

October 3, 2001

**BY HAND**

Charles M. Auer  
Office of Pollution Prevention and Toxics  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20460

Re: Proposed TSCA Significant New Use Rule for Perfluorooctyl Sulfonates  
(Docket Number OPPTS-50639)

Dear Charlie:

On behalf of the Semiconductor Industry Association (SIA) and the Semiconductor Equipment and Materials International (SEMI), we appreciate the opportunity to amplify the comments we submitted on the proposed rule, issued on October 18, 2000 ( 65 Fed. Reg. 62319), that would establish a Significant New Use Rule (SNUR) under the Toxic Substances Control Act (TSCA) for certain perfluorooctyl sulfonate (PFOS) substances.

This letter addresses a range of questions that the Agency has posed to our industry and clarifies our position on a variety of issues. Specifically, we are addressing the following matters:

- Our committee investigating the uses of PFOS outside of the photolithography process in the electronics industry has completed its work. Based on their analysis, which is summarized in this document, SIA/SEMI is not recommending an exemption for uses outside of the photolithography process at this time.
- In response to consultations with your staff, we have clarified aspects of the documentation concerning our model for use of perfluoroalkylsulfonates (PFAS) in the photolithography process.<sup>1</sup> We have included in this submission the revised

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<sup>1</sup> As we have indicated in prior correspondence, we use the term “PFOS” to refer to the general class of chemical substances in which a sulfonyl group is attached to a fully fluorinated alkyl chain consisting of 8 carbon atoms. PFOS is a member of a larger family of perfluoroalkylsulfonates, which we refer to as “PFAS”, that encompasses all homologues (C<sub>1</sub>-

documentation for the model and presented the model results for environmental releases from the photolithography process in 2000. As will be discussed in more detail, we believe that these model results demonstrate that potential human and environmental exposures to PFAS from its use in photolithography processes are insignificant.

- We are providing our recommendations for a regulatory exemption from the SNUR for specific uses in a photolithography process to produce semiconductors and other electronic devices. This submission explains our position on why such an exemption is compelled, both as a matter of policy and as a legal matter under TSCA.
- As we have indicated in the past, it is essential to our industry that EPA establish a clear and rational framework for the review of pre-manufacture notices (PMN's) and low volume exclusions (LVE's) for PFAS substances under the TSCA new chemical program. We believe that the information in this submission provides a solid framework for those decisions. Therefore, we are asking EPA to take specific actions to implement such a framework.
- EPA has been active in bringing its concerns about PFOS into the deliberations of international institutions. We are providing our recommendations on how the information provided in this submission should be incorporated into EPA's international activities related to PFOS.

## Background

Before addressing the specific topics outlined above, we believe it is valuable to summarize for EPA some of the technological and business dynamics of the electronics industry that create challenges to any industry effort to reduce use of PFAS homologues but also provide opportunities for chemical stewardship that might yield such reductions. A deeper explanation of these dynamics is provided in **Appendix I**.

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C<sub>n</sub>) of this class of materials. The C<sub>1</sub> to C<sub>4</sub> homologues are referred to as the "lower homologues" while the term "higher homologues" describes the C<sub>5</sub> and above homologues. EPA's SNUR has focused on certain higher homologues. At the same time, SIA/SEMI's data collection efforts have assembled information on PFAS materials, in part because we are uncertain about how EPA will address the lower homologues. We are not aware of any toxicological data suggesting a risk concern with lower homologues. If EPA determines, based on new toxicological data, that the lower homologues warrant a risk management strategy similar to the higher homologues, then we ask to be notified of this conclusion and presume, based on the information we have presented to the Agency, that the use of the lower homologues in our industry would be addressed in the same manner as the higher homologues.

In today's economy the electronics industry is responsible for producing products that determine the pace of innovation in a wide variety of fields, ranging from telecommunications to medicine. These innovations are often also critical to advancing public policy objectives for national security, energy efficiency and environmental protection. All of these fields depend on technological innovations in the electronics industry to deliver devices that have greater capacity, enhanced efficiency and smaller circuitry.

