the information about alternatives (DEP requirement #4) is provided in the column labeled "Estimated Timeframe To Substitute with Non-PFAS Alternatives (Timeline commences after an invention is identified)." It is important to note that the timelines provided in the table for alternatives presume that there are no known alternatives and that such timelines start when a replacement that meets necessary performance requirements has been identified.

As the detailed materials developed by the Semiconductor PFAS Consortium indicate, each of these general use categories, and each of the various sub-applications within these uses, relies on one or more PFAS chemicals and fluoropolymers for critical performance functions, for which alternative chemicals or processes are either not available or, where alternatives may exist, require substantial lead time (with timelines that extend beyond, and sometimes well beyond, 2030) to redesign and requalify equipment and production processes.

The Semiconductor PFAS Consortium also published two additional resource documents, which we incorporate by reference in our submission:

- An overview paper that summarizes the key major use categories and identifies the impacts of premature restrictions on PFAS uses in our sector.[15]
- A socioeconomic impact assessment that is specifically focused on the foreseeable direct and indirect costs of a broad PFAS restriction in Europe, prepared as part of the industry's response to the proposed universal PFAS restriction under REACH. Although this paper is focused on the EU, the types and magnitudes of identified impacts are broadly representative of the effect of analogous restrictions if adopted in Maine and throughout the U.S.[16]

Rather than attempt to itemize each such PFAS application and substantiate it individually – a process that is not possible to complete, especially in the limited time provided for this submission, let alone for DEP to review in a timely fashion – our submission incorporates each of these much more detailed papers by reference. We believe even a cursory review of this evidence will demonstrate to DEP that we have amply satisfied the burden to demonstrate the essentiality of PFAS for these uses as well as the substantial timelines that would be required to research and develop alternatives for all required uses, test them, qualify them, and integrate

[14] European Commission, *Annex To The Annex XV Restriction Report*, May 2023. See: https://echa.europa.eu/documents/10162/f71f3bed-e48d-5004-d195-e293c38d0602
[15] Semiconductor PFAS Consortium, "The Impact of a Potential PFAS Restriction on the Semiconductor Sector." Available at: https://www.semiconductors.org/the-impact-of-a-potential-pfas-restriction-on-the-semiconductor-sector/
[16] Semiconductor PFAS Consortium, "The Socio-economic Impact of a Potential PFAS Restriction on the Semiconductor Value Chain in Europe." Available at: https://www.semiconductors.org/the-socio-economic-impact-of-a-potential-pfas-restriction-on-the-semiconductor-value-chain-in-europe-2/

them into our value chain within the short period of time available before the 2030 prohibitions take effect.

We request that DEP consider these materials in formulating a general CUU determination for all PFAS currently in use throughout the semiconductor manufacturing value chain, including (for example) chemicals used in semiconductor manufacturing and related equipment (including chemicals and fluoropolymers in articles, and wet chemicals manufactured for and used in various production applications), as well as final semiconductor products and devices that contain PFAS chemicals and fluoropolymers within the devices and assembled packages.

***

SIA appreciates the opportunity to submit this proposal and looks forward to continuing to work with the DEP in the development and implementation of these rules. Please contact Alex Gordon at agordon@semiconductors.org with any questions.