To produce such devices, the industry must employ production processes of great complexity that have a very low tolerance for error. The precision needed in these processes sometimes limits the range of materials that can be used, and requires that these materials be compatible with each other and with production equipment.

These technological challenges must be met in an economic environment that is global in scope and quite competitive. For the U.S. electronics industry to compete effectively, it has been essential that it maintain a position at the cutting edge of technology. Thus, the ability of our industry to stay up to date with the cycles of technology in electronics is more than a desirable outcome; it is essential to the industry's viability and to the success of other U.S. interests that rely on our industry's products.

To appreciate the process of innovation in our industry, it is important for EPA to appreciate two parallel dynamics that are at work. First, the *product cycles* in our industry tend to be very short. The products we are selling today are not expected to meet customer needs for long periods of time, an expectation that any consumer who owns and then upgrades his or her home computer can appreciate. Second, the *technology development cycles* in our industry, in contrast, often take a long time. Because of the complexity of our products and associated production processes, a major innovation can take years to bring to market. Manufacturers of electronic devices, working in conjunction with their materials and equipment suppliers, must typically proceed through multiple stages of research, technology integration, demonstration and manufacturing ramp-up to achieve a process change effectively.

These two dynamics demand that companies in the electronics industry engage in significant planning and perpetual development of new products. Companies in our industry, therefore, often think in terms of "technology roadmaps" that define technological objectives and establish key milestones for bringing those technologies forward. As much as possible, these roadmaps need to be predictable.

New issues, including ones involving health and environmental concerns, may require modification of these timelines. The electronics industry recognizes that it is sometimes prudent to respond to new conditions by substituting process materials. Generally the industry has been adept at doing so. Depending on the significance of a material and the viability of alternatives, however, the industry's resourcefulness cannot fully bridge its technology imperatives with a material substitution strategy. As we explain in other parts of this submission, we are facing such a situation as we consider chemical stewardship options for addressing concerns about PFAS materials.

Chemical stewardship is important in the electronics industry. Our industry has grown up in a time when there has been strong public support for environmental protection, reinforced by strong government oversight of industrial operations. The industry has integrated chemical stewardship into how it thinks about product development and facility management. The industry has participated in a wide range of constructive and innovative environmental management efforts over the years, which provides tangible evidence of our commitment.

The technological and economic dynamics of the industry also support active chemical stewardship. Through careful planning, we are able to align a technology change with our chemical stewardship activities. Technology changes occur on a longer timeframe than product changes, as explained in **Appendix I**. Therefore, some chemical stewardship activities can take many years to reach the manufacturing production phase and fully mature.

The high standards of product quality that we must maintain demands that we minimize worker contact with the production process. This operational requirement aligns well with our strategies to minimize worker exposure to the chemicals used in our processes.

Even the global competitiveness of our industry reinforces our chemical stewardship objectives. Our industry is constantly looking for ways to minimize the use of costly materials in our processes. This drive to make our use of materials more efficient can serve pollution prevention and other stewardship objectives that we support.

These characteristics of our industry have important implications for any strategy to address the use of PFAS in photolithography. As a threshold matter, EPA must recognize that photolithography is an essential process in our industry. As we discuss in **Appendix I**, the effectiveness of the photolithography process determines our ability to accomplish key objectives, such as the demand for increasing miniaturization of electronic components. Without a cutting edge capability in that process, U.S. manufacturers will not be able to compete effectively in the world.

The PFAS moieties, including the higher homologues, have unique performance characteristics that cannot be easily replaced. Thus, as we have considered EPA's effort to phase out at least the higher homologues, we have focused on identifying areas where these chemistries are critical to our technology. **As we have indicated from the beginning of this rulemaking, PFAS-based materials are critical in two applications within the photolithography process: (1) photoresists;<sup>2</sup> and (2) anti-reflective coatings (ARC's).<sup>3</sup>**

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<sup>2</sup> Within photoresists PFAS moieties provide important functions as photo-acid generators (PAG's) and surfactants.

<sup>3</sup> These coating are sometimes referred to as top anti-reflective coatings (TARC's) and bottom anti-reflective coatings (BARC's), indicating their position on the wafer relative to the resist.

For both applications, we currently do not have alternatives to PFAS homologues to meet our performance needs, particularly our needs in the more advanced manufacturing platforms. It will require a technological breakthrough in our ongoing research efforts – *i.e.*, an invention - to identify viable PFAS alternatives for these applications. **Therefore, while we continue to pursue research that may identify PFAS substitutes, it is essential that higher homologue substances remain available for these limited purposes.**

Our industry will persist in its chemical stewardship efforts and other technological advancements that may reduce the industry's use of PFAS materials. As **Appendix I** describes, our industry is steadily reducing the amount of PFAS-containing material per wafer that is required in photolithography. Ongoing chemical stewardship related to the higher homologues will also eliminate the need to use developer containing these substances, a step that greatly reduces the environmental release of PFOS moieties.

We believe that the remainder of this submission provides EPA with a sound rationale for a policy approach to PFAS use in our industry that assures environmental protection while allowing for targeted use of these chemicals in core processes that are essential for technological development.

### **Investigation of PFAS Use in Non-Photolithography Processes**

As we explained in our meeting with you on July 10, 2001, members of our industry were interested in determining whether PFAS materials were also essential materials in processes outside of photolithography. As a result, members of the SIA/SEMI coalition undertook the challenging task of surveying, on an expedited basis, the wide range of operations in our industry to determine the extent of PFAS use.

The results of this survey are described in **Appendix II**. As this narrative indicates, the survey required a large investment of time and effort by companies throughout the supply chain for these materials. While we were ultimately able to generate useful information, the efforts faced a series of challenges that limited the scope of what could be determined. We know that we do not have complete information about the use of PFAS in our industry. Consistent with the time constraints for this rulemaking that you have emphasized, however, we are providing the best picture available on the significance of PFAS for our non-photolithography operations.

Working with suppliers and ultimately 3M, the SIA/SEMI coalition was eventually able to identify some 15 applications where PFOS was probably being used.<sup>4</sup> Participating

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<sup>4</sup> While we initially set out to determine the use of PFAS in the industry, constraints on our access to confidential data meant that we were quite dependent on information provided to us by 3M. As a result, the information we have is best viewed as a characterization of the use of PFOS, rather than the broader class of PFAS chemicals.

companies rated the criticality of those applications to their processes and determined that approximately 6 were deemed critical. Only two of those applications –buffered oxide etch and low-K dielectrics – were of concern to more than one company. In both of these situations, the companies are actively searching for substitutes.

Based on this assessment, the SIA/SEMI coalition has decided that it will not seek a general exemption for any of these non-photolithography uses at this time. Clearly there are situations where PFOS is being used in a few critical applications. Most of these situations, however, involve the unique needs of individual companies. If a company is not able to meet its technological requirements with alternative materials, then it can address those concerns with EPA on a case by case basis, perhaps through the filing of a Significant New Use Notice.

If more than one company is unable to find effective substitutes for PFOS use in a critical application, then those companies may address those concerns with EPA at a later time. In addition, while our members have made best efforts to survey the industry's use of PFOS, we were limited by time and thus cannot guarantee that new information will not arise. **With those necessary understandings, the SIA/SEMI coalition is limiting its request for an exemption to targeted applications in the photolithography process at this time.**

### **Final Results of Our Analysis of Photolithography**

Over the last several months, we have reported to you on our efforts to survey the use of PFAS substances in the photolithography process and characterize the potential environmental releases from that process. This effort has yielded a model that was applied to a compilation of national data about the use of PFAS in North America in 2000. In **Appendix III** we are providing you with the final results of our modeling effort, along with a narrative explaining the technical parameters and assumptions in the model.

As you know, we have made several refinements in the model over the last six months leading up to this final report. The model was most recently submitted to EPA on August 15, 2001. We have appreciated the input from your staff in this effort, most recently in a conference call that took place on September 19, 2001. We believe that we have now addressed in the narrative all of the questions that the EPA staff posed.

Subsequent to the August 15 information submittal, the SIA/SEMI coalition has received additional information regarding waste management practices at semiconductor companies using TARC products. This additional information obtained from surveys conducted by SEMI indicates that approximately 35% of semiconductor companies dispose of TARC material spun off the wafer directly to wastewater rather than solvent waste. This change to the mass balance does result in a small change (16 kg) to the amount of PFAS that enters the wastewater discharge stream. While this does not represent a major change in the mass balance results, we have made appropriate changes to the model and the data summary presented in **Appendix III** to reflect this change. Facilities that reported discharge of TARC to wastewater are evaluating the feasibility of redirecting this waste stream to solvent collection or segregated disposal.

We believe that the results derived from the model, based on national data from 2000, enable several key conclusions to be drawn. First, most of the PFAS released from the photolithography process is contained in the solvent-based wastestreams that are incinerated. As we have indicated to you, these wastestreams are typically destroyed in high temperature rotary kilns.

The model indicates that approximately 319 kilograms (kg) of PFAS were released to wastewater in 2000 from photolithography processes. Importantly, most of this discharge is traceable to the presence of PFAS in developer. **As indicated elsewhere in this submission, members of our coalition have now completed work that will allow a transition to non-PFAS developers.** With that conversion, we expect a substantial decline in releases of PFAS to wastewater.<sup>5</sup> Using the data for 2000 as an indicator, such a conversion would reduce discharges to wastewater to approximately 56 kg. The model also indicates that the potential for releases of PFAS to the environment through other pathways, such as recycling, is very limited.

We have provided information to the Agency, most of which was submitted in our May 1, 2001 submission, demonstrating that our industry has stringent occupational controls preventing worker exposure to these substances. As indicated earlier, these measures, which are also required to meet rigorous product quality requirements, are standard operating procedures in our facilities. We have also explained in our past submissions that the PFAS moiety is not incorporated into our final products, again as a matter of maintaining product quality.

Taken as a whole, we believe that this information provides clear evidence that the use of PFAS-containing materials in the photolithography process does not yield significant releases of PFAS to the environment. **While the Agency has not specified how it is defining a “significant new use” in this rulemaking, we believe that under any reasonable interpretation of that concept these uses are insignificant.**

### **Rationale for an Exemption from the SNUR**

The SIA/SEMI coalition has made it clear throughout this rulemaking that it believes that an exemption from the SNUR is needed for certain targeted uses of PFAS materials in the photolithography process. As part of this conclusion, we believe that such an exemption for this industry is required by the legal standards in TSCA as applied to the record before the Agency.<sup>6</sup> We have provided a further elaboration of our legal arguments in this regard in **Appendix IV**.

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<sup>5</sup> It should also be noted that data submitted to EPA by 3M to Docket AR-226 on June 28, 2001 presents PFOS fate and transport information suggesting reduced environmental releases of PFOS from wastewater.

<sup>6</sup> In addition to the analysis provided in this letter, both SIA and SEMI have previously presented comments indicating that the proposed SNUR, as it applies to uses in the electronics industry, does not meet the legal standards of TSCA. See letter from Charles L. Fraust, Director, Environmental Health and Safety, SIA (December 29, 2000), and letter from Victoria D.

The threshold for a SNUR under Section 5(a)(2) of TSCA is a specific finding by the Administrator that the use of a chemical is a “significant” new use. In making this determination, EPA must consider all relevant factors, including the following:

- (A) the projected volume of manufacturing and processing of a chemical substance;
- (B) the extent to which a use changes the type or form of exposure of human beings or the environment to a chemical substance;
- (C) the extent to which a use increases the magnitude and duration of exposure of human beings or the environment to a chemical substance, and
- (D) the reasonably anticipated manner and methods of manufacturing, processing, distribution in commerce, and disposal of a chemical substance.

In the preamble to the proposed rule, EPA has not provided an explicit analysis for why it has decided to classify particular uses of PFOS as “significant” under TSCA. EPA’s analysis of the current situation indicates that PFOS substances are potentially toxic to humans, based on animal data, and have a tendency to persist in the environment and bioaccumulate in organisms. Yet these elements of EPA’s hazard concerns about PFOS do not directly address what uses of PFOS are responsible for the risks that the Agency perceives.<sup>7</sup> Certainly EPA has not made any findings that relate directly to the photolithography process in the electronics industry.

The SIA/SEMI coalition does not believe that available information can support a conclusion that the presence of PFOS in photoresists or ARC’s used in the photolithography process for electronic devices constitutes a “significant” new use of PFOS. Moreover, we do not believe there is a plausible scientific basis for assuming that such a link exists. As indicated above, SIA and SEMI have now completed a comprehensive survey of the use of PFAS materials in photolithography across North America and have modeled the potential releases to the environment using reasonable worst case assumptions. This analysis indicates the aggregate contribution of PFAS to the environment from photolithography uses is insignificant.

In addition, SIA and SEMI also do not see any significant potential for there to be localized impacts of concern. The applications of PFAS that we have focused on are broadly used in the industry so the aggregate amounts of PFAS coming from photolithography are

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Hadfield, Vice President, Public Policy and North America, SEMI (December 29, 2000); letter from McKenna & Cuneo on behalf of the photoresist industry (December 29, 2000); see also letter from Aimee Bordeaux, SEMI to Charles Auer, EPA (March 27, 2001).

<sup>7</sup> To the extent that EPA indicates what uses may be causing human exposure to PFOS, the Agency has emphasized that surface treatments and paper protection uses present the greatest potential for widespread human and environmental exposure. 65 Fed. Reg. 62326 (October 18, 2000).

distributed among many companies. The approximately 80 manufacturing facilities employing photolithography processes are geographically distributed. Likewise, the environmental management practices we have described, such as the incineration of solvent wastestreams, are broadly employed in the industry. These factors, coupled with the small aggregate amounts of PFAS released to the environment from photolithography, indicate that any significant concentration of PFOS releases from such sources in a particular locality is very unlikely.

**In summary, EPA has not made or supported any specific findings that the use of PFAS materials in the photolithography process could plausibly account for the widespread presence of PFOS in humans or wildlife that is the impetus for this rulemaking. Based on the information that SIA and SEMI have now assembled and presented, the Agency has affirmative evidence that the environmental releases attributable to photolithography process are insignificant.** In light of this evidence, the Agency may no longer sweep this industry into a broader presumption that all uses of PFOS are significant new uses under TSCA.<sup>8</sup>

### **Chemicals Affected by the SNUR**

On several occasions, you have asked the electronics industry to identify, by CAS Number, specific chemicals in the SNUR that the industry is using and will need to use in the future. As we have indicated, answering that question can be difficult and ultimately does not affect substantially the potential release of PFAS materials to the environment.

The model we have presented to the Agency was designed to track the flow of PFAS-containing substances through the photolithography process and to indicate the sum total of the PFAS chemical moieties that would be released from that process. The results do not change significantly depending on the specific chemicals used in the process. In theory, the PFAS in the model could originate from one substance or some distribution of all 90 chemicals listed in the SNUR. From a policy and legal perspective, therefore, there is no strong reason to limit an exemption for photolithography to particular chemicals.

As a practical matter, the industry is not currently using all 90 of the chemicals listed in the SNUR. At the same time, however, it is difficult for our industry to specify what chemicals are essential for photolithography for at least two reasons. First, the original manufacturers of

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<sup>8</sup> In addition, under the Administrative Procedure Act, EPA must establish, through the rulemaking record, that there is a rational relationship between the operations of potentially regulated parties and the assumptions underlying the policy and technical framework for a rule. See Edison Electric Institute v. United States Environmental Protection Agency, 2 F.3d 438 (D.C. Cir. 1993) (remand of hazardous waste classification under RCRA as applied to mineral processing for failure to respond to submitted factual data showing that waste mismanagement scenario assumptions were inapplicable.)

the PFAS moieties have often treated the identity of their chemicals, certainly at the CAS level of specificity, as confidential business information. The Material Safety Data Sheets (MSDS's) that accompany the products we use often mask the chemical identities or explicitly claim those identities as trade secrets. In some cases, the quantities of PFAS materials in a product may be so small that disclosure of the substance's presence may not be required under MSDS requirements. Thus, it can be quite difficult for the users and makers of photoresists and ARC's to know precisely the identity of a PFAS moiety in a formulation.

Second, individual companies will often need some flexibility to tailor their photoresist and ARC formulations to unique product and process needs. As technologies develop over time in the industry, companies will be developing their own approaches for developing advanced electronic components through efficient processes. Some degree of flexibility is needed in the selection of process materials to allow these innovations to occur.

Recognizing these problems, the SIA/SEMI coalition has discussed how we might be responsive to your request in this regard. Accordingly, we have developed an approach that goes as far as we believe possible to narrow the list of SNUR chemicals needing an exemption in our industry. **We have conducted a technology assessment to determine which of the listed SNUR chemicals would not logically be used as an intermediate or component of a material in our industry.** As an example, we have identified substances on the SNUR list that contain chemical moieties that we would view as contaminants to the product, and thus inappropriate for our applications. Chemicals falling into that category are listed in **Appendix V**. Our members do not believe an exemption for our applications needs to include these chemicals.

### **Recommended Regulatory Exemption**

The SIA/SEMI coalition has developed specific regulatory language to implement the exemption that it believes is appropriate for photolithography. The specific language is presented in **Appendix VI**.

The intent of our proposed language is to define an exemption with the following scope:

- It would apply only to a subset of the proposed SNUR list that may be important for use in photolithography.
- It would apply only to SNUR chemicals used as components of photoresists or ARC's, or as intermediates used to produce those materials.
- The photolithography process would be explicitly defined to distinguish it from other stages of electronic device manufacture.
- The exemption would encompass photolithography processes used in manufacturing of semiconductors and other electronic devices (e.g., disk drives), since the processes

are identical and we have factored those processes into the data we have submitted to EPA.

- The exemption does not include developer or polyimide, two inputs to the photolithography that we have previously identified.<sup>9</sup>

### **Additional Regulatory Issues on the SNUR**

Assuming EPA decides to proceed with an exemption similar to the one outlined above, the SIA/SEMI coalition offers its view on two additional topics that have been raised during this rulemaking. First, EPA correspondence has expressed some concern about an exemption covering intermediates that might be used to produce other critical industrial materials. Specifically, you have expressed “enforcement concerns” about the Agency’s ability to assure that an intermediate, once produced, will only be used in production of chemicals destined for specific downstream uses.<sup>10</sup>

As a general matter, SIA/SEMI does not believe that EPA should hold such a concern with our industry. The marketplace for supplying materials to the photolithography process in the U.S. is a relatively limited one, characterized by a manageable number of suppliers and device manufacturers. Monitoring compliance at these facilities should not present difficulties for EPA. Moreover, the companies in this industry have a strong record of environmental stewardship, supported by effective compliance assurance programs. Thus, EPA can presume that there will be high compliance rates in the industry with the SNUR and any other environmental requirements.

If EPA nonetheless believes that the incorporation of intermediates into the exemption requires special regulatory measures, then we think that there are models for effective requirements that EPA should consider. Specifically, EPA should consider some of the measures that the Agency has routinely used in TSCA Section 5(e) orders to place restrictions on distribution of products that are subject to particular controls. For example, the Agency could require that a company using a chemical as an intermediate obtain from its customers a certification that the final product will be limited to the applications authorized by the exemption.

A second issue has arisen about the applicability of TSCA’s export requirements to chemicals covered by the SNUR. Under TSCA the export controls set forth in 40 CFR Part 707

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<sup>9</sup> As indicated elsewhere in this submission, members of our coalition are taking the steps necessary to phase out use of the PFOS moiety in developer, removing the necessity for an exemption. We have also received some evidence that the PFOS moiety may be present in some polyimide formulations. The companies responsible for this use are not pursuing an exemption from the SNUR so we have assumed that the PFOS moiety is being phased out of the product.

<sup>10</sup> Letter from Charles M. Auer, EPA, to James E. Downes, Solutia (June 26,2001).

apply to chemicals that are subject to rules issued under Section 5, including SNUR's. These regulations do not explicitly address the question of a use that is exempted from a SNUR. We believe the logic of the regulations and the underlying statute would indicate that there is no need to notify a foreign government about the export of a chemical for a use that has been explicitly exempted from a SNUR. We ask EPA to confirm that export notification would not be needed under the SNUR for exports destined for exempt uses.

### **Approach to New Chemicals**

As we have explained in previous submissions to the Agency, technological innovation is essential to any company in the electronics field. Innovations in our industry will necessarily require access to new performance chemicals. Due to the special properties of chemicals in the PFAS family, it is likely that PFAS chemistries will be necessary to achieve certain technological objectives.

We are concerned, therefore, about how the TSCA new chemical program addresses chemicals that contain a PFAS moiety. We are generally aware of situations where EPA has reviewed pre-manufacture notices (PMN's) and low-volume exemptions (LVE's) for higher homologue PFAS chemicals and rejected the chemicals because they are viewed as "persistent, bioaccumulative and toxic" chemicals. We are aware of other situations where EPA has accepted LVE's for lower homologue PFAS chemicals with a stipulation that the LVE might be withdrawn in the future.

It is extremely important to our industry that EPA establish a predictable risk-based framework for the evaluation of new chemical substances that contain a PFAS moiety. We believe that the data and model that we have developed for purposes of the SNUR provide a reasonable foundation for assessment of chemicals used in the photolithography process.

**Since the model provides a framework for overall use of PFAS-containing materials in photolithography, there is no reason to limit its use to the SNUR chemicals.** It is equally relevant to new chemicals that may be used to substitute for existing materials in that process. Moreover, the predictions of environmental releases generated by the model are grounded in the process itself and the general waste management practices that can be expected for particular types of wastestreams. Substitution of a new chemical for an existing material would not materially alter the basic algorithms or results of the model.

As the model indicates, there is no reason to expect significant releases of PFAS moieties from the photolithography process when the PFAS-containing materials are limited to photoresist and ARC applications. We believe these facts provide an ample basis for the granting of LVE's that are limited to photoresists and ARC's.

In its discussions with the Agency, the SIA/SEMI coalition has made this point several times. EPA has not addressed our concern directly. Agency staff have expressed the view that new chemical review is a process that is separate from the SNUR now under consideration. At

the same time, EPA has indicated that it wants to achieve a consistent approach to PFAS under both its new and existing chemical programs.

We believe that it is time for EPA to clarify the policies it will employ in the new chemical program to evaluate PFAS-containing substances in the photolithography processes of the electronics industry. **Specifically, the SIA/SEMI coalition asks EPA to establish a written policy on how it will approach PMN's and LVE's for these uses.** We ask EPA to move forward to articulate such a policy, based on the model results we have submitted, as soon as possible. If EPA believes that the new chemical context raises special concerns that differ from the issues addressed in the SNUR, we ask that the Agency explain those concerns to us and establish a process for addressing those concerns.

For us, time is of the essence on the new chemical issue. We know that LVE's that could be critical for our industry are not being accepted by the Agency. In many ways, this result is the most immediate, detrimental effect on our industry that has resulted from EPA's expressed concerns about PFOS. We have appreciated the opportunity to consult with you and your staff on the technical and policy issues related to the SNUR. It is now important to have an effective dialogue on the implications of what we have presented to you for new chemical reviews under TSCA. The urgency of this issue to our industry requires that we take all necessary actions with EPA and the Administration to achieve a prompt resolution of our concerns.

### **U.S. Position in International Deliberations Concerning PFOS**

We understand that at the same time EPA issued the PFOS SNUR Proposal in October of 2000, the Agency also initiated and led an effort to develop a risk assessment of PFOS through the OECD.<sup>11</sup> We further understand that this assessment may be near completion, and that other OECD countries have not yet taken any regulatory action with regard to the PFOS compounds. Our concerns regarding international activities on PFOS are two-fold:

"U.S. Only" Restrictions On Critical PFOS Uses. With the very short phase-out period proposed in the PFOS SNUR, EPA has moved the United States out ahead of other countries around the world. Yet, the proposed SNUR does not attempt to assess the potential disparate impact such early unilateral action by the United States might have on U.S.-based industries and manufacturing operations. In this regard, the proposed PFOS SNUR would seem premature and arguably also inconsistent with the OECD's more recent observations regarding any phase-out of the PFOS compounds.<sup>12</sup>

<sup>11</sup> See generally, "OECD Meetings Agrees To Expand Evaluation Of PFOS Environmental Threats", BNA Daily Environment Report, No. 224, A-6 (Nov. 20, 2000).

<sup>12</sup> See "Existing Chemicals Programme Progress In The Assessment Of Perfluorooctanyl Sulphonate (PFOS) And Related Chemicals", OECD 97486, ENV/JM/RD (2000) 20 (Nov. 7, 2000) (recognizing foreign production facilities, the significant implications associated with the loss of PFOS specialty uses where adequate alternatives do not yet exist, and the difficulties in gathering all relevant information associated with PFOS uses).

If the proposed SNUR goes forward and our exemption request is denied in whole or in part, the U.S. semiconductor industry would be placed at a significant competitive disadvantage as compared to its foreign competitors. As noted in Appendix I, the effectiveness of the photolithography process determines our ability to meet the demand for increasing miniaturization of electronic components. Similarly, if our request that the same risk-based framework underlying the proposed SNUR exemption be applied to review of new chemicals is not granted, we will risk losing our leadership in the semiconductor industry. Unable to keep up with technology developments, U.S. manufacturers simply will not be able to compete effectively against Asian or European manufacturers.

Narrower Exemption For Critical Uses Overseas. Most of the PFOS production and manufacturing capacity is located in the U.S. However, as EPA knows and as the OECD has recognized, there are PFOS producers overseas. Moreover, a number of SIA members own semiconductor manufacturing plants in Europe and/or Asia. If our SNUR exemption request and proposal for handling new PFOS chemicals are approved, but foreign regulatory authorities are more stringent in regulating our critical uses, such action could significantly hurt our global business. As noted earlier, we are a global business engaged in the perpetual development of new products. Notably, the OECD effort (i) has recognized the need to protect critical uses; (ii) encouraged the sharing of information on PFOS among OECD members; and (iii) is committed to the joint development of an initial risk assessment.<sup>13</sup> The OECD also has made it clear, however, that individual member countries are engaging in their own regulatory and pre-regulatory activities.<sup>14</sup> In this regard, we are concerned that our industry may be swept into a broad foreign PFOS ban that fails to recognize the minimal environmental impact from our critical photolithography uses.

Given EPA's leadership in the OECD efforts and its knowledge of our industry, the SIA/SEMI coalition requests assistance from EPA to ensure that our critical uses in photolithography are preserved both in the U.S. and internationally. **Specifically, if OECD members decide to restrict the manufacture or use of PFOS, we respectfully request that EPA use its influence to help ensure that the same photolithography exemption for existing and new PFOS uses that we have proposed in this document also is obtained in foreign markets.**

## Conclusion

For all of the legal and policy reasons explained in this submission, the SIA/SEMI coalition believes that if EPA proceeds with a PFOS SNUR, then the Agency must exempt from the regulation the specific photolithography uses identified in this submission. We have limited

<sup>13</sup> Id. at 4 and Annex I.

<sup>14</sup> Id. at p. 3.

this exemption request to the two most critical applications for our operations – photoresists and ARC's - and have made a good faith effort to limit the range of chemicals to which the exemption would apply. We believe this request is very reasonable in light of the limited nature of EPA's statutory authority and the sound technical basis for the exemption set forth in this submission.

In addition, the SIA/SEMI coalition believes it is essential for EPA to issue a written policy to guide the TSCA new chemical program's approach to this class of chemicals. We believe that this policy should allow for the granting of PMN's and LVE's that are limited to the two uses covered by our proposed SNUR exemption. We also ask that EPA provide leadership in international deliberations to assure that U.S. industry can continue to use PFAS materials in critical applications for photolithography.

We appreciate OPPT's attention to the information that we have provided as a supplement to our comments. We also look forward to our meeting with you on October 10, 2001 to discuss these issues. Please let us know if we can provide any further information on these matters.

Very truly yours,

Stephen Harper  
Co-Chair, SIA/SEMI PFOS Committee

Greg Dripps  
Co-Chair, SIA/SEMI PFOS Committee